Urban Water Management and Market Environmentalism:

A Historical Perspective for Barcelona and Madrid

Hug March Corbella

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Direcció: Dr. David Saurí Pujol

INSTITUT DE CIÈNCIA I TECNOLOGIA AMBIENTALS (ICTA),

FACULTAT DE CIÈNCIES

DEPARTAMENT DE GEOGRAFIA,

FACULTAT DE FILOSOFIA I LLETRES

UNIVERSITAT AUTÒNOMA DE BARCELONA

Universitat Autònoma de Barcelona

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Memòria realitzada per Hug March Corbella, sota la direcció del Dr. David Saurí Pujol, del Grup de Recerca en Aigua, Territori i Sostenibilitat (GRATS) del Departament de Geografia de la Universitat Autònoma de Barcelona, per optar al grau de Doctor en Ciències Ambientals.

HUG MARCH CORBELLA DAVID SAURÍ PUJOL

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Introduction

Initial considerations, objectives and methodology

Water is a basic need for humans and represents an essential component for the functioning of the biophysical world. At the same time, however, water is conceived as an economic good that can be subjected to economic laws. This tension has historically led to conflicts and social struggles for an equitable access to the resource. Cochabamba in Bolivia is one of the places where social tension crystallized under the form of a violent struggle for the access to water. In England, after the full divesture of the water companies, cut-offs of the service were not uncommon among low-income families. At the beginning of the 1990s, popular neighborhoods in Metropolitan Barcelona engaged in a revolt to avoid paying what they saw as excessive taxes on their water bills.

Water is also a political tool that may be used to unite and articulate territories. It could be employed for the opposite as well, in order to exclude and confront. In the Gaza strip wells do not provide water in enough quantity and quality; the State of Israel is allegedly pumping at a faster rate the same aquifer.

In Spain, the 20th century has been the century of the 'wet dreams' of Francisco Franco, inspired by the *Regeneracionismo* of Joaquín Costa. While during Franco's rule water was one of the main elements to construct a National cohesion, under democracy, this element has confronted territories, and the concept of *solidarity* has been hijacked to serve as an electoral tool.

The conceptualizations of water are multiple, stretching from two molecules of hydrogen and one of oxygen, to a sacred flow, or to an essential element for the correct functioning of human metabolism. These meanings could be contradictory in nature or could develop in different layers, coexisting in the same society.

To say that water has been historically, (and especially since the Industrial Revolution and Capitalism under Classical Liberalism), a critical element for the production process in various ways is, of course, rather obvious. However, water, as well as the environment in general, is increasingly imagined as a source of revenues

per se under Neoliberalism. The *Environment* is not only constituent, but also constitutive of the Neoliberal project, as environmental fixes are created to solve the endemic problem of un-sustained economic growth. Once space has been annihilated by time, as Karl Marx argued, the hegemonic economic system colonizes the environment (and environmental discourses) to tear down the few still-existing barriers for the unfettered accumulation and reproduction of capital. This is what we call the neoliberalization of the environment.

These trends however, oscillate between homogenization and differentiation, so the articulation and the outcomes of such processes are sometimes unexpected and contradictory. And this is why case-related research is essential: to confront different types of neoliberalization, their genesis and their development, and to analyze what are the differences and the common trends.

In the case of water, historic and geographical contingencies are critical to understand the multifarious and subtle ways by which global economic regimes coalesce with local and regional discourses, materialities and practices, to produce a particular model of governance.

As we will see, in Madrid, the state-owned *Canal de Isabel II*, supplying the city (and latter the region) since mid 19th century is expected to be partially privatized. Environmental needs are presented as the triggers of this process, similarly to what happened 20 years before in England and Wales. Hence, the environment is constitutive of the turn on water governance in the capital of Spain. Meanwhile, in Barcelona the debate is not centered in privatization, but on the shift of the decisional and power locus over the urban water cycle: from Barcelona to Paris. In this city, neoliberal mechanisms are more entrenched, and the choreographies of power over the water cycle more complicated as a result of the uninterrupted private control over the urban water flow by the *Societat General d'Aigües de Barcelona* (later known as AGBAR) since the mid 19th century.

Objectives and research questions

By focusing our attention on urban water in Madrid and Barcelona, we will 'flow' through the history of the urbanization of the modern and centralized water systems in the second half of the 19th century until the recent days. For us, urbanization of the water flow means the process of mobilization of water resources to keep pace with urban growth. Although with very different trajectories, especially regarding ownership and management, Madrid and Barcelona allow us to inquiry why and how two models of management (and of governance) have differed in their development, and also permits to question whether this differences are still of note or, on the contrary, have vanished into a convergence of governance systems.

In Barcelona the private company AGBAR (under various other names) has been supplying the city for the last 140 years. In Madrid, the state-owned *Canal de Isabel II* has controlled the integral water cycle of the city (and latter of the region) since its foundation in the mid 19th century. However, the ongoing process of privatization of the Canal de Isabel II and the takeover of AGBAR by Suez could completely change this picture.

In this dissertation, we want to test whether we can find common patterns of the neoliberalization of the management of water and governance in the recent years in the two case studies.

Our objectives could be summarized as follows:

- To develop a framework for the analysis of the neoliberalization of environment resources
- To establish a framework to analyze the multiple forms of water privatization
- To reconstruct the urbanization of water in Madrid and Barcelona since the constitution of their modern water suppliers (circulation of water)
- To trace the changing choreographies of power regarding the control of water resources in Madrid and Barcelona (circulation of power and capital)
- To observe how new technologies and drought discourses shape water politics

- To check how the Neoliberalization of the environment and market environmentalism applies to each case

To fulfill such objectives we will use the theoretical approach on the Neoliberalization of the environment furnished by Urban Political Ecology. The circulation of the water and capital through the built environment, as well as on the production of natures to keep pace with urban water metabolism and foster capital accumulation, will be the locus of our research.

Ecological modernization, market environmentalism, and the change in water management paradigms, are affecting both urban areas. New technologies of water production and the discourses on water scarcity are shaping 21st century water politics and policies. This dissertation is ultimately intended to show whether convergences (or divergences) on water governance in Madrid and Barcelona are happening (or not) under the umbrella of a common regulation environment, both at the European level (European Water Framework Directive, Wastewater Treatment Directive, etc.) and at the Spanish Level (*Ley de Aguas*).

Authors such Karl Marx, Karl Polanyi or David Harvey will provide basic arguments for our analysis. However, Focauldian and Gramscian perspectives will be also used. Critical Geography literature, especially authors working on theme of the Neoliberalization of the environment will be essential for our work, especially in the first three chapters. At the same time, we will also draw on the literature examining the dominance of the market over environmental governance.

Our contribution pretends to fill a number of gaps in the literature on Neoliberalism and the Environment, challenge some assumptions, and provide empirical work that in turn could inform theoretical debates.

In order to achieve such objectives, the following specific research questions are formulated:

- Is the literature on Urban Political Ecology and Critical Geography consistent enough to explain recent changes in the governance of environmental resources, and specifically of water?
- Which are the arguments backing a major presence of market principles and market mimicking techniques in the management of the biophysical world?

Is, in the case of water, environmentalism coalescing with free market rhetoric?

- Which historic-geographical contingencies have shaped the urbanization of the water supply in Barcelona and Madrid since the mid 19th century?
- Why attempts to municipalize the water supply in Barcelona failed? Why attempts to break the public monopoly in Madrid did not prosper?
- Is there a convergence in the governance model of water in both areas under common environmental neoliberalization trends?
- To what degree scarcity has been constructed and how these discourses have circulated through society? Are these discourses legitimating the enlargement of water footprint? Do they serve to push forward the barriers for capital accumulation?
- Are there tensions between discourses and practices in water management?

Structure of the Thesis

The thesis is divided in 9 chapters organized in three main parts.

Part 1 includes the theoretical framework that will contextualize and set the basic concepts and tools to proceed with the empirical cases. This part is composed of three chapters.

In **Chapter 1 (Neoliberal Environments?)**, we review the main tenets of the Critical Geography literature on Neoliberalism and environmental change. The political economy as well as the temporal and geographical expansion of Neoliberalism during the 20th and 21st century is presented. This serves us to contextualize the current debate in Geography on the hybridity of the neoliberal model and their multiple and somewhat contradictory manifestations. All this discussion will lead us to the forms that the neoliberalization of the environment may take and the changes regarding the governance of the human and non-human biophysical world. Privatization, commodification, commercialization, or corporatization, among other processes will be presented. We will also examine how environmental and neoliberal discourses may coalesce to shape and give form to the hegemonic environmental paradigms at the turn of the 21st century: market environmentalism and ecological modernization.

While in the first chapter we have focused on environmental resources in general, in **Chapter 2 (Why water? History of the urbanization of the water flow and its unique characteristics)** we turn specifically to water. First, we present the specific characteristics, and the material and discursive singularities of water supply. Economic concepts such as natural monopoly or merit good will be introduced, and, at the same time, we will engage in the discussion of whether water is better conceptualized as a human right or as a common resource. We will trace the general steps of the urbanization of the water supply since the 19th century, going through the legal and institutional changes in the management and governance of the resource, including the changing choreographies of power over the water cycle, through the discourses and paradigms of management. The turn from the hydraulic paradigm, based on engineering, to a supply-side management, where economic discourse dominates, will let to finally analyze how the trends towards the neoliberalization of

the environment and the prevalence of market environmentalism and ecological modernization discourses have shaped the governance of water flows.

This will serve us as an introduction to **Chapter 3 (The debate on water privatization)**, where we will summarize the ongoing debate around private participation in the water cycle. First, we will review the arguments fostering privatization. Private participation in the water cycle may adopt different forms and degrees of involvement, stretching from residual participation in non-core functions to the full-divesture of the service, as in the English and Chilean. Private participation in the water sector has a remarkable trajectory. This will allow us to review the outcomes of the privatization processes of the late 1980s and 1990s. Such history is ridden with successes but also with failures. In the last section of the chapter we will present the counterarguments to the private participation in the water supply and sanitation services as well as the alternatives to such arrangements.

In **Part 2** we will use the case studies of Barcelona and Madrid to elucidate on the one hand, the trajectory of the urbanization of the water supply in both cities, and, on the other hand the current discourses and debates on water management.

Chapter 4 (The urbanization of the modern water supply in Barcelona) presents the history of the urbanization of the water supply in Barcelona from the mid 19th century until the end of the 20th century. One of the main features of the chapter will be the public-private debate at the end of the 19th century, and the repeatedly failed attempts to municipalize the service at the beginning of the 20th century that will eventually lead to the private monopoly of water supply. Along these lines, we trace the progress of the physical infrastructure and the search for water resources beyond the urban limits to keep pace with the intense urbanization of the second half of the 20th century. The chapter will also review the evolution of the discourses around drought and quality problems of the water supply in Barcelona at the end of the 20th century. As we will see, these discourses will deeply shape and influence water politics and policies in Barcelona.

As an example of how water scarcity has been a key driver of Barcelona water politics, in **Chapter 5 (Drought, desalination and suburbanization in Barcelona)** we will focus on the drought episode the Metropolitan Area of Barcelona during 2007 and 2008. The particularity of our account lies in the fact that we not only

analyze the materiality of the episode, but we also attempt to deconstruct the discourses surrounding drought that appeared in the media. Previously, however, we offer a brief section on the recent urban trends in the Barcelona Metropolitan Region. Suburbanization has dramatically advanced since the 1980s, bringing about new uses of water that have deepened the uneven geography of urban water metabolism in the region.

The production of scarcity through the suburbanization of the urban fabric combined with circulation through society of discourses constructing drought as something permanent has been fuelling the quest for new resources at the beginning of the 21st century. Desalination, surrounded by a wide consensus, emerges as a technology to solve the "water problem" of Barcelona forever. We will see although that this theoretical hegemony will be challenged and that the "water problem" of Barcelona is far from being solved.

Chapter 6 (The economic geography of water supply in Barcelona and beyond, or how a local water firm becomes a transnational company) investigates, how a local private water company, the *Societat General d'Aigües de Barcelona*, born in the second half of the 19th century, has become a multinational company, AGBAR, supplying water to over 30 million people across the world. We will also analyze both the diversification strategies, stretching from the health sector to the environment, and the internationalization of the company, including the Latin America experience and the more recent Chinese expansion. Power geometries within the company have changed along these 140 years. We will conclude the chapter, turning back to the local scale and analyzing how the last reconfigurations could affect the entire metropolitan water supply and accelerate the private participation in the water cycle of Barcelona.

In the following two chapters we will turn our attention to Madrid, and trace the urbanization of the water in this city in the last 150 years. In **Chapter 7 (The Canal de Isabel II: a history of the public supply and the urbanization of water in Madrid)**, and similarly to Barcelona, we will review the early debates on the nature of the urban water supply. In this case, however, the history will be the other way round. The state-owned *Canal de Isabel II* would hold monopoly of supply, and will resist multiple attempts by private capital to hamper public control of the water flow.

In parallel to these debates, we will present the evolution of the physical infrastructure of water supply in Madrid since the constitution of the *Canal de Isabel II*. The impressive magnitude of the works belittles the water system of Barcelona. The urbanization process, however, shows that the metabolic needs of urban Madrid are higher than those of Barcelona, and, despite having higher water availability, scarcity also looms large.

The Canal de Isabel II has also suffered important organizational changes during the last 150 years. The reconfiguration of the firm in the 1980s enhanced its corporatization and also its diversification and internationalization. With presence in Latin America and Asia, the Canal could be seen as a multinational company, resembling AGBAR in many ways.

An important feature still differentiates the two water suppliers: ownership. This public-private dichotomy, however, could soon fade away due the privatization process currently taking place in the Canal de Isabel II. In **Chapter 8 (Water privatization in Madrid?)** we present the recent debate on the privatization of water in Madrid in the context of the neoliberalization of governance in this region.

With this chapter the empirical part ends, and we will proceed with **Part 3,** where we will present the conclusions (**Chapter 9).**

Theoretical and methodological concerns

In what follows we present the methodology used to respond to the objectives and research questions of this dissertation. Our methodological review, however, necessitates first the clarification of several important ontological and epistemological concerns.

Ontological concerns: conceptualization of nature and society

> "[…] in a fundamental sense, there is nothing *unnatural* about New York city" (Harvey 1996:186)

During the course of history, different meanings of "nature" have accumulated and articulated in the different scientific views on the subject. Most of these views convey an essential dualism: nature as external and nature as universal, or, in other words, nature as something pristine and pre-human and nature as something intrinsically bounded to society. In the work of Cicero, *De Natura Deorum*, emerges the concept of 'second nature', comprising "those societal institutions which facilitate and regulate the exchange of commodities, both directly and indirectly" (Smith 1984:45), that is,, the nature produced by human activity, in opposition to the non-human inherited world. According to Smith (1984) to understand the relation between the first and the second nature, Marx's exchange value has to be introduced. Nonetheless, it is the same Smith who notices and underlines the increasingly inoperability of this distinction: "the production of first nature from within and as a part of second nature makes the production of nature, not first or second nature in themselves, the dominant reality" (p.58) due to the capacity of capital to produce the material world according to its own image.

As Neil Smith points out, in the foreword of Heynen et al. (2006), the environmental movement reproduces this binary separation conceiving nature and society from the start as separate entities. This author denounces that "capitalist societies externalize nature to an unprecedented extent (even as they internalize it in the commodity form)" (p.xii). In other words: under capitalism, commodity relations conceal the multiple socio-ecological processes of domination, subordination, exploitation and

repression that foster the urbanization process. This process converts the city into a metabolic organism that stretches far beyond its borders making the socio-ecological footprint global (Kaika 2005). Smith (1984) traces back to Kant (and also to the Judeo-Christian intellectual tradition) the origins of such dualism: Indeed, the contemporary bourgeois ideas are built upon philosophical dichotomies such as mind and nature or culture and nature. Francis Bacon, one of the deacons of modern science, made popular the idea of mastery of nature through the use of the scientific method, assuming an abstraction from the social context of the events and objects. Thus from Bacon onwards, science treated nature as external.

Regarding the Social Sciences, Adam Smith, Malthus, Ricardo, Mill, and others, saw nature as the source of value, and therefore, nature was converted in an external factor as well. Against this, Karl Marx attempted to reconcile nature and history, and realized the ideological importance of universal nature. However, Marx used nature in a variety of ways. Still, some authors, among them Smith (1984), recognize in Marx certain influences of the dominant dualist conception, especially in Marx's later work. Marx's conception of Nature has been thoroughly researched by Alfred Schmidt (1971) with The *Concept of Nature in Marx*.

Neil Smith (1984), attempting to avoid the concept of domination of nature and in order to make reference to a much more complex process, coined the term *Production of Nature*: "where the 'domination of nature' argument implies a dismal, one-dimensional, contradiction-free future, the idea of the production of nature implies an historical future that is still to be determined by political events and force, not technical necessity" (p.31). In this sense, he views the development of the material landscape as a process of social production of nature, shaped by the accumulation and the expansion of economic development. The author, however, makes the distinction between the production and the control over nature, as the former concept refers to some extent to an unexpected outcome of the production process. The main question according Smith (1984) is: "*how* we produce nature and *who* controls this production of nature". This statement will guide and inform our inquiry along this dissertation.

Following Bruno Latour's (1997) critique of purifying rituals that have plagued modern science since the Enlightenment, Swyngedouw (2004) argues that we have entered to an era where it is becoming increasingly apparent that things 'natural' and

things ‘cultural’ do not exist side by side as the two opposite poles of a dialectical unity.

David Harvey most well known work deals with the ‘socio-spatial dialectic’. Some fragments of his discourse appear to ignore the non-human world, thus reproducing the separation into the two ontological domains, as Latour (1997) denounced in *Nous n’avons jamais été modernes* [We have never been modern]. Nevertheless, *Braun* (2006) contends that this criticism could induce to overlook or miss a key aspect of Harvey’s thought. According to Braun (2006) “Harvey argues that the production of space cannot be though *independently* from the production of nature” (p.192) and criticizes dualist conceptions of nature, i.e. ‘external nature’; to justify such statement, the author makes reference to one paragraph by Harvey in the book *Justice, Nature and the Geography of Difference*

> “Since spaces, times, and places are relationally defined by processes, they are contingent upon the attributes of processes that simultaneously define and shape what is customarily referred to as ‘environment’” (Harvey 1996:263)
>
> “Certainly, the idea that spatio-temporality can be examined independently of the processes evoked in environmental and ecological work cannot be sustained. From this perspective the traditional dichotomies to be found within the geographical tradition between spatial science and environmental issues, between systematic and regional (place-bound) geographies appear totally false precisely because space-time, place, and environment are all embedded in substantial processes whose attributes cannot be examined independently of the diverse spatio-temporalities such processes contain. The implications for the philosophy of geographical thought are immense…” (Harvey 1996:263-264)

As we quoted in the beginning of the section, “there’s nothing unnatural about the city of New York” (Harvey 1996). This assertion challenges the assumption of an external nature and the so-called ‘fetishization’ of nature (Smith 1996). After Harvey (1996:147) a ‘natural resource’ could be defined as a “cultural, technical and economic appraisal of elements and processes in nature that can be applied to fulfill social objectives and goals through specific material practices”.

Regarding natural scarcity, or ecoscarcity, Harvey displays a clear anti-Malthusian stance, rejecting the idea of a world made up of immutable natural laws to which humanity must succumb:

> "[w]hat exists 'in nature' is in constant state of transformation. To declare a state of ecoscarcity is in effect to say that we have not the will, wit, or capacity to change our state of knowledge, our social goals, cultural modes, and technological mixes, or our form of economy, and that we are powerless to modify either our material practices or 'nature' according to human requirements. To say that scarcity resides in nature and that natural limits exist is to ignore how scarcity is socially produced and how 'limits' are a social relation within nature (including human society) rather than some externally imposed necessity" (Harvey 1996:147).

Braun (2006) puts together the two competitive strands that emerged out of Marxism concerning nature: "those who seek to extend the insights of historical materialism to questions of the environment, and thus understand 'nature' as itself and effect of historical forces (i.e. Harvey, Smith), and those who accept nature's externality and seek to 'renovate' Marxist theories of economic crises so as to take external nature (i.e. natural limits) into account" (p.197). Among the later we can mention so-called eco-Marxists such as James O'Connor, Ted Benton, John Bellamy Foster and Elmar Altvater.

Briefly, "while bourgeois ideologies imagine an external nature prior to politics, Harvey reveals the need for a *political theory* of nature" (Braun 2006:201), or in other words, to focus on how the future is going to be produced and the consequences of the human and non-human world: In other words, Nature is above all a product of History.

From the core of Critical Geography several observations have been made to the production of nature thesis presented by Neil Smith and also developed by David Harvey. On the one hand, criticisms have focused on the economic-centered and reductionist understanding of nature's production. In that sense, Smith ignores the heterogeneous cultural practices contributing to the transformation and production of social natures (Haraway 1997, Braun 2006). On the other hand, this conception is accused to be deeply anthropocentric as it places human action at the centre of nature's dynamic story, therefore risking to reproduce "the same *Promethean or instrumental* relation to non-human nature that at other points he places at the feet of capitalism and its relentless pursuit of profits" (Braun 2006:202).

Furthermore, Bruno Latour argues that dialectics is too simple a method to understand the multiple and heterogeneous process that make up the environment (Latour 2004). For this author nature in particular or society in general does not exist.

Rather we have a series of hybrid networks constituted of non-human and human *actants* held together for short or long periods of time.

In her account of the process of water urbanization in Athens, Maria Kaika (2005) traces the evolution of the discourses on nature and the urban process that reflects this hybridity:

> "in the 19th century, nature was awesome and threatening, and impediment to urban development; in the 20th century, the once tamed nature again becomes discursively constructed as vengeful and threatening, a potential impediment to progress. However, 21st century nature is no longer pristine, wild, whimsical nature that must be tamed and conquered through progress; rather, it is a socially constructed hybrid, the outcome of intense interaction between human beings an the natural environment" (Kaika 2005:142)

These conceptions of nature and society have a translation in the environmental discourse. In that sense, Hajer (1995:17) argues that "environmental discourse is time- and space-specific and is governed by a specific modeling of nature, which reflects our past experience and present preoccupations".

Urban Political Ecology

In our research we will approach the relation between environmental change, and political, economic and cultural factors through the lens of Urban Political Ecology. Heynen et al. (2007) attribute to political ecology the duty to disclose how political discourses of environmental change are enrolled in political and economic momentum for enclosure, control, and reworking of socio-natures. In other words, by disclosing new urban political ecologies, we open the possibility to create the new urban environments we would like to live (Swyngedouw 2006).

Cities, following the bourgeois separation of nature and culture, have been historically seen as the opposite to nature, ecology or the environment. Nonetheless, the emerging field of urban political ecology operates under the assumption that urbanization is not a separation of human life from nature, but rather "a process by which new and more complex relationships of society and nature are created" (Keil 2003:729). Keil (2003) emphasizes the scalar nature this complex relationship: "urban-nature relations are now increasingly constituted at various scales of the globalization process as natural relations and urban social relations are produced

through complex processes of 'glocalization' and entangled in myriad flows of capital, things, and people" (p.729). More and more processes of urban-nature relationships have been rescaled and redefined, bringing the local into more direct relations with socio-natural processes far beyond their reach. Keil suggests that "the process that govern and regulate these complexities can usefully be circumscribed by the notion of 'urban political ecology'" (p.724). In opposition to more policy-oriented and problem-solving research of urban sustainability, Urban Political Ecology is shaped by a critical predisposition; here, critical is defined as "the linking of specific analysis of urban environmental problems to larger socioecological solutions" (p.724).

In this sense, most of the authors working under the theoretical umbrella of Urban Political Ecology consider nature and culture, the urban and the pristine, not as separate and antagonist entities but as intertwined realities than make up the world where we live. In the foreword for the book *In the nature of cities: Urban Political Ecology and the politics of urban metabolism* (Heynen et al. 2006), Neil Smith attributes to Political Ecology the task of comprehending such 'produced natures'.

Within this framework, there are several examples of viewing the landscapes and the urban infrastructures as historical products of human-nature interaction, and specifically in the case of water (Gandy 2002, Swyngedouw 2004, Kaika 2005).

As Domene (2006) contends, Urban Political Ecology is interested in the analysis on two key elements. First, the political, economic, social, cultural and environmental forces that produce the urban landscape, and second, the organization and structure of power relations as well as their social and institutional expression.

Swyngedouw (2006) proposes a framework for urban political ecology analysis fusing the work on historical materialism and the work on cyborgs by Haraway (1991) and others. In this sense the social and the natural are combined to produce 'hybrid or cyborg' urbanization, as Gandy (2004) also emphasizes. According to Kaika (2006) the work of Haraway (1991) and the work of Latour (1997, 2005) have set the basic frameworks to analyze such processes.

Circulation and Metabolism: key concepts

Two key concepts in urban political ecology are 'Circulation' and 'Metabolism' (Swyngedouw 2006).

The concept of Metabolism arose in the 19th century, first, to conceptualize the material exchanges of the human body with respect to respiration. However, it soon began to be used by other disciplines to characterize the biophysical processes within organisms and the material exchanges between organisms and the environment. Thus Justus von Liebig, in 1840, introduced the concept of 'Metabolism' to reflect "the exchange of energy and substances between organisms and the environment on the one hand and the totality of biochemical reactions in a living thing on the other" (Swyngedouw 2006:107). On the other hand, Moleschott in *Der Kreislauf des Lebens* (1852), developed a chemical theory of metabolism embedded in a framework of philosophical materialism. The notion of 'metabolism', in German *Stoffwechsel* (meaning literally the 'change of matter'), portrayed by Moleschott and Liebig, was used by Marx to conceptualize the relationship between human society and nature (Martínez-Alier 2007). Other authors, for instance Fischer-Kowalski (2003), point solely at Moleschott as the inspiration for Marx and Engels and other social scientists of the time, to characterize the dynamics of environmental change (Fischer-Kowalski 2003). Schmidt (1971) sees metabolism, or metabolic interaction, as key to Marx's notion of nature.

Smith, in the foreword of Heynen et al. (2006:xiii), and referring to Marx's 'Stofweschel', builds on the idea of the *production of nature* and on the ontological unity of nature and society.

> "the metabolism of nature is always a production of nature in which neither society nor nature can be stabilized with the fixity implied by their ideological separation. Society is forged in the crucible of nature's metabolism, for sure, but nature is equally the amalgam of simmering social change".

Regarding Circulation, Swyngedouw (2006) names Sir William Harvey, with his work in 1628, *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, as the scholar who introduced the idea of circulatory processes in the human body. Latter, this concept came to dominate scientific thinking and was, incorporated into the concept of metabolism by Liebig. By 'metabolic circulation' we mean "the socially mediated process of environmental –including technological –transformation

and trans-configuration, through which all manner of 'agents' are mobilized, attached, collectivized, and networked" (Swyngedouw 2006:113). This author adds that "the production of (entangled) things through metabolic circulation is necessarily a process of fusion, of the making of 'heterogeneous assemblages", of constructing a longer or shorter networks" (p.113). Hence the concept of 'hybrid', proposed by Latour, or the concept of 'cyborg', by Haraway.

However, not many scientists have focused on the urban as a process of socio-environmental change, and this is somewhat surprising since analyzing the city as a continuous metabolic circulatory process while acknowledging the power relations that govern this process provides an innovative way to see the urban:

> "the city as a metabolic circulatory process that materializes as an implosion of socio-natural and socio-technical relations organized through socially articulated networks and conduits whose origin, movement, and position is articulated through complex political, social, economic, and cultural relations. These relations are invariably infused with myriad configurations of power that saturate material practices, symbolic ordering, and imaginary (or imagined) visions" (Swyngedouw 2006:114).

The politico-ecological history of a city can be written as the continuous and never ending attempt to tame, domesticate and urbanize nature. This attempt implies the never ending search of resources beyond the limits of the city, and therefore expands the ecological frontier of the city outwards. For example, Maria Kaika, in her account of the urbanization and domestication of water flows in Athens, *City of Flows* (2005), excavates the flows of water that constitute modern urban Athens to produce a political-ecology of the urbanization of nature. This paragraph summarizes well the scope of her work:

> "If we were to capture some of the metabolized flows that weave together the urban fabric and excavate the networks that brought them there, we would pass with continuity from the local to the global, from the human to the non-human. These flows would narrate many interrelated tales of the city: of its people and the powerful socio-ecological processes that produce the urban (complete with its space of privileged and exclusion, of participation and marginality); of rats and bankers; of diseases and pork belly speculation; of chemical, physical, and biological transformations; of global warming and acid rain; of capital flows and the strategies of city builders; of plans implemented by engineers, scientists and economists. They would make up the (hi)story of a city of flows" (Kaika 2005:25).

Building on Kaika (2005) and Swyngedouw (2004, 2005) we argue that through the supply networks, which transform H_2O -a natural element- into water -a socially produced commodity ready for human consumption-, water becomes urbanized, commodified and domesticated. However, although water is partially or thoroughly commodified during this process, attempts to commodify the network have not been straightforward or have failed, with the exception of the English case. Notwithstanding the difficulty of commodifying such means of "collective consumption" (in Manuel Castell's words), Kaika (2005) specifies that this does not mean that water does do not have an exchange value, but, rather, that the exchange value of water is embodied in the exchange value of the commodities that water makes possible.

Methodological notes

This research has followed many methodological strands that, above all, have taken advantage of the immense (and still little explored in Geographical dissertations) possibilities offered by the New Technologies of Information and Communication, especially the Internet. Not only direct access to academic books and journals has improved enormously but also and perhaps more importantly, the access to raw data (both quantitative and qualitative) is now orders of magnitude easier than it used to be just a few years ago. In our case, for instance, the possibility of accessing on line newspapers files and all sorts of technical documents (and extremely time consuming task in the "old days") as well as the access to all the new communication forms of the so-called "Internet 2.0" (especially blogs) has been crucial. We do not pretend that the web substitutes everything: human contact and participation is still fundamental to any Geographical enquiry. However, with the Internet we think that we have to reconsider the meaning of "fieldwork" to incorporate new sources of data and information.

Theoretical debates have played an important role in our dissertation. Critical Geography literature has provided the foundations of our inquiry and we have maintained a continuous dialogue with different authors, from some classics of the 19th century, such as Marx, to Polanyi or Foucault, to the more recent debates on Neoliberalism. We acknowledge that our literature review is biased towards Anglo-American Geography. With that we may reproduce its hegemony and we may

involuntarily leave aside other non-Anglo-American traditions of Geography (Garcia-Ramon 2004). On the other hand, engaging in such 'hegemonic' literature provides with a wide basis to understand our case studies and perform comparisons with other cases, especially in what concerns the neoliberalization of the environment.

Concerning the empirical work, we have used different methodologies, both qualitative and quantitative. One of Geography's greatest strengths is its lack of canon (Sheppard 2004) and the existence of important methodological pluralisms, even within the same theoretical frameworks, which adds flexibility and avoids rigid research structures.

That said, our research has used the following methodological alternatives:

1. The environmental history of the urbanization of the water supply has been the key aspect of our research. For the undertaking of such task we have mainly build on **historical accounts** both by institutions and by independent historians. The long time span of our analysis of the two case studies discouraged direct archival research. To enrich the narrative, we have complemented the stories with the search in specialized journals with a long tradition in public works, for instance the Spanish engineering journal *Revista de Obras Públicas* publishing regularly since mid 19th century. Laws, bills and policy papers have been of special importance as well. For the case of Madrid, further details are provided at the beginning of chapter 7.

2. Newspaper-based research deserves a special and separated mention since we have used it profusely in both case studies. On the one hand, as we have indicated, this material provide us with data and interviews to politicians and managers that otherwise would have been impossible to obtain. For such objective, we have consulted the digital library of two of the oldest and still existing newspapers in Spain, one for each case study: *La Vanguardia* (Barcelona) and *Abc* (Madrid). For the more recent periods, such as the privatization of the Canal de Isabel II we have opened the search to other general newspapers such as *El País*, *Público* or *El Mundo*, and economic periodicals such as *Expansión*, *Gaceta de los Negocios* or *Negocios.com*.

The search in the newspapers has allowed us to discern media discourses in some specific aspects. Such is the case of the drought of Barcelona of 2007/2008 (Chapter

5). In this case, and through the exhaustive analysis of *La Vanguardia* we have traced how the discourses on drought are produced, how they circulate through society and how they become hegemonic. At the same time, this thorough compilation of news has showed us the permanent contradictions between discourses and practices of policy-makers or managers.

3. Structured and non-structured interviews with water supply managers and technicians of the Canal de Isabel II and the Catalan Water Agency (ACA) carried out in December 2008, and April and July 2009. . Because of the frequently controversial nature of the issues treated, we opted not to record these interviews. The objective of such interviews was to gather specific data and confirm or refute statements appeared in the media.

4. We have also followed the method of **Participant Observation** in two different fronts: the more technical side and the social movements against water privatization. Regarding the first and during the four-year period of elaboration of the thesis we have attended diverse technical conferences in Spain (such as the *Congreso Ibérico del Agua*), workshops organized by both the public administration (*Agència Catalana de l'Aigua, Ministerio de Medio Ambiente, Diputació de Barcelona, etc.*) and private companies (AGBAR), as well as seminars and field trips (visits to the desalination plant of Barcelona and to the Sant Joan Despí Treatment Plant). This has allowed us to gain familiarity with a particular group of people, technicians and decision-makers in the urban water sector, and learn about their practices and discourses through informal interviews, direct observation or collective discussions. Furthermore, the analysis of documents produced within this group, such as declarations of intentions, has also been useful.

Regarding the second group, the involvement span has been shorter but more intense. Informal talks with platforms and social movements[1] against water privatization in Madrid were held in April 2009. Direct observation also encompassed some of the public acts against the privatization of the Canal, such as demonstrations or public

[1] Plataforma en Defensa de los Servicios Públicos, Ecologistas en Acción Madrid, ATTAC Madrid, FRAVM.

campaigns. Collective discussions via mailing lists and blogs were also followed, together with the analysis of manifestos[2] and internal documents.

In the case of Barcelona, informal talks and collective discussions with platforms for the municipalization of the privatized water service were also undertaken. The analysis of manifestos and internal documents, and the participation in mailing lists has provided us with significant knowledge about the rationale behind such projects.

Despite being a complementary method, in general terms Participant observation has granted robustness to our narrative and has permitted to check the changing discourses and the discrepancies generated within those groups. Of special interest has been the contradictory nature of the discourses (hydraulic paradigm vs. demand-side management, desalination yes or no, etc.) of water managers across time and according to the target audiences.

5. Finally, the case of Barcelona has been briefly complemented with an empirical study on the determinants of urban water consumption (March and Saurí, 2010). In what concerns Madrid we have relied on studies, especially the very important of Naredo and García Zaldívar (2008), documenting the urbanization process of this city as well as the implications of this process in terms of the metabolism and circulation of water.

[2] Manifiesto contra la privatización del Canal de Isabel II, available at http://www.attacmadrid.org/d/10/081028093247.php, last accessed 6th January 2010.

PART 1:

THEORETICAL FRAMEWORK

1 Neoliberal Environments?

The myriad forms the Neoliberalization of nature: Commercialization, Privatization, Deregulation and Reregulation

> "The environment is an industrial challenge", (Veolia Environnement, 2009[3], welcome internet site)

As Veolia presents in huge characters when accessing its Internet site, the environment is an industrial challenge. In this introductory chapter we will see how the general perception widely shared among policy-makers and academia is not only that the environment is an industrial challenge but it is also an excellent opportunity to make business. To counteract decreasing benefits of the traditional industrial activities and services, capital has to reinvent itself in order to seek for new investment opportunities once the geographical fix seems exhausted. The environment is a clear example of how new business can be created, with the establishment of new property rights and the selling and buying of environmental commodities. The new market of CO_2 emission rights, water banks, various environmental services, and a so on, are examples of "things" that were outside market logics entering into the "market".

In this first chapter we review the literature on the neoliberalization of nature to elucidate the processes whereby nature is turned into an active factor for the capitalist process of production and accumulation. But an active factor not in the traditional sense, i.e. resources and flows feeding the industrial cycle, but rather conceiving the environment and its flows as a source of revenues per se.

The fusion of mainstream public choice theory with market theories unleashed the birth of the dominant ideology of the last decades (Self 1993), in other words the neoliberal discourse and practice (Toke 2000). This discourse, according to Toke (2000), "takes on board the notion that the role of the state should be restricted to creating the conditions suitable for the smooth operation of free markets" (p.78), and outlines the fact that state intervention may give opportunities to self-interested groups to gain favors form the public sector instead of improving social welfare. This

[3] Last accessed 18th December 2009, www.veolia.com/en/

neoliberal discourse “assumes that market systems are inhabited and operated by rational egoists and that under competitive conditions the results will be generally beneficial” (Self 1993:198).

There is an alleged convergence of all capitalist models towards neoliberal institutions and policies due to the competitive pressures of capital accumulation (Coates 2000). But is there consensus in the singularity of the neoliberal project or are there different “Neoliberalism” and Neoliberalization processes? As Tickell and Peck (2003) write Neoliberalism is everything but a coherent, singular and unchanging project. In the next section we will attempt to unpack and deconstruct the term “Neoliberalism” and “Neoliberalization”.

1.1 Neoliberalism: a unitary conception?

Neoliberalism, as Larner et al. (2007:225) contend, is "increasingly replacing globalization as a central analytical category in many social science disciplines, including economic geography, political economy, and political science". It is basic then to justify first why we draw on the works on Neoliberalism and not Globalization. Larner et al. (2007) argue that while Globalization has been understood and appraised as a transformation in the material structure of the world, currently social scientists, and especially geographers, have shifted their attention to 'how' Globalization is 'made'. In these new process-based approaches to Globalization, linkages to Neoliberalism are emphasized by many interested in political power through the use of the term Neoliberal Globalization. The same happens with the term Neoliberalization (England and Ward 2007). Elsewhere, Cerny (2004) argues that Neoliberalism has become a critical term for politics in the early twenty first century. Especially, as Larner et al. (2007) point out, Neoliberalism has gained momentum in the social sciences literature, and is increasingly replacing former labels that referred to specific political projects such as Thatcherism, Reaganism, etc. Also, it is more used than other related terms such as monetarism, economic rationalism, neo-conservatism, etc.

Neoliberalism in the most general sense refers to an "economic and political philosophy that questions, and in some versions entirely rejects, government interventions in the market and people's relationships to the economy, and eschews social and collective controls over the behaviors and practices of firms, the movement of capital, and the regulation of socio economic relationships" (Heynen et al. 2007b:3). In other words, Neoliberalism "seeks to establish market deference as a necessary (pre)condition attempting to renaturalize –and therefore insulate from earthly politics –those Keynesian and development economics so fatefully politicized" (Peck 2004:394). Castree (2008a) notes that Neoliberalism is best understood as a comprehensive mode of governance, not simply as an 'economic' philosophy or practice, i.e. a paradigm that seeks to naturalize the market as a mean for assessing and distributing life's necessities and luxuries.

1.1.1 Tracing the "Neoliberal Project": from Hayek to the financial crisis of 2007/08

In order to understand the current world political-economic situation it is important to trace briefly the evolution of the neoliberal ideology, from its birth, going through its unfolding from the 1970s onwards to the current situation of financial crisis, when the model is questioned and debated. As Fred Block writes in the introduction to the 2001 edition of *The Great Transformation* by Karl Polany, since the 1980s and especially since the end of the Cold War and the fall of the Berlin Wall, the doctrine of market liberalism, under different labels (be it Tatcherism, Reaganism, or the most common, Neoliberalism) has come to dominate global politics (Block 2001 [1944]).

Tickell and Peck (2003) think that from the ideological critiques of the 1970s, through the national-state projects of the 1980s, the global hegemony of Neoliberalism in the 1990s and onwards, the neoliberal ideology has undergone a multi-stage ascendancy. These authors single out at least four phases in the evolution of this ideology and practice: from its roots (Proto-Neoliberalism), through the "reaction" to the existing political economic-model, Keynesianism, (Roll-back Neoliberalism) to the "pro-action" (Roll-out Neoliberalism).

a) Proto-Neoliberalism

In the paper "Geography and public policy: constructions of Neoliberalism", Jamie Peck (Peck 2004) explains that the origins of the neoliberal intellectual project, the so-called "Proto-Neoliberalism" (Tickell and Peck 2003, Peck 2004), dates back to the mid 20th century. Peck focuses on some minority currents in mid-twentieth-century economic philosophy: from the Hayekian economic rationalism and the Mont Pelerin Society's associated campaign against totalitarianism, through the liberal economics of the Ordos school in Germany and Ludwid Erhard's treatises on the 'social market', to Ayn Rand's mythical individualism, Chicago School monetarism, and various strands of social-Darwinism and neo-Conservative thinking. Jamie Peck points out that Neoliberalism was initially shaped by the combination of these various ideological positions –"many of which seem to have been held together by little more than their shared ostracism during the Keynesian-developmentalist period of the 1950s and 1960s" (p.400), therefore encompassing "an always

problematic alliance between anti-statist libertarianism on the one hand and authoritarian interventionism on the other" (Peck 2004:400). As Fred Block notes, at the short term, Hayekian ideas had little influence because from the mid 1930s through the 1960s Keynesian economic precepts, legitimating proactive state control over the economy reigned supreme. However, after World War II these revolutionary ideals progressed in the United Kingdom and especially in the United States.

Friedrich Hayek, with his book *The Road to Serfdom* (Von Hayek 2000 [1944]) and Milton Friedman, with its famous book *Capitalism and Freedom* (Friedman 1962) were the core components of the neoliberal Chicago School of Economics. Friedmans' (1962) *Capitalism and Freedom* "laid out what would become the global free-market rulebook and, in the U.S., would form the economic agenda of the neoconservative movement" (Klein 2007:56). Some of the most important premises of such Chicago School Counterrevolution, against the American New Deal as Klein (2007) synthesizes are:

- The removal of all the rules or regulations that hinder the accumulation of capital, or in other words deregulation
- Tax schemes, in the case they are essential, should charge rich and poor at the same flat rate
- All the prices, including labor, should be set up by the market, with no minimum wage schemes
- Lifting the protection of local industries
- The sell off of public assets that could be running at a profit by the private sector; that is privatization. Friedman considered the possibility of privatization of the health care, education, retirement pensions, post-office, and even of national parks.
- The cutbacks in the funding of social programs such as healthcare, social security, education, etc.

During the 1970s, Keynesianism, hegemonic as a mode of economic and political organization and key to virtuous growth dynamics, began to show important flaws (Tickell and Peck 2003). After the oil shocks, the internationalization of capital flows or the emergence of competition from newly industrialized countries, among other

issues, economic growth began to falter, and tax revenues to decrease. However, as the same authors recall, neoliberal ideology, was only applicable to the economies of the developing world as a kind of shock treatment (see for example Klein 2007) but not as feasible and desirable governing ideology for the western world (Tickell and Peck 2003). However, Friedmanite "neoclassical" or "orthodox" economics, challenging the Keynesian consensus and proposing to unfetter markets as a solution to the economic crisis, gained respect and momentum within the Economic discipline in the 1970s. Actually, as Tickell and Peck (2003) observe, while prior to 1970s Nobel laureates in economics were all for Keynesian economists, since 1974 (when Hayek shared the prize with Gunnar Myrdal) these prizes were mostly awarded to orthodox economists (for instance, Milton Friedman won it in 1976).

Thus, despite the complexity of its origins, some authors (for instance Jessop (2002) or Harvey (2005)) situate the reaction against Keynesianism in the context of the economic stagnation during the 1970s that unleashed a sea-change in the economic organization of the western world. In this sense, Jessop (2002) conceptualizes Neoliberalism as the dominant post-Keynesian mode of regulation, and as a response to particular crisis in governance.

According to Leitner et al. (2007), the emergence of Neoliberalism was not determined by its natural superiority as a body of thought, as Friedrich Hayek, among other relevant orthodox economists thought (Von Hayek 2000 [1944]) nor by the logic of capital accumulation and class power restoration as Harvey (2005) argued in the book "A Brief History of Neoliberalism". Rather, these authors argue that core elements of Neoliberalism were attractive to many opposing to Fordism in many ways.

> "Neoconservatives saw an opportunity to promote individual liberty and responsibility. Capitalists saw an opportunity to boost profits by reducing state intervention. States saw an opportunity to address their fiscal crises. Welfare states clients were tired ob being told what to do by representatives of state agencies, and had hardly experienced the welfare state as a resounding success" (Leitner et al. 2007:7).

Thus, while during the colonialist period capital accumulation and reproduction relied on the geographical expansion of the capitalist system (Harvey's (2003)

"accumulation by dispossession" applied to land), for Friedman the new frontier was the state, that is, public services and assets.

Finally, the role think tanks had in the unfolding, the dissemination and the political dimension of Neoliberalism was critical. The Institute for Economic Affairs, founded in London (UK) in 1957, and the American Enterprise Institute, the Heritage Foundation and the Cato Institute, founded all three in the US respectively in 1943 (though "re-founded" in the mid 1970s), 1973 and 1977, all paved the way for the political materialization of such ideology.

b) Roll-back Neoliberalism

In the 1980s Neoliberalism became a dominant state strategy in a context of the general crisis of the model of production. Fordism would give place to more flexible modes of production, labeled "Post-Fordism". At the same time, Keynesianism was dismissed and discredited as solution to the problems of labor and capital over-accumulation. Alongside those features, monetary policy, following Friedman's precepts, played an important role, focusing on inflation issues: less spending and restriction on money supply were defended as two main remedies. Thus, according to Tickell and Peck (2003) monetarism and macro-economic management constituted the cornerstone of Neoliberal policy in the 1980s.

Margaret Thatcher in the United Kingdom and Ronald Reagan in the United States, were the first politicians who applied the neoliberal premises dictated by the Chicago School, although we have also to include here Pinochet's Chile (see below). In those countries, and according to Tickell and Peck (2003), the 1980s witnessed:

- Significant middle-class tax cuts
- The progressive liberalization of credit
- The wholesale privatization and retrenchment of public services
- The removal of boundaries between different branches of financial sector
- The extensive reworking of industrial relations law and practice
- The relaxation of regulations across a swathe of industrial sectors
- Major confrontations with labor unions

However, authors such as Naomi Klein (2007) argued that countries such as Chile or Argentina were the laboratories of economic orthodoxy in this case facilitated not by consent but by coercion..

To summarize the effectiveness to supplant the former Keynesian mode of production (markets) and organization (institutions) and to redraw the role of the state Tickell and Peck (2003:170) state that "in its own terms Neoliberalism roll-back was a phenomenal success".

Roll-back is a form of crude and shallow Neoliberalism, based on deregulation, privatization, tax removal and the dismissal of some of the social rights conquered during the 20th century. This shallow but intense wave gave place in the 1990s to a deeper process of neoliberalization.

c) Roll-out Neoliberalism

In the 1990s and following Tickell and Peck (2003), Neoliberalism, was far from being an exhausted project. On the contrary, this period witnessed the normalization of new neoliberal modes of regulation. The Washington Consensus of 1994 is a clear example of the neoliberal hegemony of the 1990s, serving as a template for neoliberal policy, with its focus on small government, low taxation, deregulation, privatization, and enhanced competition. The same authors remark that the consolidation of Neoliberalism in International law, especially under the form of the World Trade Organization and the naturalization of market logics. There was also a technocratic turn in neoliberal practice.

The Gramscian concept of cultural hegemony (Sacristán 2005 [1970]) serves us to illustrate the dominance and entrenchment of Neoliberalism at the end of the 20th century. Neoliberalism "infuses 'mainstream' political discourses across much of the developed and developing capitalist world, while shaping the architectures of multilateral institutions and regional state structures" (Tickell and Peck 2003:171). This permeation throughout society of an entire system of values that favor specific interests is clear in our times. However, that does not lead to the End of History (Fukuyama 1992) but simply to a change of the dominant form of Neoliberalism. Along these lines, Crotty (2000) calls the current capitalist phase as the "global neoliberal regime", with a policy agenda consisting of deregulation, privatization,

global integration and liberalization. The decade of the 1990s, when Neoliberalism became hegemonic, was the period with the lowest economic growth in the post-war era (Crotty 2000, Harvey 2005).

Similarly, Carrier (1997) emphasized the hegemonic "market model": the dominant public language that "shapes what can be debated and how it can be debated" (p.50-51):

> "As a public language, the Market model provides the vocabulary and conceptual equipment that make it relatively easy to define certain sort of things as problems and relatively hard to define other sorts of things that was. Just as it influence the sorts of problems that can be addressed, so it influence what is likely to appear as an acceptable, plausible solution" (Carrier 1997:51)

As we will see in the next chapters, public-private partnerships have thrived considerably well alongside the efforts to marketization. Third-Way rhetoric, or in other words, 'social democratic Neoliberalism' has displaced challenging the economic liberalization paradigm 'off limits' in mainstream political discourse. Tickell and Peck (2003) unravel the de-politicization of previously contested economic fields" in the same way that Swyngedouw develops the concept of the "post-political city" (BAVO 2007). In the second place, proactive forms of statecraft and institution building have been and are critical features of this wave of Neoliberalization. This is what Tickell and Peck (2003) call Janus-faced state strategies. We reproduce a fragment of Wacquant (1999:338), in Tickell and Peck (2003), as it summarizes perfectly well the essence of roll-out Neoliberalization, emerging probably from the contradictions of previous waves:

> "'free', that is, (neo)liberal and non-interventionist 'above', in matters of taxation and employment; intrusive and intolerant 'below', for everything to do with the public behaviours of members of the working class caught in a pincer movement by the generalization of underemployment and precarious labour, on the one hand, and the retrenchment of social protection schemes and the indigence of public services, on the other hand"

In table 1.1, and drawing on Tickell (2003) we summarize the main features of the different waves of Neoliberalization.

Table 1.1. Stages of the Neoliberalization process

	Proto-Neoliberalism	Roll-back Neoliberalism	Roll-out Neoliberalism
Period	Pre-1980	1980s-early 1990s	Late 1980s onwards
Mode of political practice	Extra-state project	Statization	Hegemony/State-building
Dominant discourses	Anti-Keynesianism/State failure	Small government/deregulation	Paternal state/free economy
Key institutions	Liberal think tanks	Governing parties	State cadres
Modes of political rationality	Ideological critique	Ideological project	Technocratic
Sources of resistance	Keynesian orthodoxy	Organized labor	Cyber-activists
Intellectual frontier	Monetarist economics	Supply-side economics	Bourgeois sociology
Totemic figures	Milton Friedman, Hayek, Pinochet	Thatcher and Reagan	Clinton, Blair, Schröder, Greenspan
Principal agents	Theorists, philosophers	Vanguard politicians, political appointees	Policy-functionaries, technopols
Intellectual elite relations	Confrontation	Conciliation	Co-optation
Service delivery	Spending cuts	Privatization	Marketization
Labor regulation	Crisis of full employment	Mass unemployment	Full employability
Fiscal posture	Stagflation	Tight money/liberal credit	Persistent deflation
State finances	Fiscal crisis	Systemic indebtedness	Debt repayment
Geographic heartlands	Chicago	London and Washington, D.C	Brussels, London, and Washington, DC
Geographic frontiers	Santiago	Brussels	Paris, Berlin, Hong Kong, Singapore, Johannesburg
Spaces of resistance	--	British cities and coalfields, North American rustbelt	Anti-globalization confrontations, France, Malaysia
Scalar constitution	--	National	Glocal
Financial discipline	Inflation	Structural adjustment	Standards and codes
Ethic	Individualism	Amoral marketization	Moral authoritarism

Source: adapted from (Tickell and Peck 2003)

Once we have briefly traced the evolution of the neoliberal ideology, next we want to present how the current roots and new frontiers of Neoliberal ideology before moving to Neoliberal Environmentalism as an object of study.

1.1.2 Neoliberalism today: a hybrid and an evolving project

Neoliberalism and its contents undergo a continuous process of mutation, change and broadening. Thus, while the early understanding of Neoliberalism used the political philosophy of Hayek and Friedman, the concept has evolved to become understood as a political project premised on “marketization” and minimal state, or a new form

of economic and social rule based on 'government at distance' (Larner 2000, Larner et al. 2007), in a more Focauldian sense. Briefly, "today, Neoliberalism can be variously understood as a set of political ideas, a hegemonic ideology and governmentality" (Larner et al. 2007:226). Similar to Gramsci's cultural hegemony, Foucault's concept of governmentality (Foucault et al. 1991), further developed in the 1990s and 2000s by other scholars (Dean 1999, Miller and Rose 2008) is also useful to understand Neoliberalism. By governmentality we mean the manifestations of power through the use and production of knowledge and discourses that shape the behavior of individuals and populations. As Foucault wrote (Foucault 1979), in Miller and Rose (2008:20), governmentality is an "ensemble formed by the institutions, procedures, analyses and reflections, the calculations and tactics, that allow the exercise of this very specific albeit complex form of power" When talking about neoliberal governmentality we talk about the auto-regulated behaviors of the population resulting from the application of market mechanisms and the diminishing of direct intervention by the state, what Miller and Rose (2008:22), drawing on Latour's "action at distance" (Latour 2005), call "governing at distance": individuals are to be governed through their freedom.

> "Neoliberal governmental technologies are indirect: setting targets and monitoring outcomes; transforming the ethos of governance from bureaucracy to business; giving agencies autonomy to act as long as they are accountable; and creating calculable spaces to monitor outcomes (relying heavily on auditing, targets, and rankings). Governance remains rather unidirectional, however: Institutions, agencies, and individual citizens are expected to make their activities visible to centers of calculations, but these centers are less often required (much less enticed or persuaded) to make their activities transparent to neoliberal subjects" (Leitner et al. 2007:3-4).

These authors add that this sort of technologies enhance the construction and production of a neoliberal subjectivity.

> "Under Neoliberalism, individual freedom is redefined as the capacity for self-realization and freedom from bureaucracy rather than freedom from want, with human behaviour reconceptualized along economic lines. Individuals are empowered to actively make self-interested choices and are made responsible for acting in this way to advance both their well-being and that of society" (Leitner et al. 2007:4)

Not only the term Neoliberalism has evolved and has been understood in different ways, but also, as Larner et al. (2007) note, the temporalities and spatialities of this phenomenon have changed as well. Early studies on Neoliberalism were framed

basically under the nation-state level, especially focusing either on those countries that underwent important state sector reform programs (mainly in South America) or on those countries known as former liberal welfare states (Canada, United Kingdom, Australia). Later, scholars turned their eyes to the processes at supranational or global scale (the so-called Neoliberal Globalization) and also on urban and regional Neoliberalism. Through these accounts, a great deal of importance has been given to the ways in which Neoliberalism is mutating, or in Larner's et al. (2007:226) words "to identify and examine the different forms of Neoliberalism over time and space, to trace the flows and networks through which neoliberal discourses and techniques have been disseminated, as well as to interrogate the various forms in which Neoliberalism has been instantiated and embodied". One of the key aspects of Neoliberalism is its multiple scalar natures (Larner 2003). Neoliberalism is being analyzed at different spatial scales: not only transnational and national, but also regional and urban political environments.

This ample set of readings and perspectives has resulted in a wide variety of definitions and notions of what exactly Neoliberalism and Neoliberalization processes are about. According to Peck and Tickell (2007:28) Neoliberalism "is a distinctive political-economic philosophy that took meaningful shape for the first time during the 1970s, dedicated to the extension of the market (and market-life) forms of governance, rule, and control across –tendentially at least –all spheres of social life".

Heynen et al. (2007) give an alternative definition that defines Neoliberalism as "a philosophy that describes itself in terms of 'hard realism' but is often wrapped in a cloak of remarkably utopian promises, offering a world liberated to 'unleash' the emancipatory power of markets and local decision-making" (p.3). These authors point out some of most common practices in the context of Neoliberalism (p.6):

- Regressive reforms of state taxation and rollbacks in redistribution spending
- Privatization of services formerly provided by and through the state
- Liberalization of state regulations specifically governing trade and investment across international borders
- Emphasis on state austerity and fiscal retrenchment with an associated defunding or outright cancellation of a wide array of social services

- Workfare, and other incentive-based schemes aimed at disciplining workers and civil servants, accompanied by deregulation and re-regulation of labor markets
- Restructuring of state regulatory apparatuses in ways that tend to enhance private and corporate authority over economic, environmental and social action
- Offloading and decentralization involving both the re-scaling of governance up and down from nation-states, as well as the recruitment of volunteer, civil society-based organizations to undertake many functions formerly provided by the states

In a wide sense, Neoliberalism is understood as a process of economic restructuring (for an extended review see Cohen and Centeno (2006)). For some authors, Neoliberalism is also seen as a global effort to restore class power (Harvey 2005) through the rollback of regulations on capital flows and the reduction of the state-coordinated redistribution of income. In the book *A Brief History of Neoliberalism*, Harvey (2005) conceptualizes Neoliberalism as a global project to restore, renew, and expand the conditions for capital accumulation, while restoring or establishing the power of economic elites. Actually, Neoliberalism conceived this way, i.e. consolidating the rich rather than protecting the market, is even strongly criticized and generates unease among neoliberal 'true believers' (Robison 2006).

Tickell and Peck (2003) define "Neoliberalization" as the mobilization of state power in the contradictory extension and the reproduction of market (-like) rule. Neoliberal discourses, according to these authors, are used to praise the logical, philosophical and historical superiority of markets, and to a broader sense of privatized and individualized economic relations. The following quotation of Phillip O'Neill (1997:291-292) cited in Tickell and Peck (2003) neatly summarizes the contradictory essence of the neoliberal ideology:

> "It is axiomatic, according to neo-liberalism, that the absence of state intervention is the market, that market failures are never failures of the market per se and, therefore, they can only ever be failures of the state…The political consequence of this view is the drive to deregulate…[Yet] the neo-liberalist vision of 'less state' is entirely illusory. Neo-liberalism is a self-contradicting theory of the state. The geographies of product finance and labour markets that it seeks to construct require qualitatively

> different, not less, state action. Neo-liberalism is a political discourse which impels rather than reduces state action"

In fact, the term Neoliberalism is not a term used by neo-liberals, who tend to prefer other labels such as free market liberalism, classical liberalism, liberal conservatism, economic conservatism or just plain economic liberalism (Gamble 2006) but it is more often used from critical inquiry in Geography, Sociology or Political Science.

Peck and Tickell (2002:381) have even described and labeled Neoliberalism as the 'common-sense of the times' to prove the hegemony that it has reached in the practice of daily politics. According to theses authors it is useful to draw on Focault's concept of 'dispositif', which is similar again to Gramsci's notion of 'hegemony'. In that sense, 'dispositif' means that hegemonic conditions prevail when a "thoroughly heterogeneous ensemble" of agencies and discourses and "polymorphous techniques of power" *appear* to be functioning in contiguous, cohesive ways. Thus part of the process of undoing hegemony is exposing its heterogeneous, uneven, and contradictory relationships" (Rankin and Shakya 2007:76) quoting Foucault (Foucault 1980:194)

In a context where Neoliberalism seems to be everywhere (Peck and Tickell 2002), attention should focus on the connection of those more empiric enquiries with the more abstract and theoretical work. There is a tension between those narratives that see Neoliberalism everywhere, and do not differentiate contingent particularities, and those that are too specific and fail to draw general conclusions. Next, we engage in these debates.

1.1.3 Hybrid versus monolithic accounts of Neoliberalism

Most geographical analysis on Neoliberalism is embedded within the Marxist and neo-Marxist theoretical approach, which presents the flaw, according to Wendy Larner (2003), to focus and analyze what has already been lost rather than "thinking about Neoliberalism as an involving process that *produces* space, states and subject in complex and multiple forms" (p.511). This author further argues that "the assumption that Neoliberalism is best understood as a top-down imposition discourse leaves us powerless to explain why people (sometimes) act as neoliberal subjects" (p.511)

Larner (2003) criticizes that the widely held assumption that neoliberal globalization is conceived and depicted as a monolithically project with a clear ideological core coming directly from the United Kingdom and the United States of America. According to Peck (2004) the United States represents just a 'case', rather than *the* 'neoliberal model'. Without dismissing its clear genesis, Neoliberalism "arrives in different places in different ways, articulates with other political projects, takes multiple material forms, and can giver rise to unexpected outcomes" (Larner 2003:511). Drawing on the Focauldian work on governamentality, Larner encourages scholars to focus on particular states, spaces and subjects as artifacts rather than as architects of Neoliberalism. In other words, this author calls to pay more attention to the multifarious variations of Neoliberalism, and especially to the *hybrid nature* of contemporary policies and programs and to the "*multiple and contradictory aspects* of neoliberal spaces, techniques and subjects" (Larner 2003:509). In further work, Larner et al. (2007) insist in criticizing monolithic stories of globalization, Neoliberalism, and Neoliberalization, and propose instead that "rather than searching for an overarching analytical category, or assuming direct and/or determining relationships between different aspects of a single process" it is necessary "to make visible the multifaceted nature of the processes involved, thereby opening up possibilities for multiple political interventions" (p.227). Thus "rather than seeing Neoliberalization as a pre-constituted political formation in full control of hegemonic actors and with predictable consequences, or even as a contested political process" their emphasis is "on tracing the changing content of governmental discourses and practices and exploring their implications for spaces and subjects" (Larner et al. 2007) Apart from the concept of *hybrid* neoliberalisms by Larner (2003), Brenner and Theodore (2002) label this multiple faces adopted by Neoliberalism in the real-world as *actually existing Neoliberalism* to oppose to what they call thinly propagandistic self-descriptions (Brenner and Theodore 2002a). In this sense, Peck (2004) advises that we must be aware of the difference between actually existing Neoliberalism and the abstraction that we call Neoliberalism in general. Robertson (2007) recalls the tendency of capitalism to oscillate between differentiation, or uneven development (Smith 1984), and homogenization.

Thus, it is important to consider the specific array of historically contingent social and political forces (Beeson 2007) that may determine the extent and the way market

forces progress. Again, we recall how 'actually existing Neoliberalism (Brenner and Theodore 2002b) may deviate from the ideal neoliberal model:

> "while market-based modes of economic organization may have become dominant across much of the world –for the moment, at least –what a particular focus on the status of Neoliberalism suggests is that the precise form they assume may continue to deviate from the idealized neoliberal model in significant ways" (Beeson 2007:46)

According to these accounts, the reality of Neoliberalism is never as pure as its free-market rhetoric. In Tickell and Peck's (2003) words, the *practice of Neoliberalism* has little to do with laissez-faire deregulation but actually is linked with the extensive deconstruction and reconstruction of institutions, normally in the name of the "market". This is a key point to understand how actually existing Neoliberalism operates. In the next section when we will confront specifically the neoliberalization of the environment we will delve into these deregulation and reregulation logics in depth. Along these lines, we retake the ideas laid out before regarding the different stages of Neoliberalism and neoliberalization: Peck and Tickell's (2002) "rolling back" and "rolling out" Neoliberalism. Following this argumentation, Peck (2004) recalls that Neoliberalism does not always mean deregulation but, in practice, neoliberal states are sometimes quite interventionists paradoxically. In other words, Neoliberalism, contrarily to a deeply rooted belief, does not forcedly entail shrinking the state:

> "neoliberalism cannot be reduced to a simple process of replacing states with markets because, in practice, 'privatized' or 'deregulated' markets still have to be managed and policed (often by a new breed of neoliberal technocrats) and because, more fundamentally, 'markets' themselves are not, never have been and cannot be spontaneously occurring and naturally self-regulating" (Peck 2004:394)

Therefore, economic globalization, adds Peck (2004), does not mean the death of the state but instead the reinvention of the state role and of its linkages to the logics of capital accumulation:

> "it is now widely recognized that national states, far from fading into insignificance, remain important animateurs of the globalization process, that they are pre-eminent narrators of this process, and that its outcomes have involved the restructuring and reorganization of state capacities, rather than their straightforward erosion or destruction" (Peck 2004:394).

While interrogating particular geographies of Neoliberalism in Latin America Perreault and Martin (2005) reach similar conclusions regarding the hybridity of neoliberal practices:

> "neoliberalism is best characterized not as a coherent end product, but rather as a complex and contested set of processes, comprised of diverse policies, practices, and discourses. Although neoliberal policies share an underlying logic and ideological foundation, they emerge from, and take hold in, distinct social, political, cultural, and environmental contexts" (Perreault and Martin 2005).

Similarly, Larner et al. (2007), in their criticisms towards universalizing and monolithic descriptions of neoliberalization, highlight the usefulness to see the current moments of political economy in different places as involving experimentation, innovation, and even contestation rather than following the paths imposed by the 'rolling-out' of a pre-constituted and concrete political program.

Development is argued to be a terrain of neoliberalization (Rankin and Shakya 2007) often absent from the accounts in geographic scholarship. The approach used by these authors shares with other authors presented in this chapter "its rejection of Neoliberalism as a hegemonic project and its focus instead on how Neoliberalism as a hegemonic project articulates with national and sub-national political-cultural formations –forming the necessary alliances, but at the same time generating spaces for critique and alternative imaginaries as its contradictions become increasingly apparent" (p.48). By exploring the Nepalese developmental microcredit schemes, the authors find out that neoliberalization is a "highly variegated, uneven process involving a 'heterogeneous ensemble' of actors having different, sometimes competing perspectives" (p.52)

Neoliberalization is shown as a process "out there" and "in here" (Peck and Tickell 2002) and not as an end-state (Brenner and Theodore 2002; Peck and Tickell 2002). Peck (2004) refers to such hybridity (Larner 2003) when he argues that Neoliberalization processes are hybrid from the outset. According to this, Critical Geography research on such processes must be sensitive to institutional hybridity, path specificity, and uneven development. Despite the fact that neoliberalization processes are at work simultaneously in many different places, we do not have to expect a simple convergence of outcomes everywhere, or what Peck and Tickell

(2002) would qualify as the neoliberal end of geography and history. Continuing this argumentation Peck (2004) summarizes state intervention as follows:

> "the neoliberal script suggestively encompasses a wide range of proactive state strategies designed to refashion state economy relations around a new constellation of elite, managerial and financial interests. The outcome is not one of simple convergence towards a neoliberal monoculture, comprising a series of unified and fully integrated market oriented polities, but rather a range of institutionally mediated local, national and glocal 'neoliberalizations' between which there are telling interconnections and family resemblances" (Peck 2004:396-397)

Along similar lines, Gamble (2006) suggests to avoid reifying Neoliberalism and treating it "as a phenomenon which manifests itself everywhere and in everything" (p.34). This author highlights the need to bypass oversimplification stating that despite that "ideologies are extremely important […] ideological determinism is in the end no better than economic determinism and no more illuminating" (p.34). The history of Neoliberalism shows us that a pure or single form of Neoliberalism does not exist but a variety of hybrids and compounds.

Such hybridity is again emphasized by Lockie and Higgins (Lockie and Higgins 2007) when approaching agro-environmental governance in Australia through the prism of governamentality. Theses authors set aside the most common neo-Marxist approaches that conceive Neoliberalism as a largely unified and durable mode of rule that colonizes the entire 'social' arena. Instead, they draw upon the notion of roll-out Neoliberalism (Peck and Tickell 2002) and hybridity (Larner 2003), which are "highly creative in drawing together technocratic techniques of economic management with a deeply interventionist agenda focusing around social and certain environmental issues" (Lockie and Higgins 2007:3).

> "In a sense which is true but rather unenlightening all governments throughout the global economy are now neo-liberal governments, because they are obliged to operate within a set of structures in the global economy which reflect, however imperfectly, neo-liberal principles. What is important to grasp, however, is that neo-liberalism – like globalization –is not monolithic or proceeding in a single direction. It has different aspects and many contradictions, which create different political spaces and possible outcomes. The two faces of neo-liberalism, on the one hand the iconoclastic, ground-clearing, radical impulse to tear down the obstacles to capital accumulation, and on the other, the concern for using the state to ensure the democratic legitimacy of the market order and to create the kind of institutions which encourage

> participation and limit the destructive impacts of free markets, are often in conflict and will continue to determine the way in which this doctrine develops" (Gamble 2006:34-35).

Some authors speak of the existence of two main strands of Neoliberalism (Gamble 2006): a laissez-faire strand and a social market strand. The latter strand believes in the role of the state in creating and sustaining the institutions that allow the market to reach its full potential. Gamble (2006) writes that the constant mutation of Neoliberalism is driven by internal differences and political limitations inherent to the very concept. Glassman (2007), following to some extend the argument developed by Harvey (2005), argues that "perhaps neoliberalism is not a project for rolling back the state, deregulating the economy, privatizing enterprises, or even implementing private property regimes *per se*" (p.96). On the contrary, it is more about the processes and practices of the most powerful and mobile capitalists to use both the state to roll back and roll out "regulation and re-regulation, privatization and nationalization, and varied property regimes quite opportunistically" (Glassman 2007:96).

As we can observe, beyond the philosophical and programmatic core ideas of Neoliberalism, it is not easy to find consensus among scholars (England and Ward 2007). In this sense, McCarthy and Prudham (2004:276) point out that "defining neo-liberalism is no straightforward task", partly because "the term 'neoliberalism' stands for a complex assemblage of ideological commitments, discursive representations and institutional practices, all propagated by highly specific class alliances and organized at multiple geographical scales".

Ward and England (2007) outline four different understanding of Neoliberalism:

- Neoliberalism as and ideological hegemonic project: for example in Harvey 2006
- Neoliberalism as policy and program: privatization, liberalization, deregulation policies
- Neoliberalism as a state form: rolling back and rolling out Neoliberalism (Peck and Tickell 2002)
- Neoliberalism as governmentality: Larner (2003), Larner et al. (2007)

Despite the interesting body of work by geographers dealing with Neoliberalism and Neoliberalization processes presented above, there are important divergences in the way they approach the subject. On the one hand, scholars such as Peck and Tickell (2002) or McCarthy and Prudham (2004), despite conceiving Neoliberalism as a set of different ideological commitments and institutional practices and discourses articulated through multifarious class alliances, see some common grounds that enable to characterize Neoliberalism as a likely and potential supra-local project. On the other hand, Noel Castree (2006:1) presents the 'perplexing amorphousness' of neoliberal reforms to environmental governance and the outcomes emerging from these realities as a barrier to generalize 'Neoliberalism in general'. In the same lines, regarding Neoliberalism and water, Perreault (2006) stresses the importance of differences in water governance form. Such drawbacks and hindrances can only be overcome by means of more specific geographical accounts of such neoliberalization processes.

Larner et al. (2007) challenge existing accounts of neoliberalization. They note that even though there have been calls for the appraisal of the diverse geographies of Neoliberalism, as Peck (2004) noted, Larner et al. (2007) argue that most of the accounts on neoliberalization are still based on the description of a totalizing and universalizing process manifested in similar ways in different places. To ground this claim they draw on the New Zealand experience of what they call 'After Neoliberalism' to rethink what neoliberalization entails. These authors derive part of their theoretical approach from Arturo Escobar "post-structuralist political economy" (Escobar 1995).Hence, neoliberalization would be more usefully understood as "an ad hoc, post facto rationalization in which connections are made across political projects that were initially quite discrete and even contradictory" (Larner et al. 2007:223), with different origins, encompassing multiple spatialities and temporalities and engaging a multiplicity of actors.

In their constructive critique, Larner et al. (2007) underline that the current literature on Neoliberalism still tends to focus on the *effects* of marketization for particular peoples and places: "Neoliberalism is still most often used as a shorthand term to refer to the preference for market provisioning of goods and services and the emphasis on demonstrating the new forms of economic and social inequality that ensue from this approach" (p.226). This implies, according to these authors, that

social scientists tend to share the belief that these processes of Neoliberalization are inherently problematic. Far from these accounts and even challenging them, Larner et al. (2007), draw on Escobar's (1995) 'post-structuralists political economy, the political economy literature on globalization and governance, feminist and post-structuralist accounts of discourse and subjectivity, and on neo-Focauldian literature on governmentality, to read Neoliberalism not "as a philosophy or an ideology, nor as the most recent manifestation of a contested capitalist agenda (as in most accounts of neoliberalization), but rather as an assemblage of rationalities, strategies, technologies, and techniques that allow 'government at a distance'" (p.227).

They conclude arguing that:

> "The majority of analyses of Neoliberalization emphasize the pre-constituted at the expense of the co-constitutive nature of these political projects. While agreeing with colleagues that Neoliberalization can be related to enduring problems of the state and a dominant political rationality, we argue that this process emerges as much out of the cross-fertilizing among diverse strategies, projects, and experiments as it does from any prior ideological or structural-functional coherence. These strategies, projects, and experiments are co-constitutive; they work through ongoing encounters, engagements, and contingencies, and the active working of agents, discourses and tactics. That said, the co-constitutive process is not radically open and free-flowing. Rather, it is subject to strategic alignments, shared interpretations, and mutual path dependencies that establish boundaries and directionality. It is both distracting and immobilizing to think about these projects as the manifestation of a coherent political agenda. Rather, we need more dynamic understandings of Neoliberalization, a greater understanding of the relational arenas and the institutional ensembles that are being developed and reworked through neoliberalizing processes. In this context, the need for both more rigorous theorization and careful empirical research should be clear" (Larner et al. 2007:246)

With the present work we aim to respond to the need of empirical research on neoliberalization processes. We are especially interested on the inquiry of "nature's Neoliberalism" since we share with David Harvey (1996) that all socio-ecological projects are political projects. Particularly, we are interested in approaching the changing configuration in the government and governance of the urban water cycle in two different areas during the 19th and 20th century.

However, before discussing the characteristics of water and the politics and economics behind it, and flowing through the case studies, we need to review the literature related to changes in political economic approaches to the environment.

1.2 Inquiring into Nature's Neoliberalism or the Neoliberalization of environmental governance

Until now, we have presented a brief review of Neoliberalism and neoliberalization processes through the prism of Critical Geography. We have developed the different conceptions of what and Neoliberalism and neoliberalization processes mean to different authors, particularly whether the former concept is useful to label a concrete and homogenous economic and social project or on the contrary it is used indiscriminately to name a disparity of unconnected processes. Now, we will attempt to relate this broad discussion to a more concise analysis of how neoliberalization processes shape environmental governance and environmental politics and policies.

Neil Smith (1984) with his book *The Production of Nature* and his theory of uneven development under capitalism, together with the dialectics between equalization and differentiation, represents a good starting point for our purpose. Despite not referring directly to Neoliberalism as such, the concepts presented by Smith are very useful and operative in order to understand better how the Neoliberalization of the environment unfolds and how environmental policies are constructed.

From Geography many critical scholars have made neoliberal processes affecting the environment the object of their enquiries. Neoliberalism, and classical liberalism as well, are seen as both the product of, and drivers towards, the reconfigurations of socio-natural systems (Heynen et al. 2007a) or the re-working of socio-natures (McCarthy and Prudham 2004). For Heynen and Robbins, Neoliberalism is "the most recent embodiment of a well-established cycle of movement and reconfiguration, investment and production, and scouring, destruction, and abandonment" (Heynen and Robbins 2005:5). These authors (p.6) distinguish four key aspects of the neoliberal agenda on the environment:

- Governance: the institutionalized political compromises through which capitalist societies are negotiated.
- Privatization: where natural resources, long held in trust by regional, state and municipal authorities, are turned over to firms and individuals.

- Enclosure: the capture of common resources and exclusion of the communities to which they are linked.
- Valuation: the process through which invaluable and complex ecosystems are reduced to commodities through pricing.

Elsewhere, Julie Guthman (2008) remarks that Neoliberalism fetishizes the market as the mechanism to regulate human action. According to her, such reliance in the market is linked with the commofidification of everything.

According to Heynen et al. (2007), critical Geography literature on Neoliberalism has mainly targeted post-Fordist regulation (see for instance (Jessop 1994)), neoliberal reforms of labor markets (for example Peck (2002)), neoliberal reforms at the urban scale (Swyngedouw et al. 2002) or the spatiality of neoliberal reforms (Peck and Tickell 2002). However, the environment has been traditionally neglected. In this context, some scholars (Heynen et al. 2007b) argue that environmental change and environmental politics are constitutive to a certain degree of the brief history of Neoliberalism. Here we retake again the idea of David Harvey (1996) that all the ecological projects are political projects and vice versa. Continuous attempts are made to "stretch" and "deepen" the commodity circulation (Lysandrou 2005), relying on "the re-working of environmental governance and on entrenching the commodification of nature" (Heynen et al. 2007:3). Likewise, Liverman (2004) points out two emerging issues in environmental governance: the commodification of nature, and the reworking of environmental governance (Liverman 2004).

Some authors (McCarthy and Prudham 2004) have called to examine critically the somewhat overlooked nexus between Neoliberalism, on the one hand, and environmental change, environmental politics and environmental governance, on the other. The book *Neoliberal Environments: false promises and unnatural consequences* (Heynen et al. 2007b) is probably the most successful attempt to compile different studies on the environment and Neoliberalism nexus. The book intends to analyze the dynamics and outcomes of the sea change that neoliberal reforms have spawn upon the environment, the effects of which are complex and not entirely predictable. Beyond the study of the environmental impacts of the neoliberal reforms, the book is also interested in how environmental governance, and environmentalism as a set of political movements, coincide, collide, articulate, or

even enhance the emergence of Neoliberalism (Heynen et al. 2007a). As a premise, these authors envisage the relationship between environmental politics, change and governance, and the neoliberal reform as something else than a coincidence. While recognizing that environmental politics and change have become arenas to challenge the limits and costs of the hegemonic economic model, these authors insist that, at the same time, neoliberal orthodoxies "circulate through and hybridize with environmentalism" (p.11). In turn, however, this renders the study of neoliberalization more complex.

While the environment is widely accepted to be the subject under scrutiny elsewhere Castree (2007:283) prefers to use the term 'neoliberal ecologies' rather than 'neoliberal environments' as the former "expands this meaning to denote diverse but often interlinked and possibly dynamic *biosocial complexes* in which neoliberal policies and practices remake (and are remade or resisted by) the non-human world".

In critical Geographical and from other critical disciplines, Neoliberalism (and liberalism too) is depicted as a product of, and a driver towards, the reconfiguration of socio-natural systems, or, in other words, as the outcome and the cause of environmental change (Heynen et al. 2007b). Glassman (2007) calls for the need to investigate the specific environmental tensions and contradictions that appear in the neoliberal projects, following the idea of the capitalism's tendency to destroy the ecological conditions of its own reproduction (O'Connor 1988).

Despite the fact that Neoliberalism, as we have reviewed, is not easy to identify in pure and single form, McCarthy (2006) researching community forestry management in British Columbia, sets out four clear elements of neoliberal governance (p.99) of the environment:

> "a strong reliance on market forces" when formulating and evaluating environmental policy (in this case forest policy);
>
> "increased appeal to the benefits of private property rights" and to capitalize natural assets;
>
> "a strong a clear shift away from the state-centred, command-and-control regulatory approaches characteristic of the Fordist era and toward more voluntary and results-based regulatory approaches";
>
> Finally, "a strong impetus toward the devolution of governance functions to greatly expanded roles for non-state actors, including communities"

Toke and Lauber (Toke and Lauber 2007) analyze how renewable energy policy is shaped by different strands of neoliberal environmental policy in the UK and Germany. The authors contrast Anglo-Saxon 'market-based' mechanisms with the more traditional German 'command-and-control' approaches to promote renewable energy development. In doing so, the authors stress that little attention has historically been paid to the possible significance of a key early manifestation of Neoliberalism shaping the institutional environment ('path dependent nature') that latterly has influenced environmental policy in turn, in this case energy policy. This idea could be very relevant for our empirical work.

Elsewhere, Wilder and Romero (2006) reify the hybridity developed by Wendy Larner to characterize actually existing Neoliberalization processes. These authors analyze the lights and shadows, and the paradoxes of water decentralization and privatization in Mexico reaching the conclusion that such reform has resulted "in highly context-specific outcomes that are often paradoxical in nature" (Wilder and Romero Lankao 2006:1991). Therefore, and despite the importance of broader global trends endorsed by international organizations and water corporations, these authors underline the importance of the role played by other actors and sectors as agents renegotiating and reinterpreting such processes at different scales rather than being simple passive receptors of these global neoliberalizaiton. Esteban Castro (2009), referring also to the governance of the urban water flow, argues that the neoliberal model actually promotes a greater degree of non-state actors in natural resources governance and management. However, he also contends that it does so while prioritizing monopolist private capital interests over the involvement of communal water users and the citizenry.

In order to comprehend better how neoliberal policies affect the environment, it is necessary to single out the different processes by which neoliberalization of the environment unfolds. These processes are privatization, deregulation and reregulation, commercialization and/or marketization and commodification, and we will examine each one in turn next

1.2.1 Privatization of nature

The Merriam-Webster[4] dictionary defines *to privatize* as "to change (as a business or industry) from public to private control or ownership". In Spanish the concept *privatizar* (to privatize) according to the *Diccionario de la Real Academia de la Lengua* EspañolaI (22nd edition, 2001[5]) means "to transfer a firm or a public activity to the private sector" (own translation from Spanish). Similarly, in Catalan *privatitzar* means according to the *Diccionari de la Llengua Catalana*[6] to transfer to the private sector (an activity or a state-owned firm). Hence, as Andrés Sanz (1998) recalls, by privatization we do not only mean the transfer of ownership of a public firm to private hands, as public limited companies, but we do also refer to the transference of public duties/activities to the private sector.

In recent debates, the term privatization has been used to describe the transfer of ownership and/or control of business from the public sphere to the private. In Karen Bakker (2003b:331) words, privatization "refers to the shift in ownership from the public to the private sector. Private sector participation entails the participation of private companies and private capital, through a variety of contractual arrangements to build and manage infrastructure on behalf of the public sector". Castree (2008a) simply describes privatization as the assignment of clear private property rights to social or environmental phenomena that were previously state-owned, un-owned, or communally owned.

For Becky Mansfield (2008:1), privatization is actually a "variant of a more general process of limiting access to resources through enclosure, in which things are made into property that can be owned, controlled, and transferred. Privatization of nature, according to Becky Mansfield (2007a) plays a fundamental role within the larger project of Neoliberalism, becoming a key feature for the understanding of the contemporary remaking of nature-society relationships. According to Mansfield (2007a) through privatization Neoliberalism becomes possible. Instead of treating privatization as another aspect constituting the neoliberal project, together with deregulation, liberalization of trade, marketization or commodification, we coincide with Mansfield (2008) that such process is the articulating aspect that helps to hold

[4] Merriam-Webster online www.merriam-webster.com ; last accessed 22nd July 2009
[5] See also www.rae.es
[6] Diccionari de la Llengua Catalana, 2ona edició, Institut d'Estudis Catalans. Available online at: http://dlc.iec.cat

all the other aspects of Environmental Neoliberalism together. Thus, according to her, because property has become the fundamental means to govern multiple forms of nature, privatization is the central and acts a precursor to other market-based reforms. Briefly, this author sees privatization as a key moment for creating commodified things through which capital can circulate.

Mansfield adds that privatization is furthermore a disciplinary process, creating new kinds of subjects, both owners and workers, and turning nature into commodities. Privatization does not only entail an institutional shift, from the state to the market, but instead it implies a more "fundamental restructuring of political-economic and nature-society relations, including people's senses of themselves as subjects" (Mansfield 2007:396). She develops further this concept in *Privatization: Property and the Remaking of Nature-Society relations* (2008). In this work, she explains that privatization requires changes in subjectivities (individuals to act in different ways) as "property disciplines both owners and non-owners to become market subjects" (p.3-4) or "self-disciplining capitalist subjects" (p.4). Several parallelisms could be drawn between what Larner exposed around neoliberal techniques of government and what Mansfield advocates.

Mansfield (2007a, 2008) works with a broad definition of privatization that includes the extension of the property relation into new domains of nature, such as genetics, the enclosure of commons, and the privatization of environmental management through market-based instruments. Her definition encompasses three different ongoing trends of privatization of nature. First, there is the enclosure of commons, be it fisheries (Mansfield 2001, Mansfield 2004a, St. Martin 2007, Mansfield 2007b), wildlife (Robbins and Luginbuhl 2007), land (Wolford 2007), minerals (Bridge 2007) or water (Swyngedouw 2005, Swyngedouw 2007a) which started centuries ago (see for instance Marx's Capital for the enclosures of land in England in the 17 and 18th centuries), and enabled Marx's (1995) primitive accumulation. A second string of privatization would impose property relations to forms of nature not previously touched, such as the human body or other organic forms such as plants, animals, genetic materials, biological and biochemical processes and components, etc. We argue that the European carbon trading scheme is a paradigmatic example of how property rights could be found in things that were hitherto not in the market. Eventually, a third strand of privatization is constituted by the privatization of

environmental management by means of market-based instruments. The present research focuses mostly both in the first and the latter trends. In Diana Liverman's words, this remaking of property regimes is bringing about "a massive transformation of the human-environment relationship" (Liverman 2004).

Carvalho and Rodrigues (2006), revisiting the work of Fred Hirsch, insist on the "spontaneous tendency for the market to expand" (p. 337):

> "More generally, the effect of privatization of facilities previously outside the strict commercial domain, and of substitution of commercial exchange for social convention…tends to have a cumulative effect. It makes privatization more attractive or more necessary to those who have still to adopt it" (Hirsch 1976)

For John Locke and the liberals of 17th and 18th century, the enforcement of private property and hence privatization (meaning enclosure and protection of property as the natural outcome of people's labor), were seen as the best options to guarantee accumulation and the greater good for society.

Contrarily, Karl Marx, who also saw enclosure as a stimulus for accumulation, diverges from Locke in reading enclosure as means of dispossession (to separate people from the means of production) and hence of the social production of scarcity. In turn scarcity enables the capitalist labor relation and also existence of capitalists markets and commodities. Privatization of nature-based conditions of production (Swyngedouw 2007a) or the enclosure of 'public natures' (Bridge 2007) could be equaled to Marx's primitive accumulation (Marx 1995) or to Harvey's 'accumulation by dispossession' (Harvey 2003). Harvey convincingly argues that one of the forms of expansion and reproduction of the capitalist system is by incorporating peoples and resources that where previously outside its reach. Erik Swyngedouw, drawing upon David Harvey, clarifies that "the official terminology for "accumulation by dispossession" is of course "privatization" […], a process through which activities, resources, and the like, which had not been formally privately owned, managed or organized, are taken away from whoever or whatever owned them before and transferred to a new property configuration that is based on some form of "private" ownership or control" (Swyngedouw 2005:52). The author ends with a somewhat polemic statement: "[privatization] is nothing else than a legally and institutionally condoned, if not encouraged, form of theft" (p.82).

Nancy Hartsock (2006) in *A Critical Reader: David Harvey* (Castree and Gregory 2006) develops the work of David Harvey on Primitive Accumulation. Hartsock (2006:176) notes that in *The New Imperialism* (Harvey 2003) Harvey takes the position, supported by the work of Hannah Arendt and Rosa Luxemburg, that the process of primitive accumulation that Marx described in volume 1 of *Capital* did not end but still remains powerfully present within capitalism's historical geography until now:

> "Displacement of peasant populations and the formation of a landless proletariat has accelerated in countries such as Mexico and India in the last three decades; many formerly common property resources, such as water, have been privatized (often at World Bank insistence) and brought within the capitalist logic of accumulation; alternative (indigenous and even, in the case of the United States petty commodity) forms of production and consumption have been suppressed. Nationalized industries have been privatized; family farming has been taken over by agribusiness; and slavery has not disappeared (particularly in sex trade)" (Harvey 2003:145-146).

Bakker (2001) argues that the scarcity of resources, specifically water, is one of the main arguments to prompt the accumulation of capital and the stretching of the markets. In the same line, Mansfield (2007a), recalling Marx (Marx 1995), contends that privatization is not only the stimulus to accumulation but ,at the same time, it is also dispossession or the social production of scarcity. According to Marx, dispossession is the trigger and the precursor of capitalist accumulation, which welds in the same moment the capitalist commodity, the market and the wage labor relation.

Harvey (2003) quotes corporate fraud, speculation by hedge funds or raiding of pensions funds (Hartsock 2006) as the main mechanisms of primitive accumulation in operation at the beginning of the 21st century. However, he mentions a second main mechanism of primitive accumulation both in the Global North and South: the enclosure of global commons. Harvey (2003:147-148) lists four different ways to achieve such goal:

- The development of intellectual property rights, especially patenting of genetic material, and seeds that are then used against the very population who developed those materials.

- The depletion of the global environmental commons (land, air and water) that now requires capital-intensive agriculture.
- The corporatization of previously public assets such as universities, water and public utilities (we will devote more attention to this issue later)
- The rolling back of regulatory frameworks so that 'common property rights' to a state pension, to welfare, to national health care are under attack.

Hartsock (2006) traces what she considers flaws of Harvey's analysis. In the first place, according to the author "Harvey has missed the gender dimensions of what is happening in this moment in capitalist accumulation" (p.178). Hartsock argues that "primitive accumulation is not gender neutral but involves important differential treatment of women and men" (p.177). Nonetheless, Hartsock make extensive her critique to other relevant authors who approached contemporary global capitalism and have not included gender questions derived of the reshaping of the global economy: neither Hardt and Negri' *Empire* (Hardt and Negri 2000) nor Samir Amin's *Capitalism in the Age of Globalization* (Amin 1997) to put some examples are aware of gender or of "the other" for that matter. Incidentally, we can mention here that there is a potentially very rich area to explore located at the nexus of feminist research, post-colonial studies and the environment. In the case of water, for instance, the journal *Gender, Place, and Culture* dedicated a special issue to "Gender Geographies of Water" in 2009 (Reilly et al. 2009;), including the outcomes of neoliberal policies on gender issues (Ahlers and Zwarteveen 2009, Harris 2009, Sultana 2009).

Back to Harvey, Hartsock focuses more "one the recapitulation of the processes by which capital is able to become concentrated in fewer and fewer hands" (p.178) while Harvey is more interested in "the new mechanisms by which a variety of tools for dispossession feeds the accumulation of capital" (p.178).

Mansfield (2007b) underlines the fact that Neoliberalism may take multiple forms when put into practice, not only individual forms of privatization but also collective forms. The main arguments to privatize, according to Swyngedouw (2007a) are the failure of non private modes of social organization of production and the belief that market-organized production through private ownership is the best way to allocate resources.

But why do investors search for new frontiers for capital investment in the environment? Swyngedouw (2007a:54-55) thinks that this "privatization of the commons trough a strategy of 'accumulation by dispossession' became increasingly central to accumulation dynamics as the standard routes of restructuring of existing capitalist-economic processes and investments in new products were no longer sufficient to absorb the ballooning volume of capital in search of profitable investment". Far from rolling back, the state becomes very involved in 'regulating' and 'organizing' privatization and dispossession (Swyngedouw 2007a) and in establishing a post-regulatory framework and institutional body, thus setting up a new choreography of institutional and regulatory organizations with a new geometry of social power more difficult to disentangle. In other terms, privatization does not occur spontaneously as a natural and evolutionary process but the State may perform an important role creating, defining and enforcing property rights (Mansfield 2007). Therefore, the State is a key actor in the privatization process, not only enforcing property rights, but also, as Mansfield (2008) argues in creating and defining the property to be enforced in what is usually called "reregulation". Prior to shifting to reregulation, we want to explore the debate on privatization of nature in relation to changing structures of governance.

1.2.2 A key concept: governance

Governance is one of those terms ('sustainability' would be another example) that seem to fit well with everything. We clearly remember Erik Swyngedouw's commentary on what meant to be sustainable, at a workshop in Lancaster in November 2008. He argued that if McDonalds (the fast-food chain) production is said to be sustainable, the UN or the EU seek 'sustainable policies', Greenpeace defends sustainability, Mr. Bush Jr. argued to be sustainable and even Erik's soon talks about sustainability, all that this reflects is that we have a problem with the concept. With sustainability we can understand so many things and situations that the terms ceases to be useful and operational. In spite of the apparent differences, something similar appears to happen with the term 'governance'. Governance depends on the context and could be used in many diverse ways.

Governance could be defined in a general sense as the relationship between a society and its government, in economic, social and political terms. In parallel, it could also

be understood as the relationship between an organization and its governing entity. Karen Bakker (2003a) declares that governance is widely understood as the art of steering societies. She sees governance as a set of processes whereby stakeholders articulate their interests, try to impose their decisions, and decision-makers are held accountable: "the range of political, organizational and administrative processes through which communities articulate their interests, their inputs absorbed, decisions are made and implemented, and decision makers are held accountable in the development and management […]" (Bakker 2003a:4) of resources. Similarly, Furlong and Bakker conceive governance as "the process through which decisions are taken within or among organizations, including the inclusion (or exclusion) of stakeholders, and rules for accountability" (Furlong and Bakker 2007:4). In other words, governance is "the process through which decisions are taken within or among organizations. It includes: who is involved, assignment of responsibility, the setting of priorities, and rendering accountability" (p.23). These authors differentiate between governance from management; while 'governance' refers to the decision-making process and 'management' refers to the operational approaches adopted.

The notion of governance model is also important: "a governance model is a description of the principles of good governance, and of the allocation of responsibilities and relationships between stakeholders for tasks and practices required for good governance" (Bakker, 2003:5). In this sense governance models (table 1.2) differ depending on the Business model (i.e. the allocation of ownership, management, etc) applied.

Governance also varies according to scale issues and may combine different types of models: multi-level, distributed, delegated, etc. In figure 1.1, Furlong et al. (2008), referring concretely to water conservation, distinguish different types of governance, with different scales and different stakeholders.

Table 1.2. Examples of governance models for locally provided public utility services

	Planning	Market	Community
Asset owner	Government	Private Corporation	Users
Asset manager	Government	Private Corporation	Users
Consumer role	Citizens	Customers	Community members
Organization structure	Civil service	Corporation	Association/network
Accountability mechanism	Hierarchy	Contract	Community norms
Primary decision makers	Administration, Experts, public officials	Individual households, Experts, companies	Readers and members of community organizations
Primary goals of decision makers	Minimize risk Meet legal/policy requirements	Maximize profit Efficient performance	Serve community interests Effective performance
Key incentives for good performance	Expert/managerial feedback in public policy process Voter/ratepayer opinion	Price signals Customer opinion	Community norms and shared goals Community
Key sanctions for failure to maintain services	State authority backed by coercion Political process via elections Litigation	Financial loss Takeover Litigation	Livelihood needs Social pressure Litigation
Participation of consumers	Collective, top-down	Individualistic	Collective, bottom-up
Associated Business model	Municipality owns utility	Private corporate utility	Community cooperative

Source: adapted from Bakker, (2003:19) and McGranahan (2001)

We can observe a transition from government towards governance (Swyngedouw 2000), and a change in the scale of governance: "The double rearticulation of political scales (downward to the regional or local level; upward to the EU, NAFTA, GATT, etc; and outwards to private capital) leads to political exclusion, a narrowing of democratic control, and, consequently, a redefinition (or rather a limitation) of citizenship rights and power" (Swyngedouw 2000:70). This re-scaling is reproduced

in the arena of resource governance, where supra-national and sub-national institutions and governance forms become prominent, configuring a "multi-scaled articulation of institutions and actors with varying degrees of power and authority" (Swyngedouw 2007a:57). However, state territoriality and indeed the national scale continue to be important arenas for governance, even growing stronger as the globalization process increases (Mansfield 2001).

Figure 1.1. Types of governance

- **Multi-level Governance:** all levels of government are engaged and have distinct and complementary roles
- **Distributed Governance:** a range of actors, beyond governments, is included in decision-making.
- **Delegated Governance:** actors beyond government are involved in implementation of programs
- **Regulatory Governance:** Provincial, federal and municipal governments take a regulatory approach to promoting conservation where they have jurisdictions
- **Voluntary Governance:** voluntary measures and incentives
- **Regional Governance:** municipalities work together in regions

Source: adapted from Furlong et al. (2008)

Finger and Allouche (2002) remark that, in the context of a weakening State, the distribution and environmental protection issues are approached from the economic perspective even more. Elsewhere, Finger (2005) points out that under the context of globalization of the 1990s some actors, such as transnational corporations had the opportunity to change 'the rules of the game'. In the water sector, this has translated into a situation where

> "the transnational corporations have managed to take advantage of the recent globalization process in order to redefine the power relationships among actors to their advantage, codifying furthermore this new power relationship in a new institutional framework and corresponding ideology" (Finger 2005:276)

Neoliberalism, through marketization and privatization is being exposed as the dominant common's governance model (Mansfield 2004b, Mansfield 2007), where the state has a prominent role as the creator and the regulator of property rights. Actually, Mansfield (2004b, 2007), studying the neoliberalization of fisheries, highlights the critical role of the State in promoting the neoliberal shift in the

governance of the oceans. This author sees a convergence between different approaches around neoliberal and market oriented perspectives.

As Larner (2003) notes, Neoliberalism is not the unitary ideology that it seems. Moreover, contradictions arise continuously, and the Polanyian 'double movement' (Polanyi 2001 [1944]) is used in some recent works to uncover the double nature of the Neoliberalism. Karl Polanyi, in *The Great Transformation*, traced the rise of free market capitalism, analyzing its effect on different 'fictitious commodities'. The socio-natural value, physical or biological function of such 'commodities' uses to exceed largely that registered through market transactions. Thus, by treating them as 'true commodities', purely manageable through price signals, market economies are inherently contradictory. For Polanyi, the free market was itself a myth, as markets always need regulation if they are to survive. Carvalho and Rodrigues (2006), in his paper revisiting the work of Fred Hirsch, draw on Polanyi to brand the new phase of capitalism as a second "Great Transformation". This double nature of Neoliberalism and its contradictions could be observed in the north Atlantic fisheries, for instance (Mansfield 2004a). In fact Polanyi's double movement characterizes the persistence of state institutions through their re-orientation and re-organization (Lee Peluso 2007). Therefore and quite paradoxically, laissez-faire is in fact planned (Block 2001 [1944], Prudham 2007) as we explore next.

1.2.3 Deregulation and reregulation

Becky Mansfield (2007a:4) raises the critical question of whether we have to delimit privatization as a *separate from* the regulation or rather we should contemplate it as a *form* of regulation (author's italics):

> "What does it mean to carefully delimit privatization as separate from deregulation when we can also talk about privatization as a form of regulation?

Though we treat regulatory issues distinctively from privatization issues *per se*, we totally agree with her argumentation. However, we think that giving to privatization an ontological position of priority helps to understand better the functioning of nature's Neoliberalism.

Deregulation, i.e. the dismissal of norms and laws in order to facilitate the expansion of capital, appears in the collective imagination as one of the main feature of

contemporary capitalism. Noel Castree (2008a) sees this process as the rollback of state interference in numerous areas of social and environmental life so that state regulation is light touch and more and more actors become self-governing within centrally prescribed frameworks and roles. However, without dismissing the importance of deregulation,and drawing on Polanyi (2001 [1944]), Prudham (2007) or Lee Peluso (2007) among many others, we argue that paradigmatically, reregulation is as important as deregulation to understand current neoliberalization processes. According to Castree (2008a) reregulation is the deployment of state policies to facilitate privatization and marketization of ever-wider spheres of social and environmental life.

Karl Polanyi (2001 [1944]), studied the inherent contradiction between the free market and the Liberal State. *Laissez-faire* needed the constant intervention of the state, in what he tagged "double movement", both to extend the market and at the same time to protect the population from its more pernicious effects. Polany argued that while laissez-faire was planned, planning was not (Block 2001 [1944]). While the market has been expanding continuously during the 19th and 20th century, a countermovement has been always present, checking the market expansion in definite directions. Polanyi pointed at this inherent paradox of the capitalist mode of production: "paradoxically enough, not human beings and natural resources only but also the organization of capitalistic production itself had to be sheltered from the devastating effect of a self-regulating market" (Polanyi 2001 [1944]:138). In that sense, Karl Polanyi contributed to unmask the myth of the free market as there was never truly free and self-regulating as Joseph Stiglitz remarks in the foreword of the 2001 edition of Polany's book (Stiglitz 2001 [1944]). As Block (2001 [1944]:xxvi) writes that "real market societies *need* the state to play an active role in managing markets, and that role requires political decision making; it cannot be reduced to some kind of technical or administration function".

Thus, according to Polany, free market capitalism is not a real choice but only an utopian vision (Block 2001 [1944]). Along these lines, Carvalho and Rodrigues (2006) call this double movement "capitalism's indispensable impurity" (p.344). Despite writing at the outset of the 20th century, Polanyi's argument applies to the situation of early 21st century as well because this author places the norms governing the world economy at the centre of the framework of analysis of modern Capitalism.

Following the Polanyian perspective we argue that reregulation is as essential for the neoliberalization of resources as deregulation is. Current neoliberal "common sense" pictures privatization processes as recovering the natural state of things (Sanz 1998), after the Welfare State wave of the 20th century. Sanz (1998) notes that it is rather curious that International organizations have made tremendous efforts in order to return to the "natural status quo". Thus, both the United States and supranational organizations such as the World Bank, the International Monetary Fund or the OCDE, have been actively involved in recovering the "natural state of things".

Studying the urbanization of water supply in the city of New York and how materials have been reworked to shape the 'metropolitan nature', Matthew Gandy (2002) emphasizes the articulation of specific projects of resource regulation throughout time while analyzing in the wider transformation in the modes of political economic governance. Tracing the evolution of the regulatory framework is critical to understand how new modes of resource management or governance shape practices, discourses and policies.

Karen Bakker (2007a:111), is of the idea that "neoliberalization is implicated in processes of re-regulation which rescript the entitlements of both humans and non-humans, with outcomes that are not necessarily negative for what we conventionally delimit as the 'environment'. Referring to her case study of water supply privatization in England and Wales Bakker (2007a:111) contends that it is not that Neoliberalism is casually linked to improvements in water quality but rather that "neoliberalization is constituted by (and constitutive of) processes of re-regulation that may result in improvements in environmental quality". Reuniting the Polanyian 'double movement' hypothesis with the re-regulation of natural resources, Bakker writes that

> "re-regulation of resources occurs as public and private actors respond in a variety of creative, and constantly evolving ways: capital seeking profit; the state seeking to develop a mutually supportive relationship between capital accumulation and regulation, enabling economic growth and creating the conditions for political stability" (Bakker 2007a:104).

With similarities but also differences, Morgan (2004) argues that the role of the western states has been often to support and create a market framework rather than to modulate or to soften market's harsher effects. Further developing this idea, the

author introduces the concept of "partnerships" that will be developed later in this thesis when dealing with legal arrangements for the supply of water:

> "the market-state relationship in the international context tends to be premized on 'partnerships' where the public regulatory role is limited to the provision of market-strengthening support, and where it is difficult and controversial to expand that role, even where the political will exist" (Morgan 2004:12)

1.2.4 Commercialization, mercantilization and marketization

According to Karen Bakker (2005:6) commercialization "entails a displacement of public sector by private sector management institutions (understood in the sociological sense of law, rules, norms, and customs)" that involves the reworking of decision-making and management mechanisms. Elsewhere, the same author (Bakker 2007a:1003) notes that commercialization "entails the changes in resource management practices which introduce commercial principle (such as efficiency), methods (such as cost-benefit assessment), and objectives (such as profit-maximization)":

> "[Commercialization] refers to a reworking of the management institutions (rules, norms and entails the introduction of markets as allocation mechanisms, market simulating decision-making techniques, and the displacement of the Keynesian-welfarist by neol-liberal principles in policy-making" (Bakker 2003b:331)

For the specific case of water, commercialization "rescripts water as an economic good rather than a public good, and redefines users as individual customers rather than a collective of citizens" (Bakker 2007b:441). This is also valid for other natural resources, such as forests, the oceans, or even the air.

It is important not to conflate privatization, which, as we have already clarified, implies organizational changes, with commercialization, which entails institutional changes. They are interrelated but different processes. Moreover, privatization and commercialization are not always part of the same story. For instance, regarding the water sector, some publicly owned water companies are run along fully commercialized lines. Conversely, there are some private companies, mainly run under Public-private partnerships (see chapter 3) that offer cross-subsidies to its poorer consumers, moving thus away from strict commercial lines. Empirical examples, as those presented by Bakker (2003b, 2005) show that:

- Privatization may occur without liberalization, as it happened with the divesture of the public water companies in England and Wales in 1989;
- Competition for the market may occur without private ownership in the infrastructure as it takes place for instance in France or Spain.

According to this, and building on Bakker,, privatization and commercialization may be distinct modes of transformation of natural resources management. However, in practice, privatization (or private sector participation) may often imply commercialization:

> "there is a tendency in neoliberal times for public policies to redesign institutions according to a certain vision of the market, emphasizing the role played by monetary incentives and disincentives in shaping individual behaviour" (Carvalho and Rodrigues 2006:345).

Carvalho and Rodrigues (2006) state that relying excessively in such monetary mechanism could erode the intrinsic motivations of the individual unleashing a kind of "crowding-out effect", whereby external pecuniary incentives replace internal and non-monetary social practices. In what concerns the environment this dynamic translates in the fact that economic mechanisms currently monopolize the paths that should guide to a more sustainable society. We will return to this point when summarizing the dominant paradigms of environmental management.

Prior to this, it is important to introduce "commodification": another concept associated with the Neoliberalization of environmental resources, which is tightly linked with commercialization, to the point that many analyses talk indistinctively about both. Although related, commodification and commercialization present several differences: commercialization "entails changes in resource management institutions, a necessary but insufficient condition" for commodification, "which involves the conversion of a resource into an economic good" (Bakker 2007a:103). Other terms, such as marketization (Castree 2008a) and mercantilization (Bakker 2002), located between commercialization and commodification, are also deployed to qualify some processes whereby nature becomes ruled by the market.

1.2.5 Commodification

A commodity according to Karl Polanyi is something that has been produced in order to be sold in the market (Block 2001 [1944], Polanyi 2001 [1944]). Polanyi distinguishes between real and fictitious commodities, defining the latter ones as those that were not originally produced to be sold in the market, most notably land, labor and money. One of the central arguments of Polanyi lies on this distinction; he criticized modern economy for ignoring such point and treating land, labor and money as real commodities, .

Fred Block (2001 [1944]) proposes to divide Polanyi's argumentation in two levels. The first concerns morality: it is morally unacceptable to treat human beings (labor) and nature (land) as objects whose price is determined by the market. From ecological economics this refusal of treating nature as a commodity has been seen as one of the first arguments of contemporary environmentalism (Daly et al. 1989). The second level of the argumentation, concerns the role of the state in the economy and the impossibility of self-regulation by the market. This argument unites with the double movement exposed before, namely that the state must play a role in regulating commodities.

> "In short, the role of managing fictitious commodities places the state inside three of the most important markets; it becomes utterly impossible to sustain market liberalism's view that the state is "outside" the economy" (Block 2001 [1944]: sxxvi)

This impossibility of 'dissembeding'[7] the economy is explained in part by these fictitious commodities. At the beginning of the 21st century, when capitalism is searching for new frontiers for accumulation it is fundamental to expand this debate to the environment in general (and not only to 'land'). In that sense, Gavin Bridge (2007) points out that Karl Polanyi's category of 'fictitious commodities' could encompass, apart from land or labor, environmental resources such as water, fish, minerals, etc. These commodities are 'fictitious' in the Polanyian sense, as the capitalists do not produce them. Bridge supports this argument through the study of the neoliberalization of access regimes to mineral resources (Bridge 2002, Bridge 2007) and discloses how the earth is transformed into a site for the circulation of

[7] The concept of embeddness is an important contribution of Karl Polany. According to Block (2001:xxiii-xxiv) this term "expresses the idea that the economy is not autonomous, as it must be in economic theory, but subordinated to politics, religion and social relations"

(international) capital. Similarly, our intention is also to unravel how local water flows can be turned into global flows of capital.

Karen Bakker (2007a:103) defines commodification as the process whereby an economic good is created "through the application of mechanisms to appropriate and standardize a class of goods or services, enabling them to be sold at a price determined through market exchange". At the most abstract level, in a Marxist perspective, commodification entails rendering equivalent and saleable qualitative distinct things through the means of money (table 1.3). Particular use values are commensurated and operate as exchange values (Castree 2003). Karen Bakker (2007b) oppose commodity, i.e. economic good, to commons, i.e. public goods (see table 2.1, chapter 2).

In western societies there is an increasing tendency to "universal commodification", as Margaret Jane Radin (1996) points out, due to the hegemonic and dominant market rhetoric in policy-making circles. Nigel Thrift (2000:96) contends that "the process of commodification has reached into every nook and cranny of modern life". Similarly, Watts (1999) argues that more and more spheres of social life are controlled by the market. In the famous book *The Limits to Capital* (Harvey 1982:373) David Harvey asserts that "monetary relations have penetrated every nook and cranny of the world and into almost every aspect of social even private life". As Ian Gough also expresses:

> "Following decolonization and the collapse of state socialism at the end of the 1980s, few areas of the world remain to resist the logic of capitalist markets and economic enterprises. This in turn is imposing the needs of capital in more an more areas of life and is weakening the resources of states and citizens to fight back" (Gough 2000:17) quoted by Williams (2002) and Williams and Round (2007)

In the paper *Embodying Neoliberalism: economy, culture, and the politics of fat* Guthman and DuPuis (2006) argue that Neoliberalism solution to the recurrent crisis brought about by disarticulated accumulation has been the "commodification of everything". That is, "not only making markets for things that were once held in common (the new enclosures) but also creating needs and desires where none previously existed" (p. 441).

Table 1.3. Characteristics of a commodity.

	Commodity
Definition	Economic Good
Pricing	Full-cost pricing
Regulation	Market based
Goals	Efficiency and water security
Manager	Market

Source: Adapted from Bakker (2007b)

As we have already mentioned, commodification is a critical step to create not only new objects that can be bought and sold and new subjectivities in individuals. Privatization is also a critical for creating commodified things (Mansfield 2008). Prudham (2008), studying life patents in Canada, recognizes this relational character of commodification and privatization. Admitting the importance to distinguish the different underpinnings and components of the neoliberal project regarding nature, as some scholars have warned (for instance Karen Bakker (2005, 2007b)), Prudham (2008) warns that there is some peril to overemphasize the distinctions between commodification and privatization. And that is why he raises the idea of such relational character: thus, "privatization […], concerns relational moments in specifically *capitalist* commodification" (p.19).

To overcome the dichotomy commodified / non-commodified "things", Radin (1996) proposes the concept of "incomplete commodification". By this term, the author refers to the commodities that, despite being on the market are subjected to state regulatory control. We would see that water, at least in our case studies, fulfils such characteristics to some extent. For Radin, the rationale behind lies in the fact that commodified and non-commodified "versions" of certain good could not coexist for long, and that eventually the commodified version displaces the non-commodified, in what Radin calls "domino effect". In that sense, incomplete commodification policy strategies, compared to the dualistic compartmentalized strategies (based on the dichotomy commodified/non-commodified goods), are less likely to lead to Radin's "universal commodification" (Walsh 1999).

Despite the accounts that show the increasing commodification of daily life and of the environment, other authors have assessed critically such literature, finding out that non-commodified economic activity does exist. Sociologist Colin C. Williams

(2003) clarifies that those non-commodified practices are not leftovers of a pre-capitalist society but instead are signs of the contradictory nature of the post-Fordist society. Thus, non-capitalist elements exist within capitalism in order to give the system the moral elements that make it viable as a social order. Likewise, Adrian Ellis and Kumar (1983) explain that such elements are not only residues of former social systems but critical and essential elements that permit the persistence of the capitalist system. In the same line, and looking at the fixes of the financial crisis of 2008, some of them are essentially non-neoliberal, but close to Keynesianism. Thereby, instead of mentioning non-capitalist, we would rather speak about non-neoliberal elements in Neoliberalism. Incomplete commodification (by means of state regulation), proposed by Radin (1996), though addressed to safeguard some goods from "universal commodification", could be interpreted as a non-neoliberal fix to the neoliberal system. In such a sense, this could be named "actually-existing Neoliberalism", which is far from the ideal Neoliberal project.

McAfee (2003) studies how commodification not only takes place in the macroscopic natural world but also could encompass processes and elements of the microscopic world. This author focuses on how economic-reductionist arguments argue for the patentability of the genetic information and the desirability of the application of market-based management in the biotechnology arena. In her opinion this discourse extends the commodity realm to the molecular level.

In *Commodifying which nature?* Castree (2003) tries to ascertain "what is 'commodification'?", "what 'nature' is being commodified?" and "what is the material and moral significance of nature's commodification?" According to this author, we cannot speak about a common process of commodification of nature, but we have to recognize the specificity of each 'nature' to be commodified. In this sense, the process and the effects of capitalist commodification will operate and roll out quite differently, depending on the natures that are being commodified: "the process of capitalist commodification is not necessary indifferent from the natures commodified" (Castree 2003:275). Along these lines, commodification of natural resources could have a differential impact depending on class or gender. We argue that this process could have a biased and greater impact on women, especially in developing countries, where the feminine role is basic in provisioning essential resources, such as wood or water. Zwarteveen (1997) examines the consequences of

the changing water policies on women's water rights in the developing world. In the context of increasing fears of scarcity and shifting mechanisms of allocation through the market, these rights do not receive a special attention and equity issues are therefore not addressed.

Returning to Castree, this author suggests that maybe the question is more about 'what kind of characteristics do things take-on when they become commodities?' rather than 'what it is a commodity' (p.277). Castree also asks the audience why we want to talk about commodification of nature and not about the 'production of nature' (Smith 1996) or the 'valuation of nature' (Harvey 1996).

The author responds the question by clarifying that commodification

> "draws our attention to the process, and therefore the propriety, of certain ontologically and categorically distinct things being seriously altered because of their potential, temporary, permanent or indeed 'denied' commodity status. To examine commodification is to view capitalism-nature relationships through an especially illuminating window" (Castree 2003:278).

Commodification needs of the existence of other processes to take place. According to Castree (2003) processes such as privatization are critical to feed the commodification process (table 1.4).

Once these characteristics of the perfect neoliberal commodification process are established, Castree (2003) advises us to avoid visualizing commodities as an everlasting characteristic of entities. Actually, the "commodity status is not intrinsic to them but the result of the conscious and unconscious actions of people in specific circumstances" (p.283). Apart from establishing those six facets of a commodity, Castree (2003) establishes four ontological distinctive natures: Nature as external, Nature as internal, Nature as the human body and Nature as information. Subsequently Castree move towards identifying the main modalities of nature's commodification that appears in the literature: *commodification effects* (physical impacts upon non-commodities due to the commodification of proximate or related things), *incomplete commodification* (when different barriers, internal or external to the process of commodification, appear), *real commodification* (involving the facets of commodification depicted above) and *proxy commodification* (treating not commodities as commodified things through markets).

Table 1.4. Key moments of the commodification process

Privatization	"Privatization is thus as much about control over commodities – prior to, during and after exchange – as it about ownership in the technical, legalistic sense" (p.279).
Alienability	It refers to the capacity of a commodity to be physically and morally detached form their sellers.
Individuation	it refers to the physical action to separate a thing from its context. In Castree's words (2003:280) it is about "putting legal and material boundaries around phenomena so that they can be bought, sold and used by equally 'bounded' individuals, groups or institutions".
Abstraction	It has to do with how an individualized thing is assimilated to the homogeneity of a broader group.
Valuation	Capitalist commodities are monetized.
Displacement	Through the displacement process inherent in commodities intertwined social and natural relations are concealed. Thus, commodities are not things but socio-natural relations.

Source: adapted from Castree (2003)

According to Castro (2009) it is important not to conflate commodification with the application of economic principles, as price allocation mechanisms in water management. Referring concretely to water, he understands commodification as the circulation of the water flow as a private good whose exchange value includes a profit made by a private agent holding the private rights over the flow. As an extreme case, Castro gives the example of bottled water.

Once we have reviewed commodification of nature as a key processes characterizing Neoliberalism, we will end discussing a fifth pillar: corporatization. While commodification is related to changes in how resources are conceived, corporatization is a more specific term signaling organizational change in managing a public service from the public administration and adopting neoliberal techniques at the same time.

1.2.6 Corporatization

The creation of a public firm or a public organism to produce goods or services that were previously directly produced by the administration (local/regional/state) does not imply the privatization of the service (Sanz (1998). Changes in the organization could mean, according to Sanz, an increase in efficiency and efficacy in the use of

public resources. Thereby, this formula could provide a better service to the citizen and also ensure that the service will remain in the public sphere. Notwithstanding the virtues of those organizational changes, they could also have as objective to prepare the ground for the eventual privatization of the service.

The difficulties to implement an important retrenchment in State spending and intervention prompted neoliberal governments to shift the focus to new public management techniques. In other words, to make the public sector more efficient by introducing the market into the state (Gamble 2006), introducing a new jargon of targets, audits, internal markets, performance indicators, and emphasizing outputs. In Gamble's (2006:30) words, New Public Management's "central thrust is not so much concerned with shrinking the scale of government as with expanding its scope".

We do not have to simplify the reality and assume that public management means non-mercantilized management, as Castro (2009) reminds us for the case of water supply and sanitation services. Exemplifying the case of urban water management in Brazil, where some public utilities have floated shares in private stock markets, Castro thinks that the process of mercantilization/commodification/corporatization of public management is likely to have a deeper impact in some countries than the process of privatization of the 1990s. As a result, more and more public firms disregard the notion of water as a basic right and embrace economic and financial efficiency principles.

According to Castro, therefore, the corporatization process would be a result of the inertia of the privatization process. Concerning water supply, some conceptual and discursive changes would be the most important outcome: water services are no longer seen as a citizen right but increasingly public water supply and sanitation services seek profit making rather than a sustainable public service under citizen democratic control. In that sense, the privatization process has been successful in transforming how water services management are conceived. Laila Smith (2004) argues that corporatization, as it has been applied in her case study, South Africa, does not necessarily entail privatization but just more efficiency. Notwithstanding this, Smith also argues that the effects may be alike to those bring about by privatization due to the lack of transparency in the organizational transformation process. Cost-recovery is considered one of the main objectives, with the increasing importance of efficiency over equity issues. Smith continues stating that this

objective in the case study of Cape Town (South Africa) has been implemented through three strategies: water pricing, outsourcing and cut-offs and debt management.

The same author sees corporatization as a mechanism characteristic of the second wave of the unfolding of Neoliberalism, or what Peck and Tickell (2002) would call 'roll-out' Neoliberalism (while privatization is seen as the main first wave Neoliberalism tool). This process entails the state interiorizing a private ethos, in other words, it is a process of "state engineering in order to emulate private practices" (Smith 2004:377). Corporatization thus implies the creation of an arm-length entity (Yarrow 1999) fully owned by the public sector, but setting in operation ring-fencing mechanism, setting up business units and performance based management (Smith 2004) and minimizing political interference in the decision-making process. Following this, the corporatization model implies indeed a swift from government towards governance of service delivery. In this sense, "the corporatization model undermines public accountability because it inherently involves a policy shift that moves away from political processes towards greater technical intervention that places a premium efficiency at the expense of equity" (p.382). Briefly, corporatization is argued to be a more subtle form of Neoliberalism.

Despite not specifically speaking about corporatization Noel Castre (2008a) sees the existence of market proxies in the residual public sector as a constituent characteristic of Neoliberalism. This term is similar to corporatization, as it describes the state-led attempt to run remaining public services along private sector line as 'efficient' and 'competitive' businesses.

Bakker and Cameron (2002) and Bakker (2003a) distinguish two different corporate models, with common characteristics: the Corporatized public utility and Crown corporation. The former is a publicly owned enterprise operating under a framework of corporate law. This entity mimics private sector business models and the government acts as the shareholder. Corporatization could mean, although not necessarily, the precursor of privatization, as many international lending agencies such as the World Bank recommend as a prior step to the divesture process (Bakker and Cameron 2002, Bakker 2003a).

Crown corporations are a very particular model of corporatized public utilities. This model refers to a stand-alone public agency, created *de novo* under a specific law to run a public company at a regional or national level. In Canada, as Bakker and Cameron (2002) show, Crown corporations are very common. The name indicates ownership of the company by the crown; in practice, however, they are run by the government. We spend some time with this model due to its similarities in relation with the Madrid case study. In table 1.5 we present the main features of both models.

Table 1.5. Main characteristics of the crown corporation and the corporatized public utility

Crown corporation	Corporatized public utility
Corporate structure, with tasks, responsibilities and powers defined in a special act Government is sole shareholder Boards usually have representation from senior government officials Autonomy in day-to-day operational management Operates at provincial/state or national level Particularly suited for network industries which operate at a large scale Vertically and horizontally integrated Often externally audited rather than by government auditor	Utility corporation may be profit or not-for-profit It may own assets and operate infrastructure, or may operate infrastructure on behalf of an owner (e.g. a municipality) Complete autonomy in day-to-day management The public administration owns the shares and appoints the managers The public administration may retain authority over key issues such as rates policy, condition and terms of appointment of managers, diversification and acquisitions The board may or may not have direct political representation from Council

Source: Bakker and Cameron (2002:22-23)

In table 1.6 and 1.7 we list the main advantages and disadvantages of both models. Note the common features of the two models. Among the main advantages we must mention the facility to access capital markets as well as the financial and managerial autonomy. In terms of disadvantages, Bakker and Cameron (2002) mention the limited accountability or the potentially higher cost of capital, among other issues.

Table 1.6. Advantages and disadvantages of the "Crown Corporation"

Advantages	Disadvantages
Economies of scale and scope Required management expertise can be obtained Autonomous management Access to capital; may be accessed at favorable rates	Required rationalization and consolidation of industry Ineffective regulation may lead to: abuse of monopoly power, inefficient management Lack of incentives for innovation

Source: adapted from Bakker and Cameron (2002)

Bakker (2003a) argues that the corporatized public utility model, encompassing the two sub-models presented above, is found in many places, such as Canada (Crown corporation) or Western Europe, in countries such as Germany, the Netherlands, Belgium or Italy. In chapter 7 we will see that this model is basic to understand the case of Madrid.

Table 1.7. Advantages and disadvantages of the a "Corporatized public utility"

Advantages	Disadvantages
Access to capital Management independence Financial autonomy Commercial discipline	Potential higher cost of capital Reduced direct accountability to users Commercial confidentiality limits information to politicians and consumers May not be compatible with some public mandates

Source: adapted from Bakker and Cameron (2002) and Bakker (2003a)

Also very relevant for our Madrid case study is the concept of New Public Management (NPM). Nickson and Franceys (2003:7) detail the main goals and characteristics of such scheme:

- In order to overcome chronic macro-economic imbalance, the overall role of the state in the economy should be reduced;
- Within the framework of this reduced role, the state should retreat from involvement in productive sectors of the economy but strengthen its involvement in social sectors;
- In those sectors where the state retains a strong involvement, it should switch from a direct provider role to that of strategic 'conductor', at one and the same time regulating an enabling the delivery of services by other providers.

Elsewhere, Finger and Allouche (2002) refer also to New Public Management (NPM) schemes mainly taking place in the Global North: “NPM is mainly the effort, on behalf of nation-states, to streamline administrative functions by focusing on service quality on the one hand, and to more clearly distinguish between politics and management on the other” (Finger and Allouche 2002:14-15). Under such schemes, the authors underline that management is being outsourced and decentralized, and in some cases privatized.

Besides the previous widely accepted features of ‘Neoliberalism’, Castree (2008a) also classifies as an element of Neoliberalism the construction of flanking mechanisms in civil society. In other words, the state-led encouragement of civil society groups (charities, NGOs, ‘communities’, etc.) to provide services that interventionist states did, or could potentially provide for citizens. These society groups are also seen as able to offer compensations to any problems suffered by citizens as a result of privatization, deregulation, corporatization, etc. Sanz (1998) in his essay of privatization in Spain, follows the same direction. He argues that privatization is the transference of the production of a good or service to the private sector; and that NGOs, non-lucrative foundations, associations or even trade unions could be included in the private sector.

1.3 Market environmentalism and Ecological Modernization: a change of paradigm in the management of environmental resources?

Once we have presented the basic concepts and the idea of the environment under the neoliberal rule, it is interesting to think about how the neoliberal orthodoxies described before hybridize with environmentalism enhancing the role of market-based incentives and mechanisms in environmental governance (McCarthy and Prudham 2004). In other words, it is important to appraise how environmental governance and environmentalism coincide, collide, articulate or even promote the rise of Neoliberalism (Heynen et al. 2007b:12): "environmental politics and environmental governance as key arenas for extending and hybridizing political and economic projects". In this sense, environmental governance is expected to be influenced and even shaped by the neoliberal imperative to deregulate, privatize and marketize (Mansfield 2007) described in the previous section.

Why are human interactions with the non-human world being 'neoliberalized' across the globe? Why neoliberalize the governance of the nonhuman world? Castree (2008a) attempts to identify the principal logics that underlie different neoliberal policies relating to aspects of the non-human world in different parts of the Earth. This author differentiates four environmental fixes that the capitalist mode of production, under the shell of Neoliberalism, uses to face the endemic problem of sustained growth. The first one is Free Market Environmentalism, which may unfold in three different ways:

1. State bodies and private firm strategies to 'roll-back' direct state responsibility for environmental goods and services and natural resource management
2. Where such responsibility was not exercised in first place, measures are crafted so that the private sector can appropriate this responsibility. Consequently firms and other private interested actors step into vacuums deliberately created.
3. Where state bodies must, for whatever reason, retain control over their use, these resources are to be managed in market-mimicking ways

The second fix Castree develops is to 'expose hitherto protected or state-controlled aspects of the natural environment to the full force of market rationality and capital accumulation'. In other words, measures addressed to extend the capital's form and/or real subsumption of nature without any overtly 'eco-friendly' motivation. Castree (2008a) concludes here that, as a result, the non human world becomes a means to capital accumulation, or what Harvey (2003) calls 'accumulation by dispossession'. This is particularly clear in developing countries with little or no history of state management.

Castree's third is related the degradation of the biophysical world: 'actively degrading hitherto protected or proscribed nonhuman phenomena yields profit'. Clearly, this goes the way opposite to the first fix, intensifying the contradictions of capitalism that Polanyi (2001 [1944]) and later O'Connor (1998) made central in their analysis. Overall, this third fix is about capitalist firms using neoliberal measures to extend their rights over nature.

Finally, the fourth and last environmental fix suggested by Castree relates to the logics of the state and its inherent responsibilities for the relationship between the capitalist economy, civil society, and the natural environment. The state must successfully manage the consequence of these contradictions for capital, labor, and the wider public while at the same time maintaining its own fiscal stability and its credibility as a governing body. Contradictions in state apparatus may emerge due to the complexity of state regulatory actions.

After exposing these environmental fixes unfolded and triggered by neoliberal policies, Castree (2008a) reaches the conclusion that 'neoliberalism' is, in environmental terms, an apparent paradox: by giving full reign to capital accumulation, it seeks to both protect and degrade the biophysical world, while manufacturing new nature in cases where that world is physically fungible.

We argue that two interrelated ideological fields have triggered the emergence of hybrid forms of neoliberal governance: on the one hand, the reform-oriented environmental discourse of Ecological Modernization and, on the other hand, the discourse of Free Market Environmentalism, with some trends of 'environmentalism' coalescing with neoliberal economics. This fusion of neoliberal trends and environmentalism seeks, in Esteban Castro's words (2009:46, own translation from

Spanish), "to dismantle public water management capacities and to establish a water governance model based on capitalist social relations (of property, production, circulation, etc.). Castro also stresses those other branches of environmentalism that confront both market environmentalism trends and technocratic and authoritarian public management.

Next, we focus on the two ideological strands that have shaped environmental governance in the late 20th an early 21st century: ecological modernization and market environmentalism.

1.3.1 Ecological Modernization and the technological dream

The Ecological Modernization School defends the compatibility between social, environmental and economical goals, especially through technological change and the market. In other words, Ecological modernization relies heavily on technology, science, and expert-led processes of change while avoiding to address basic social contradictions

This policy-oriented environmental discourse, which strongly emphasizes the role of technological innovation and economic development to overcome and cope with the environmental problems, was born in the 1980s in Germany under the name of *Okologische Modernisierung* (Hajer 1995, Andersen and Massa 2000). The Brundtland report (Brundtland and World Commission on Environment and Development 1987) and the famous concept of sustainability were inspired by such principles.

According to Hajer (1995) there are six realms where we could observe this shift of paradigms. In the first place, regarding the techniques of environmental policy-making, i.e. a shift from 1970s 'react-and-cure' to the 'anticipate-and-prevent', with the introduction of the polluter pays principle, cost-benefit analysis, risk analysis, precautionary principle, tradable pollution rights, emissions taxes, resource taxes, etc must be noted. In the second place, science acquires a new role in environmental policy-making, and becomes entangled in the very centre of the policy-making process. In the third place, there is an important change at the microeconomic level, from the idea that environmental protection only implies costs to the concept of 'pollution prevention pays'. Fourth, at the macroeconomic level, nature appears to be

seen as a public good rather than a free good that can be used as a sink; this shift backs the emergence of environmental pricing, the management of scarce resources, recycling strategies, and also technological innovations. In the fifth place there is also a change on the legislative discourse. Finally, there appears to be a reconsideration of existing participatory practices as well.

Within this tradition, the State is seen as the enabler of markets for new technology and as the regulator of the economic sphere to be more 'sustainable'. Some scholars even consider the State as unable and inefficient to govern the ongoing environmental crisis. In this sense new forms of environmental governance are desired (Beck 1992).

After presenting the main features of ecological modernization, Hajer (1995) appraised critically the emergence of that framework. He argued that ecological modernization appealed the governments because it constituted a direct critique of the ineffective bureaucratic practices of the 1970s. Secondly, ecological modernization suggested a positive-sum solution in contraposition to the former zero-sum regarding environmental problems. The use of business language (environmental pollution as a matter of inefficiency, cost-effectiveness, and administrative efficiency) justifies that environmental improvements do not have to be secured by constraining the market logic to capitalists. In other words, ecological modernization envisages the solution of environmental problems through the opening up of new markets, new demands, and the stimulation of innovation in production, in transport, in industrial organization, etc. Moreover, it is important to remember that ecological modernization avoids addressing basic social contradictions that other discourses might have introduced. Thus, there is a structural displacement of important political decisions to other, formally non-political, realms, such as scientific councils, laboratories,(i.e. Beck's 'Subpolitics'). Consequently, ecological modernization does not call for a structural change but for techno-institutional fix for the environmental problems: efficiency, techno-scientific management, technological innovation, procedural integration, and coordinated management. Hajer (1995) not only sees in ecological modernization a technological answer to environmental problems but a strategy of political accommodation of the radical environmentalist critique of the 1970s, and a turn to and internalization of the neoliberal ideas of the 1980s and onwards.

Next, we study further this link through the analysis of the third cornerstone of the trinity: Free Market Environmentalism.

1.3.2 The rise of Free Market Environmentalism

If we see Neoliberalism as one possible 'shell' for the capitalist mode of production, as Castree (2008a) does, then this shell offers firms, state bodies, and sympathetic stakeholders a range of 'environmental fixes' to the endemic problem of sustained growth. Accordingly, Castree (2008a) suggests that the first and probably one of the most important fixes is 'Free Market Environmentalism' which allows conserving resources and ecosystems through their privatization and marketization. Karen Bakker (2007, 2008:39) summarizes perfectly what market environmentalism seeks:

> "Market environmentalism offers hope of a virtuous fusion of economic growth, efficiency, and environmental conservation: trhough establishing private property rights, employing markets as allocation mechanisms, and incorporating environmental externalities through pricing, proponents of market environmentalism assert that environmental goods will be more efficiently allocated if treated as economic goods – thereby simultaneously addressing concerns over environmental degradation and inefficient use of resources"

Elsewhere, Dryzek and Schlosberg (1998:205), editors of *Debating the Earth. The Environmental Politics Reader*, succinctly summarize the rationale of this emerging market liberalism:

> "Hard-line market liberals believe that all environmental problems have a common origin: the failure to specify appropriate private property rights. If it is a truism that people tend to take care of their private property much more carefully than they care for what they hold in common with others, why not, then, convert the environment into private property too? Market liberals have devoted a great deal of effort to exploring how property rights might be established in land, fisheries, air, and water. Once established, such rights can be exchanged in the market, available to the highest bidder and so to the most socially and economically beneficial use"

In recent years, nourished by Ecological Modernization discourses (Young 2000) and the state failure in environmental governance (Jänicke 1990), market-based instruments have been gaining importance in environmental management and governance (Andersen and Sprenger 2000, Jordan et al. 2003) where 'command-and-control' measures were predominant. Ian Baley (2007), in the context of climate

policy in the UK and Germany, attributes the important growth of market based instruments during the decade of the 1990s both to the increasing cost of direct regulation, i.e. command-and-control measures, and also to the growing influence of neoliberal ideas over environmental policy and resource management. We, as Baley (2007) does, stress the fact that little research has been conducted on Market Based Instruments (MBI) as specific tools of neoliberal approaches to environmental policy and governance.

Such change at the international level regarding environmental policy making could be clearly observed in the OECD report *Evaluating Economic Instruments for Environmental Policy* (Smith et al. 1997). Although, other authors such as Economy (2007), outline that it was back already in the 1980s when OECD countries turned their attention to economic mechanisms to develop and improve their environmental policy-making and governance systems. This period coincides with the emergence of ecological modernization as the hegemonic environmental discourse around the globe (Hajer 1995). Such mechanisms comprise "market based instruments, larger responsibilities and tasks for private actors, public-private arrangements in environmental governance, economic valuation techniques and approaches, a stronger reliance on environmental taxes and the privatization of utility companies" (Economy 2007:25). These market-based instruments, as we will see later more in-depth will be to some extent the basic axis of demand-supply strategies to regulate urban water demand.

Anderson and Leal (1982, 1991, 1997) are among the major defenders of the convenience of market-based instruments to solve environmental problems. Already in 1982 these authors introduced the term New Resource Economy, a concept envisaged as the predecessor of the term Free Market Environmentalism. In their book, *Free Market Environmentalism* (1991) they challenge the 'common perception' that environmental issues must be regulated by the government and not by the market. For some authors such as Dryzek and Schosberg (1998:205) this book remains "the best comprehensive statement of hard-line market liberalism", together with Meiners and Yandle (1993) *Taking the Environment Seriously*. Back to Anderson and Leal, they confront government and market regulation of environmental issues, or, in their words, "sustainable development" and "free market environmentalism". They suggest that "sustainable development violates ecological

principles by seeking static solutions to dynamic problems" while "free market environmentalism is an approach to environmental problems that is consistent with principles of ecology" (Anderson and Leal 1991:170).

According to these authors, the heart of market environmentalism is a system of well-specified property rights to natural resources: "it is when rights are unclear and not well enforced that overexploitation occurs" (Anderson and Leal 1991:3). Andersen and Leal build on Garret Hardin's notion of the *Tragedy of the Commons* (Hardin 1968) defending that the establishment of property rights is the solution to environmental problems as these rights provide owners with incentives to promote sustainability. Thus, emphasizing the critical role of property rights, they continue stating that:

> "Free market environmentalism depends on a voluntary exchange of property rights between consenting owners and promotes cooperation and compromise. In short, it offers an alternative that channels the heightened environmental consciousness into win-win solutions that can sustain economic growth, enhance environmental quality, and promote harmony" (Anderson and Leal 1991:8)

The role of the state remains critical in the enforcement of these property rights, i.e. the re-regulation concept presented in the previous section. In this sense, free market environmentalism assumes that people respond to the available information and incentives and that the role of institutions is to help them in this process (Pennington 1999). However, the authors clearly defend, although not directly, privatization as they argue that in the public sector, efficiency is not the main goal. In addition, they back the minimization of legal barriers to the 'innovative solution' of establishing property rights. For instance, for the case of Morocco (although a general feature in Northern and Sub-Saharan Africa), Diana K. Davis (2006) critically appraises the deployment of environmental narratives to justify economic and political control over environmental resources. This author points out to the double face of Neoliberalism in Morocco: while on the one hand policies of state retrenchment had been applied in many areas, such as social services, at the same time the State has expanded its reach and control over, even in an authoritarian way, other areas, such as environmental resources. Davis (2006) points at the example of the agrarian reform in Morocco, where the State has produced environmental discourses casting the traditional farmers (pastoralist and small holder) and its practices as threatening

for the environment, both for its alleged inefficiency and wastefulness, and for the alleged degradation of the environment they cause.

Similarly to the Ecological Modernization discourse, Anderson and Leal (1991) praise the compatibility between environmental quality and economic growth:

> "Free market environmentalism also emphasizes that economic growth and environmental quality are not incompatible. In fact, higher incomes allow us to afford more environmental quality in addition to material goods" (p.171)

Once presented their main points, we could argue, building on Pennington (1999), that Anderson's and Leal's 'Free Market Environmentalism' blends together insights from public choice theory, Coasian property rights and from the Hayekian school, and radically challenges the perspectives of environmental improvement through governmental action. In sum, "Free market environmentalism decentralizes power and harnesses self-interest through market incentives" (Anderson and Leal 1991:172)

However years later, the same authors, , in the book *Enviro-Capitalists: Doing Good While Doing Well* (1997), introduced some corrections in their discourse. Despite the fact that market based instruments became widely used, both in the public and private sector, environmental entrepreneurship was in their words "not a panacea" (Anderson and Leal 1997:4) especially in the case of global environmental problems.

Sprenger (2000:3) conceives Market-based instruments as "proxies for market signals in the form of change to relative prices and/or financial transfer between polluters and society", which are aimed at (p.3-4):

- Forcing producers and consumers to take account of the implication for the environment of their action;
- Leaving them the freedom to choose and adapt their activities;
- Enabling them to apply least-cost solutions;
- Creating a dynamic which encourages the search for and application of better and cheaper means of maintaining and improving environmental quality

Among the theoretical and alleged advantages of Market-based instruments over traditional 'command-and-control' strategies (Andersen and Sprenger 2000) some authors underline the following:

- They allow market agents to decide its own behavior (reducing pollution or decreasing consumption, for instance)
- They provide permanent incentives for technological improvements
- They provide flexibility
- They promote resource conservation through appropriate pricing
- And they provide revenues useful to reinforce the incentive effects or to reduce other distortions in the economic system

As examples of such mechanisms, we could cite charges or taxes, deposit-refund schemes, subsidies, liability schemes, and market creations, among others.

Although in our work we will use the term "market environmentalism", other authors have coined other names for such strategies. Goldman (2005, 2007) coined the term "neoliberal environmentalism" to define the development regime of the World Bank regarding global water policy. "Green Neoliberalism" is another term Goldam (2006) works with, to refer to the need to economically valuate higher developing countries' natural assets and services to therefore be more efficiently managed by the market. However, this work is highly criticized an contested by Cammack (2007) in a review of Goldman (2005) due to its allegedly lack of criticism towards the World Bank. Elsewhere and drawing on Focauldian governmentality, Rutherford (2007) coined the term Green governmentality.

According to the 4th Edition of *The Dictionary of Human Geography* (Johnston et al. 2000), in turn adapting from O'Riordan (1989) technocentrism, as a form of environmentalism is a:

> "Belief in the retention of the status quo in the existing structure of economic and political power, but a demand for more responsiveness and accountability in political regulatory, planning and educational institutions" (Johnston et al. 2000:224).

Two main strains spring from this paradigm (p.224):

1. Accommodation: "Faith in the adaptability of existing institutions and approaches to assessment to accommodate environmental demands"
2. Intervention: "Faith in the application of science, market forces and managerial ingenuity to intervene in nature to create economic growth and overcome environmental problems".

While the former, more cautious than the latter, plead for the adaptation of existing socio-economic frameworks to environmental problems, the interventionist mode believes in the power of "humanity" to transform the environment while at the same time managing the problems that arise in the process. In our opinion, both competing forms are etched on the skin of the ecological modernization paradigm, although the dominance of either one is spatially and temporally contingent.

Alternatively, the term "liberal environmentalism" has also appeared. Bernstein (2000), from a neo-Gramscian perspective, uses this concept to differentiate the international environmental norms set out after the UNCED in Rio 1992 from the Environmental Protection norms established after Stockholm 1972. While in Stockholm command-and-control and regulation reigned supreme, in Rio new approaches to market mechanisms were championed.

Using the Norwegian experience with agro-environmental taxation, Arild Vatn (2000) suggests that, despite the fact that taxes or subsidies may help to regulate the externalities arising from the interdependencies of actions by members of societies, they may pervert and obscure the original character of the problem, disguising a citizenry issue as a simply market relation. In this sense Vatn (2000:114) argues that "reducing moral issues to commodity transactions may even result in the deterioration of moral attitudes and, over time, increase the need for technical regulation" . Others, such as Hogg (2000), think that there is an overestimation of the beneficial impacts of market-based instruments, concretely environmental taxes, thus challenging the assumption that such mechanism effectively induces technical and technological changes and innovation. There relies the importance of the calculation of elasticities to determine the environmental effectiveness of economic instruments.

Critical research on market environmentalism frames such paradigm as the "neoliberalization of nature". From this prism, Bakker (2007a) conceives market environmentalism, the pursuit of environmental and economic ends via market means, as an outright example of neoliberal resource management. Baley (2007) departing from the theoretical framework of Neoliberalization of Nature, examines the reasons for geographical variations in market environmentalism, using the cases of Climate Policy in the UK and Germany. He questions the uneven geographies of emerging Neoliberalism, as sees in national policy styles and resistance of national institutional traditions the main conditioning of such geographies. In this sense the

author remarks that policies are conditioned by the historical-institutional contexts, including the historical role of non-state actors, i.e. not only the regulators but also the regulated.

1.4 Epistemological concerns

To study how nature is becoming neoliberalized Castree (2008b) proposes three different levels of abstraction. In the first place, we find a highly abstract level whereby we can identify common procedures and mechanisms that, in some ways, operate in otherwise different situations. Secondly, we come across a less abstract level throughout which we can identify specific ways in which nature is neoliberalized that are common to a specific subset of cases (e.g. water). Finally, with the most empirical level we can simply understand on a case-by-case basis[8] nature's neoliberalization with all its specificity and complexity. Castree argues that carrying out the latter without the second is nonsensical.

Actually Castree (2008b) recognizes that the answer to the question on what are the principal ways of nature neoliberalization and with which effects, must ultimately be empirical. Thus, this answer must emerge from a nuanced understanding of how particular neoliberalizations produce the effect they do in specific social and ecological circumstances.

1.4.1 Neoliberalism as a polysemous word

Castree (2008a) argues that the term 'neoliberalism' is widely used in critical geographical scholarship despite the lack of ground rules to allow comparisons between empirical cases at a variety of different scales. Thus McCarthy and Prudham (2004) claim about the necessity of specific case studies to unpack the complex interplay between environmental project, environmental change and Neoliberalism. According to Barnett (2005) and Peck (2004) there is no such thing as a generic 'neoliberalism'. Mansfield (2004a) calls for the analysis of both "the geographical constitution of neoliberalism and its geographically distinct and uneven outcomes. Leitner et al. (2007) contend that while theorizing about Neoliberalism is necessary, it could also reify its power and ubiquity. Thus, according to these authors, it is necessary to pay attention to the complex and different contestations that rework and search for to supplant Neoliberalism.

[8] An empirical 'case study' could examine events at a national or even continental scale, not just local or regional scale.

Interestingly, Jamie Peck (2004:396), draws the attention to the fact that:

> "While geographers tend to be rightly sceptical of spatially totalizing claims, splitting differences over varieties of neoliberalism cannot be an end in itself, not least because it begs questions about the common roots and shared features of the unevenly neoliberalized landscape that confronts us. It is no longer really enough to say that neoliberal states are 'differently interventionist' and that the attendant processes of institutional change are qualitively rather than quantitatively distinctive; there is a growing need to add content to these assertions, to track actual patterns and practices of neoliberal restructuring, and to make meaningful part-whole connections between localized and institutionally specific instances of reform and the wider discourses and ideologies of neoliberalism. Otherwise, the concept of neoliberalism has little, if any, utility" (Peck 2004).

Therefore, a very important role for theoretically informed research emerges in three important directions according to Peck (2004):

- Examination of the discontinuous historical 'evolution' of the neoliberal project
- Need for further work on the domestic versions of Neoliberalism in the Global North
- Work on its complex mutations in the Global South

In order to improve the study of Neoliberalism from the academic perspective, Larner assumes (2003) that three basic points should be fulfilled:

- A more careful tracing of the intellectual and policy manifestations of Neoliberalism in government policies and programs
- A more careful analysis of neoliberal ideologies, emphasizing the *hybrid* nature of Neoliberalism and its possible reinforcement or articulation within other political projects (e.g. neoconservative projects, third-way governments, etc.)
- Emphasis on the techniques of Neoliberalism, or in Larner's (2003:511) words "the apparently mundane practices through which neoliberal spaces, states, and subjects are being constitute in particular forms", i.e. performance indicators, benchmarks, best practices, audits, etc. All this "neutral" techniques are rarely mentioned or their role is systematically downplayed.

Our own project will focus basically in the second point proposed by Peck (2004), i.e. to deal with some aspects of the discontinuous evolution of the neoliberal project in our case studies. We will also include the suggestions by Larner (2003). Castree (2008a) argues that if empirical studies could demonstrate the path dependency variability and contradiction of specific neoliberalizations of specific aspects of the biophysical world then critics of Neoliberalism have a strong hand to play. Thus these studies can show how and why certain neoliberal policies fail (or not) when they mutate from the drawing board to the real world. Referring to Wendy Larner (2003) and to Becky Mansfield (2004a), Castree (2008a) argues that contextual studies help to "overcome the fear and hopelessness generated by monolithic accounts of the neoliberal project" (Mansfield 2004a:569) since "it is easy to treat neoliberalism as…unified and coherent…[as] ascendant around the world" (Larner 2003:512).

Inquiring the nature of Neoliberalism, Critical Geography, according to Castree (2008b), should have, on a cognitive level, a purpose to expose the relations of domination and inequality brought by Neoliberalism. On the other hand, in a more normatively stance critical geographers should demonstrate a determination to uphold principles and/or devise policies that will assist those in society who are most disadvantaged in terms of assets and opportunities. In that sense, Castree (2008b) proposes that any criticisms towards the ongoing processes of neoliberalization should fulfill at least these three requirements if they are to convince the audience and challenge those favoring Neoliberalism: the criticisms should be based on explicit and well-justified criteria and respond to evidences and feasible alternatives should be suggested at the level of both principle and policy. In addition, Castree asserts that the normative stance on such phenomena could be of two main types. On the one hand, there is an internal critique, which involves judging something according its own standards or showing to be auto-critical (e.g. internally contradictory in practice) such that it generates opposition and dissent. On the other hand, there is external critique that includes confronting a phenomenon with evaluative criteria that are very different from those existing (perhaps hegemonic) in a given context. Whatever the critique we use it must be well justified as a desirable and compelling base of evaluation. Briefly, Castree considers critical to 'unpack' the bases of our criticisms and be transparent on our normative stances.

As mentioned, it is important to contextualize Neoliberalism, but as Leitner et al. (2007:8) suggest, it is also critical to "examine its articulation with contestations within and beyond the state that have shaped and will continue to influence its conditions of possibility". Both the neoliberal project and its counterpart contestation are shaped by each other. Chapter 8 will specifically deal with the articulation of the contestation in urban Madrid against the privatization of the water cycle.

Peck and Tickell (2002) denounce that some scholars tend to frame Neoliberalism as a singular and hegemonic project, while others carry out unreflexively concrete and contingent analysis of local neoliberal projects. In that sense the present thesis pretends to bring about two local/regional accounts of the neoliberalization of the urban water flow though reflexively taking into account the multi-scalar connections of each case with a more global project.

1.4.2 Which is the proper scale to analyze Nature's Neoliberalism?

Geographical scale is an important factor that will shape the rest of our study on nature's Neoliberalism as different versions may exist at any and all geographical scales (Castree 2008b). Noel Castree notes, however, that the same modalities of Neoliberalism can exist at different scales in relation to a range of social and environmental phenomena. Likewise, different modalities can coexist at the same scale in different policy areas. Castree (2008b) warns us that uniting empirically the multi-scalar intertwining of these different modalities with non-neoliberal agendas may difficult our analysis. This is a key point: it is important to bear always in mind that neoliberal agendas usually blend with *a priori* non-liberal projects. For that reason, in our study we will be to very cautious to use un-reflexively the term Neoliberalism or neoliberalization. Instead, we will focus on the details and the linkages with other scalar levels of water government and governance.

Cases studies appraise and scrutinize one or several phenomena 'in a context'. The context, according to Castree (2005), who in turns refers to Cox and Mair (1989), is necessarily multi-scalar. Thus, "developing adequate historical geographies of neoliberalization is not simply a matter of proliferating case studies of 'local neoliberalizations', but calls for an understanding of the connections between and conjoint effects of these local transitions together with new scalar and network architectures in which they are embedded" (Peck 2004:399). Peck (2004) also thinks

that it is not clear at what geographical scales and levels of theoretical abstraction we can identify nature neoliberalization substantively. He further argues that Neoliberalism has at the same time a local and a transnational character. Therefore it is not neither a solely external imposed condition (from above) nor an inside job (local), but it is locally embedded and yet a transnational process. As Brenner and Theodore (2002c) in the preface of *Spaces of Neoliberalism* write, 'new localism', i.e. local and regional spaces, is becoming a key arena for the unfolding of a set of political strategies and policy experiments. However, much of the attention of the 'crystallization' of the so-called Neoliberalism has been paid at the international political economy level, therefore not considering enough the institutional and political dynamics and the socio-spatial effects of such processes at the urban scale. Elsewhere, these authors point at cities as the "key politico-institutional arenas within the broader geographies of actually existing neoliberalism" (Brenner and Theodore 2002a, Brenner and Theodore 2002b:20). In other words "cities have become the incubators for many of the major political and ideological strategies through which the dominance of neoliberalism is being maintained" (Brenner and Theodore 2002b:28). Although to identify at what geographical scale we have to work to better understand the issue may not be evident, Peck (2004) stresses the importance of local institutions in shaping the style, the substance, the origins and the outcomes of neoliberalization processes. The relevance of the local notwithstanding, McCarthy (2006) recalls that similar policies do not automatically create similar policies on the ground.

Our accounts will depart from the cities of Madrid and Barcelona, but as we develop their specific historical accounts, different scales will be encompassed: the local, the regional, the state and the transnational, and international. Although the flows of water that sustain both cities had to do with the local and regional, and at most the national scale, the flows of capital that have permitted the taming of natural flows had acquired a state and transnational character. The networks of actors intervening and shaping the Barcelonan and Madrilenian hydrosocial cycle are neither purely local nor exclusively transnational, but as we will see vary over time and encompass different multi-scalar networks.

1.4.3 An analytical framework to approach the multiple faces of nature Neoliberalism

Once we have developed the concept and the ways nature's Neoliberalism unfolds, we will present an analytical framework that will enable us to proceed with our two case studies. By drawing on Critical Geography[9] literature we will try to contribute to this field by means of empirical examples. Despite the benefits of doing case study research, Castree (2005) highlights that some of this research is 'ill-conceived' as it does not really understand the nature and rationale of this case study research. Elsewhere, Bakker (2007b:433) adds that "conceptual confusion frequently arises due to a lack of analytical precision about the wide range of ongoing reforms that are often over-simplified into a monolithic (and inaccurately labeled) 'neoliberalism'". This setback was already observed by Larner (2003), who claimed the need of more case study research. Since then (2003), several critical scholars have carried out research about the natural environment and its governance in specific locations of the world. In response to Larner's call for a more clearly specified analytical treatments of the contingent character of neoliberal projects, Peck and Tickell (2007:28) elaborate a conception of neoliberalization "as a socially produced, historically and geographically specific, crisis-driven, conjunctural, and definitionally incomplete phenomenon". Thus, Peck and Tickell aim to draw attention to the ways in which neoliberalization is a politically constructed project with deep roots in local political economies, though acknowledging the transnational nature of many of its connections and characteristics.

Castree (2005) marks some of the most important contributions and strong points of such research. Namely (p.342): a) general theoretical claims about 'neoliberalism' in the singular are subject to the complications and rigorous of empirical analysis; b) in geographical terms, neoliberal ideas and policies are shown to be variegated rather than serially produced across space; c) in normative terms the substantive and empirical diversity revealed creates space for tailored criticism and finessed evaluation.

Those points notwithstanding, Castree (2005) warns us that unless we reach a clear understanding of how 'common roots' and 'shared features and characteristics' of

[9] We use 'Critical Geography' in the sense of Castree (2005). That is, to designate in a broad sense research that in some way takes issue with the prevailing social and/or environmental order.

particular nature's neoliberalizations can be identified, two risks may arise. On the one hand, we risk identifying *formal* rather than *substantive* commonalities between cases. The other risk is to categorize different cases as "neoliberal" when common points are clearly outweighed by the divergences. Castree (2008a) suggests that we have to move beyond the abstract argument and the universalistic rhetoric around neoliberalization of nature. In that sense great care and clarity would be needed to specifying the neoliberal dimensions of the case study under investigation (Castree 2008b) as Bakker (2005) successfully did for the case of water privatization in the UK. According to Castree (2008b) specific modalities (variants or hybrid forms) of nature's neoliberalization can be potentially identified as can the way these operate in similar (or different) ways in specific places, regions, or countries. At the same time, the author notes that different modalities tend to lead to distinct social and environmental outcomes.

Bakker (2007b) summarizes the main two points posed by Castree (2005) in the following manner. First, by pointing out the failure to identify criteria by which different cases of neoliberalizing nature can be deemed sufficiently similar in order to carry out comparisons. Second, by underlining the occlusion of distinct types of neoliberal practices when subsumed under the general label of Neoliberalism.

Once this is done, Bakker tries to respond to Castree's (2005) call for an analytical framework to appraise neoliberalization establishing and parsing the three arenas of resource management upon which neoliberal reforms could be put at work. Bakker (2005) emphasized the need to elucidate specific variants or modalities of nature's neoliberalization, in part by attending to the biophysical influence of nature in the neoliberalization process. Similarly Brenner and Theodore (2002:353) argue that "an adequate understanding of contemporary neoliberalization processes requires not only a grasp of their politico-ideological foundations but also, just as importantly, a systematic inquiry into their multifarious institutional forms, their developmental tendencies, their diverse socio-political effects, and their multiple contradictions". Castree (2008a) warns that scholars could infringe some hindrances when using 'Neoliberalism' and 'neoliberalization' to refer to and judge phenomena and situations that are not necessarily comparable. When working at the national or local scales, the forms of national and local governance can be ostensibly similar but casually or substantively unconnected. In this case the author argues that these forms

can be meaningfully compared only if there is clarity and consistency in the specification of the neoliberal element of the situation.

Down to the local level, Bakker (2007b) sets a framework; that in her own words "… enables us to correctly compare different types of market environmentalism reforms, and to more accurately characterize their goals and evaluate their outcomes".

Table 1.8. Resource management reforms under neoliberal governance

Category	Target of reform	Type of reform
Resource management institutions	Property rights	Privatization (enclosure of the commons or asset sale)
	Regulatory framework	De-regulation
Resource management organizations	Asset management	Private sector 'partnerships' (outsourcing contracts)
	Organizational structure	Corporatization
Resource governance	Resource allocation	Marketization
	Performance incentives/sanctions	Commercialization
	User participation	Devolution or decentralization

Source: Adapted from Bakker (2007b)

Karen Bakker (Bakker 2007a), as Castree (2003) already noted, criticizes that scholars tend to conflate terms such as privatization, commercialization, marketization and commodification. According to her it is important to clearly distinguish between these terms to avoid the risk of concealing or obscuring a critically important dimension of neoliberal projects, "which weakens our ability to understand how neoliberalization evolves, and why neoliberal projects may sometimes fail" (p.103). In table 1.8 we present the distinct targets and reforms the neoliberalization of the environment may adopt. In turn, those targets and types of reform are grouped in three different categories. In the first place, Bakker (2007b) talks about 'resource management institutions'. This includes the laws, the rules, the norms, the policies and the customs by which resources are governed. Within this category, we find two main types of reforms: privatization and de-regulation, affecting the property rights and the regulatory framework respectively.

Secondly, she focuses on the category resource management organizations, i.e. the collective social entities that govern resources use, including both the asset

management reforms (Private sector 'partnerships') and the organizational structure reforms (corporatization). Finally, Bakker proposes a third category named 'resource governance'. Neoliberal reforms could aim to shape resource allocation through marketization, the performance (incentives and sanctions) by means of commercialization strategies and user participation through devolution or decentralization.

Her proposal aims to overcome two main confusions she conceptualizes as critical when dealing with neoliberalization of nature, in particular, and neoliberal reforms in general. In the first place, she defends that "reforms to institutions, organization, and governance are all subsumed under the general term 'neoliberalization', despite the fact that they often involve very different types of reforms, applied to different aspects of resource management" (Bakker 2007b:434). Second, she adds that sometimes, different terms such as privatization and commercialization are assumed to be synonymous when they are not. The author develops three main points to justify as critical the use the framework presented before. First, "the failure to distinguish between categories of resource management, and between targets and types of reforms, obscures the specificity of reform processes which are object of analysis, and limits our ability to compare cases" (Bakker 2007b:434), as Castree (2005) already pointed out. In the second place, such framework could be useful to address the widespread failure to properly tell the difference between different elements of the neoliberal reform process. Finally, Bakker writes that "in analysing processes of 'neoliberalizing nature', we are likely to misinterpret the reasons for, and incorrectly characterize the pathway of specific neoliberal reforms" (Bakker 2007b:436).

2 Why water? History of the urbanization of the water flow and its unique characteristics.

> [If] one chooses to take the risk of representation, one has to start somewhere, and where one starts is with a name. The name which has no literal or adequate referent…, but is used as if it did, temporally and strategically, so that a narrative can be constructed around it, temporally and strategically, for scrupulously visible political interests, is a catachresis. (Best 1999:481) quoted in (Hannah 2005).

In the first chapter we have reviewed the main debates around Neoliberalism and the changes Neoliberalism is producing in the governance of the human and non-human world. In this chapter we will see how the neoliberalization of the environment and the prevalence of market environmentalism and ecological modernization discourses have shaped the governance of water flows in the late 20th and early 21st century. This will serve as an introduction to chapter 3, where we will present the debate around the private participation in the water cycle.

Before dealing with the trajectories and discourses around urban water flows, we will provide first a general framework to understand the urbanization process of water, especially in the Western world, and the changing choreographies of power controlling this resource. By urbanization of the water flow we mean the process of mobilization of water resources to satisfy the expansion of cities.

Under the dominant political economic framework, water is affected (although unevenly) by the different dynamics exposed in the previous chapter: privatization, deregulation, commercialization, corporatization, commodification and reregulation. H_2O in its natural form and water[10] flowing through the hydrosocial cycle could be seen as new frontiers for capital investment, but also as barriers to its reproduction. According to Finger and Allouche (2002) water has evolved from being a common good and a public service into a commodity being managed according to economic

[10] By separating H_2O from water, we want to denote the hybrid condition of the latter. Similar to Swyngedouw (2005) we argue that the former becomes the latter after going an important process of transformation, both material (treatment, pollution, etc) and discursive (when the flow is considered a resource to be seized and metabolized)

principles; this transformation has been accompanied by the incipient change from public water utilities to utilities managed by transnational corporations. These processes are taking place in a context of economic Globalization, changing roles of the nation state, and the pursuit of industrial development.

Matthew Gandy (2002:22), in his inquiry on the socio-environmental history of New York, argues that "to trace the flow of water through cities is to illuminate the functioning of modern societies in all their complexity". Therefore he concludes that "history of cities can be read as a history of water". We will build from this statement to reconstruct the history of water in Madrid and Barcelona. Coming back to the urbanization of water, city landscapes are, according to Gandy "sculpted into a life-sustaining circulatory system through the interaction of the flow of water and the flow of money" (p.23). Elsewhere, Swyngedouw (1997) suggests that water lubricates the circulation of capital, constituting thus a necessary although sometimes invisible precondition to modern life and industrialized societies. Bakker (2003b), similarly, contends that water as a resource continuously circulates through the hydrosocial cycle –a en embroiled and complex network of pipes, meters, water laws, quality standards, gardens, swimming pools, leaking taps, as well as rainfall, evaporation and runoff. Briefly, water circulation is not only dependent on climatologic conditions and on the hydrological cycle but also upon institutions and practices.

In this chapter we attempt to expose why we consider water relevant for the study of how environmental governance works under a context of ecological modernization and market environmentalism. Water will be the vector used to elucidate how a resource becomes urbanized (i.e. captured to feed the urban metabolism), how and who governs it, and how these configurations of power change over time. Tracing the urban water flow will permit us to understand how political-economical contexts have evolved. In this sense we follow David Harvey (1996) dictum that ecological projects are always socio-political projects, and vice versa.

2.1 The singular characteristics of water

Prior to describing the historical stages of the water supply and analyzing the current situation and the change of paradigms in water management, we want to recapitulate on the singularities of the water flow. Water, and concretely water supply, presents certain characteristics that make it different from the rest of goods and services, which needs a change of approach towards its study.

2.1.1 Is water a different and special good?

Water has some intrinsic characteristics that differentiate it from the rest of natural resources. In figure 2.1 we present some of these features collected by Savenije (2002) and Savenije and Van der Zaag (2002). While some of them are shared with other resources we argue that only water captures all of them at the same time.

Figure 2.1. Characteristics of water

- It is essential for life, such as other essential goods as air or energy.
- It is fugitive. It flows under gravity. Therefore, if not captured, it is gone and its availability varies over time. Of course there are stocks of available fresh water, but they are very small compared to fluxes. Hence, the big difference with fuels, whose stocks are much larger than annual fluxes.
- It constitutes a system
- It is bulky. Therefore it cannot be transported easily from one place to another as it is done with other goods, unless large amounts of energy and work are employed (water transferring).
- It is non-substitutable. This is due to the fact that the alternatives to water are rainfall water, groundwater, surface water, etc, which is water from the same system. This is another large difference with other goods such as fuels, which have different alternatives to satisfy the same function (oil, gas, coal, wood, etc…). It could be argued that with the massive introduction of desalination plants along the coast of some countries, a trade-off between water and energy will take place.
- It is not freely tradable (except for bottled water, water transfers, or with virtual water. The latter one is seen as a mechanism to save water for a country (Chapagain et al. 2005)

Source: Savenije (2001) and Savenije and Van der Zaag (2002)

Furthermore, water is essential for a wide variety of ecological services (Brooks 2006).

For all these reasons, authors such as Savenije (2002) or Savenije and Van der Zaag (2002) argue that the character of water precludes the application of market theory to allocation of the resource between sub-sectors and different water using categories. However, they recognize that market mechanisms could be applied in one category, such as urban uses. Then the classical interpretation of water as an economic good

may be useful if there is an ability to pay. This may exclude some social groups, mainly from developing countries but also the urban poor of some western cities.

From a geographical perspective of commodities, Page (2005) highlights the special characteristics of water. First, water does not tend to move very far between production and consumption, with the exception of flows of water embedded in food. This is because it is heavy and bulky, and therefore expensive to transport, and has forced engineers to try to minimize the distance between the source and the water user. Moreover, the state is engaged in the production of water since it is considered a basic necessity and a key element of national infrastructure (at least in the most countries). Finally, water supply is normally categorized as a service, rather than a good, which implies that, as Page states, (p.295) "that is not the water for which a consumer pays but the delivery of the water to the home".

Besides this discussion we should point out as well the usual misuse of the term public/private good when talking about the ownership of the resource. It is worthwhile to clarify this widespread conclusion since it may generate some misunderstanding. Gleick et al. (2002), using economic parlance, defend that:

> "Economists define private goods as those for which consumption (or use) by one person prevents consumption (or use) by another. Water for consumptive use is a private good. Public goods are those that can be used by one person without diminishing the opportunity for use by others. Water-supply systems are public goods because, in most circumstances, delivery of water to one household does not prevent delivery of water to another household. The economic definitions of private and public goods should not be confused with public or private ownership of goods. A private good can be publicly owned" (Gleick et al. 2002:16).

From the economic perspective, water supply presents some issues that require especial attention. The existence of a natural monopoly in water supply services is probably the most relevant of such issues. However, other features, such as the existence of positive externalities or the fact that water is considered a merit good contribute to nourish the debate on the desirability of private participation in the water sector. Below, we present the arguments deployed by proponents and critics with the notion of water as a commodity.

2.1.2 The existence of a natural monopoly

The intrinsic characteristics of water and of its industry preclude competition for substitutes (other products could not replace water) or competition within the market (once one firm supplies an area, a second one can not enter into that market). Thus water only allows for competition for the market (in the form of concurrence to obtain the concession to supply a given area). As a result, urban water services are usually seen as natural monopolies (Morgan 2006) due to their capital-intensive nature. Indeed water industry is said to be the monopoly par excellence (Nickson and Franceys 2003). We will review the concepts of monopoly, concretely of natural monopoly, and other related terms, such as market power, all of them important to understand the unique nature of the urban water supply industry.

Different issues contribute to the creation of a natural monopoly: for instance the existence of economies of scale and the lack of competence between deliverers. One of the most common barriers to allow competence between deliverers is inherent in the technology, and thus difficult to avoid. Gómez-Ibáñez (2003), reviewing the literature on infrastructure monopolies, clarifies that durable and fixed investments, and not economies of scale, are "the defining characteristic" (p.9) of these monopolies. Interestingly Gómez-Ibáñez (2003:9) also points out that "an effective monopoly in local infrastructure depends on the customers, as well as on the company, making durable and immobile investments. The customers make their durable and immobile investments when they establish their residences and businesses in the territory served by the infrastructure company".

Davis (2005) presents some aspects of the water sector that both contribute to the emergence of natural monopolies and at the same time make difficult large private gains. This author refers to the capital intensiveness of the sector, the demanding lumpy capital investments, the long useful live of the assets, and the low ratio of recurrent to fixed cost. These elements configure a sector with substantial revenue risk for service providers. In this sense the author indirectly makes a defense for the public engagement arguing that many characteristics of water and supply economics appear more consistent with the long-term planning horizon of the public administration than with the priorities of private companies based on profit-maximization and risk-minimization.

The existence of a natural monopoly (full or partial) under private hands forces the government to regulate prices for such basics services; at the same time, the government must commit to a schedule to ensure a regular revenue flow for the investor. Gómez-Ibáñez (2003) remarks that this situation may lead to two possible risky outcomes. On the one hand, there is a potential risk for the investor since once investments are made the government may be tempted to ask for lower tariffs knowing that companies cannot withdraw the investments already made. On the other hand, there is a potential risky situation for the government and/or consumers. Since the company awarded enjoys a monopoly, this discourages the competitors to enter the market due to immobile, durable, and expensive investments. In turn, the lack of competition raises fears that the company may increase prices well above the costs.

Johnstone and Wood (2001) challenge all these assumptions and bring into question the idea of the existence of natural monopoly for the water sector. These authors argue that the introduction of vertical 'unbundling' into the water sector may break its monopoly condition. However, according to Bakker (2007a), when analyzing England and Wales change in water industry, attempts to direct competition by 'common carriage' of bulk water through supply networks were fraught with high costs, technical barriers and concerns over public health.

Some authors, such as Gómez-Ibáñez (2003), prefer to use the idea of 'market power' instead of that of 'monopoly'. While monopoly classically involves a single seller serving a market, market power is usually referred as "the degree to which a company can raise the prices for its products above its costs without losing too many sales". Gómez-Ibánez (2003:6) summarizes the difference between monopoly and market power:

> "Monopoly can be misleading, because the presence of only a single seller is neither necessary nor a sufficient condition for effective market power. Even if there is only one seller in a market, for example, that firm may not be able to charge prices above cost if it believes that doing so will imply invite many other firms to enter the market and compete with it. Similarly, even if there are several sellers in a market, they may find ways to collude so as to effectively inhibit competition".

In that sense, the conditions for a firm to enjoy market power are (Gómez-Ibáñez 2003):

1) The existence of barriers preventing other firms to enter the market, either created by the government or firms or triggered by industry's technology. E.g. natural monopoly.

2) The existence of few close substitutes for the good or service. Again, a clear example is piped water. Therefore, private water suppliers may enjoy a great degree of market power.

Bakker (2003b) recalls that the water and sewerage sector is characterized by its long life (although also by a quickly outdated infrastructure) together with a highly inflexible and highly capital-intensive nature. In the Global South this situation is translated into technical difficulties to expand the networks, which, along with institutional problems, result in the uneven and unequal distribution of the resource. Bakker labels this as the problem of the 3 'lows': low investment, low service standards and low cost recovery.

Briefly, the monopoly issue, combined with the intrinsic characteristics of water presented before, turns urban water governance into a peculiar public service. Competition for provision, in the case it exists, is always indirect, i.e. for the service per se, and not competing with different infrastructures.

Apart from this, other issues characterizing water supply services, such as the existence of externalities, the asymmetry of information and the condition of merit good should be taken into account to realize the singularities of this sector. We will examine these issues next.

2.1.3 Externalities, merit good and the asymmetry of information

In Economics, an externality is the effect produced on third parties not involved directly in a transaction between the seller and the buyer of a good or service. Externalities could be positive or negative. In the case of water supply and sanitation services, externalities are mostly positive, and health-related, and, allegedly they cannot be captured in market prices. Most of thse positive externalities are health and environmental improvements steaming from water supply and especially from wastewater treatment (Johnstone and Wood 2001). Therefore, as Nickson and Franceys (2003) contend, an unregulated market will deliver a sub-optimal allocation of water. This means that if control and regulations are not implemented water will

lack for some people and for some uses. This is an extra argument supporting the public involvement in the government of the urban water cycle.

Tightly linked to positive externalities, some authors, such as Nickson and Franceys (2003) or Johnstone and Wood (2001), define urban water services as a merit good, i.e. one from which the consumer benefits to a greater extent of what she or he realizes. Davis (2005:152) defines a merit good as one "to which society judges all its members should have access, and which is expected to be underproduced by market because its consumption generates positive externalities whose value are not reflected in its price". This author, who recognizes that qualifying water as a merit good is a matter of opinion, includes water supply and sanitation in this classification, together with other merit goods such as primary education, vaccination programs, and fine arts institutions.

The asymmetry of information between providers and consumers (this point being especially critical in low-income countries) is another issue that has to be taken into account (Nickson and Franceys 2003). Mainstream economics requires symmetry of information between buyers and sellers in market transactions. In the case of the water sector, this condition is clearly not achieved, as citizens do not have enough information regarding the characteristics of the 'product' they are purchasing.

2.1.4 Water: Human right, common, or commodity?

> "Food and water are basic rights. But we pay for food. Why should we not pay for water" Ismail Serageldin at the Second World Water Forum, The Hague (Gleick et al. 2002:21)

The statement quoted above by Ismail Serageldin, founder and former Chairman of the Global Water Partnership[11] (1996-2000) and also former chairman of the World Commission for Water in the 21st century (1998- 2000), is paramount to understand how water is thought and envisaged in the 21st century. At the same time, it provides some hints to comprehend how some concepts have evolved and are co-opted by private capital so that they are no longer valid for many critical discourses. Such is

[11] The Global Water Partnership was founded in 1996 by the World Bank, the United Nations Development Programme, and the Swedish International Development Agency with the aim to foster integrated water resource management. This network is open to all organisations involved in water resources management, be it public or private.

the case of the human right to water as an argument to preclude the privatization of water supply.

Water supply as a human right has been claimed even by the United Nations (2002). Concretely, the UN Committee on Economic and Social Human Rights, referring to socio-economic rights speaks about "sufficient, safe, acceptable, physically accessible and affordable water" (United Nations 2002: article 2)

The existence of such characteristic is for some authors sufficient to justify public direct provision of water (Delclòs 2009). Privatization of water supply may entail some risks regarding market issues: takeovers, disinvestments, geographical re-allocation, bankruptcies, inefficient operation, political risk, etc, which according to Swyngedouw (2007a) may challenge the long-term sustainability of market-based urban water supply.

Despite that this claim is often quoted as clear evidence that the responsibility for water services should be retained by the State, Davis (2005) suggests that state responsibility for basic services provision does not presuppose and require direct public provision and could be delegated to private sector

Others, while arguing that these characteristics alone do not justify public direct provision, agree in that they provide a strong argument for promoting public sector regulation when private direct provision exists (Nickson and Franceys 2003). Similarly, Bakker (2007b), despite being far from defending private participation in the water sector, acknowledges that privatization may be totally compatible with human rights to water. In that sense, she coincides with Morgan (2004:16):

> "[…] Nor is human right to water necessarily incompatible with private provision. Even imposed as a mandatory obligation on national state governments, it can be given technical and practical flesh via the entrepreneurial initiative of well-resources private actors such as multinational water companies in combination with a regulatory framework controlled by public actors". […] "The rhetoric of a human right to water once implemented and fleshed out in practice has a tendency to dissolve into a series of strategies eerily resembling consumer right –an important dimension of a market state but hardly a frontier against its expansion".

Human rights and consumer rights, according to Morgan (2004) increasingly appear as part of a unique, coherent and indeed fairly technocratic conversation. In this sense, Bakker (2007b) insists that the discourse on human right to water as anti-

privatization campaign makes three strategic errors (p.439): conflating human rights and property rights; failing to distinguish between different types of property rights and service delivery models; and thereby failing to foreclose the possibility of increasing private sector involvement in water supply. Briefly, Bakker pleads for the use of the commons perspective for water instead of the human rights perspective.

Morgan (2004) highlights sees many images of water, especially in the non-western world: a communal natural resource held in common, a human right, a fundamental need, and even as a sacred fluid or a physical mystery. The author argues that these visions clash with "the legal and regulatory frameworks that ensure the sustainability and efficiency of massive capital investments into the physical infrastructure that makes access to water the effortless turn of a tap" (p.14). That said, Morgan puts as an example how the problematic and conflict-ridden 1999s concession contract of water supply in Cochabamba to International Water (Bechtel and United Utilities) conflicted with ancient indigenous practices: collecting rainwater for instance became subject to an authorization (paid) system.

A commons perspective should take into account the unique qualities of water. For instance, as Shiva (2002) poses, water could be conceptualized as a non-substitutable flowing resource essential for life and ecosystem health and tightly bounded to communities and ecosystems through the hydrological cycle. Bakker (2007b), using again the argument developed by Shiva (2002), sets out three arguments to justify community management of water resources (p.441):

a) Water supply is subject to multiple market and state failures;

b) Water has important cultural and spiritual dimensions that are closely articulated with place-based practices;

c) Water is a local flow resource whose use and health are most deeply impacted at a community level. Therefore, under a common perspective, water conservation is more effectively carried out through a collectivist, environmental ethic of solidarity.

According to Bakker (2007b), this 'commons' view of water resources, and not the view based on human rights, is in real opposition to the commodity view (see table 2.1). The commodity perspective contemplates private ownership and management of water supply systems as possible, and indeed preferable. As long as water is

similar to other essential goods and utility services, private companies can efficiently run and profitably manage water supply systems. In disagreement with this perspective, Bakker (2007a) opposes that water does not fit in the neoclassical definition of a commodity, i.e. "a standardized good or service, with interchangeable units, sold at a price determined through market exchange" (p.107).

In the context of the water industry privatization in England, the author points at two main barriers hampering the commodification of water: the variation of water quality between catchments and the fact that water supply networks were not integrated even within company supply areas. Bakker (2007a) speaks about a quasi-commodity or a partially commodified good. Other barriers to commodification, in this case before the privatization of water supply in England (chapter 3), were the absence of competition and the lack of market-based pricing mechanisms.

Table 2.1. The commons versus commodity debate

	Commons	**Commodity**
Definition	Public Good	Economic Good
Pricing	Free or "lifeline"	Full-cost pricing
Regulation	Command and Control	Market based
Goals	Social equity and livelihoods	Efficiency and water security
Manager	Community	Market

Source: adapted from Bakker (2007b)

Despite the evident differences between both perspectives, Bakker (2007b) reports some points of convergence. On the hand, both parts accept that commodification is fraught with difficulties as water is conventionally considered to be an imperfect public good, which is non-excludable. Full commodification rarely occurs: although private property rights can clearly be established this does not imply full commodification. On the other hand, both neoliberal reformers and 'commons' defenders raise the issue of dissatisfaction with centralized bureaucratic state provision.

Once we have revised the main characteristics of water and some key concepts such as those of natural monopoly, human right or commons, we will move towards the history of the implementation of centralized water supply systems in the urban

sphere. What follows next is a general description that attempts to provide the reader with broad idea of how water becomes urbanized and the scalar nature of its management and governance.

2.2 Stages in the urbanization of the water supply

Water has historically been (and of course still is) a critical resource for the support of urban life. The genesis of cities cannot be understood without tracing how water has been mobilized to permit urban growth. From the use of local resources, such as groundwater, to the transportation of water through channels derived from dams, ending up with technological artifacts such as desalination plants, water has become urbanized through history, and especially since the Industrial Revolution, facilitating the massive concentration of people in cities. The singularities of the material side of the urbanization will not be the subject of this chapter. Instead we will focus our attention to the changing control over the flow of urban water.

Since modern water supplies in western cities were established, different and shifting configurations and types of water control regimes have taken place. Although each case may have followed a given geographical-historical trajectory, we can highlight four main stages for urban water supply in the western world:

1) Atomized private suppliers in the city
2) Municipalization and monopoly over the urban water flow
3) Increasing role of the State, even to the point of nationalizing water suppliers
4) Private participation in the urban supply of water

As Erik Swyngedouw (2007a) notes, we can observe a dialectical relation between the State and capital from one historical stage to another. This dialectical relation between the public and the private sphere will encompass different scalar geometries of power, from the local public administration or bourgeoisie to the international level with regulatory bodies and transnational companies, encompassing also the national level with the State, the stock exchange markets and national companies.

2.2.1 The supremacy of private delivery in the early 19th century

The first phase of modern water supply comprises the period up to the mid 19th century, when private delivery of water was hegemonic almost everywhere (Kerf and World Bank 1998, Morgan 2004). The practice of water concession dates back to the

Middle Ages (see for instance Bezançon (1995)). By the early 19th century small private companies supplied usually some parts of the urban fabric (especially in Europe and North America), normally the richer ones, creating therefore a notorious social stratification of service provision (Swyngedouw 2004). Encouraged sometimes by the public sector (Davis 2005), the private sector undertook a large share of the investment in the first water supply and sanitation networks, mainly in the US and England. Budds and McGranahan (2003) argue that private participation in water supply was already widely debated by then. Gandy (2002) characterizes 19th century Western water technology as an organic form with limited flows of water. These flows of water were only directed to the well-off neighborhoods as a private good subject to the ability to pay of the consumer (Castro 2009).

Kerf (1998) compiles interesting examples from three different countries (France, Britain, and the United States). where private companies developed much of the early water infrastructure: Thus, in France, the French government granted already in 1777 a 15-year concession to the Perrier brothers to collect and distribute water to households in some districts of Paris (see Bezançon 1995), and the 19th century saw the foundation of the two most well-known French water companies: *Compagnie Generale des Eaux* and *Lyonnaise des Eaux.* Elsewhere, in London, there were as many as six private water companies supplying some parts of the city by the 1820s (Foreman-Peck and Millward 1994). Regarding the United States, at the dawn of the 19th century 15 out of the 16 waterworks constructed were privately owned. Gómez-Ibáñez (2003) points out the existence of two important waves of the construction of private water systems: immediately before and after 1800, and between 1875 and 1890. Nonetheless, by the end of the century in the US (table 2.2), the public administration became the dominant supplier of water, at least in cities (Jacobson and Tarr 1995). According to Gómez-Ibáñez (2003) after the 1890s, several cities across the US purchased their private systems, while most of the new systems were public. Hence, the share of private participation declined to 24 percent by 1915. Table 2.2 summarizes such change of ownership in the United States of America.

Table 2.2. Private ownership of water utilities in the United States, 1800-1915.

Year	Total waterworks	Privately owned waterworks	Municipally owned waterworks	Percentage privately owned
1800	13	15	1	93.7
1825	32	27	5	84.4
1850	83	50	33	60.2
1875	422	195	227	46.2
1890	1,878	1,072	806	57.1
1896	3,179	1,489	1,690	46.8
1915	4,440	1,395	3,045	31.4

Source: Gómez-Ibáñez (2003: 160)

Throughout the 19th century there were generalized quality and quantity problems concerning water supply regardless the source (surface or underground). With the emergence of industrialization pollution in water soared. At the same time, industrialization pushed migratory flows towards cities, enlarging their population and consequently increasing the demand for the resource..

Many cities had to rethink their water supply and some (for instance, Madrid, Washington or New York) opted to bring water from far away. Others decided to strengthen their current supply or draw more water from nearby sources. Therefore, two main options were considered by that time: either to draw water from nearby sources and lift it by means of a steam machine, or to bring water from far away sources and convey it by gravity. Although the latter was more expensive than the former, it required less maintenance and did not rely upon the replacement of the steam machine. We will see this dichotomy when presenting the Barcelona and Madrid cases.

The historian Rosario Martínez Vázquez de Parga (2001a) reviews different European cases to show the multiple and hybrid configurations of the water supply setting in material terms (figure 2.2).

Figure 2.1. Examples of the water supply in some European cities

Paris: The origin of water supplied was diverse: the Seine river, nearby springs, and from far away by means of the channel Ourcq. The allowance per capita was around 73 lpcd, including water for the fountains, garden watering and street cleansing.

Marseilles: in 1847 a channel of 83.5 kilometers length was completed to bring water to the city. However, it was an open channel, which entailed some problems such as the loss of water (leaks, evaporation) and quality deterioration.

London: the city of London chose to pump water by means of steam machines. The allowance per capita was 52 lpcd. The management was carried out by private water companies, offering a very precarious service with frequent interruptions. Water was in shortage for fire extinction duties and even lacked for watering the garden or fill monumental fountains. Epidemics struck recurrently the city which stimulated municipal campaigns to encourage the citizens to use more water, and prompted the need to control water quality tightly.

Manchester: before 1848 water in Manchester came from local wells, plagued with quality problems. In 1848 it was proposed to draw water from Etherow river and to construct terraced water tanks, in order to filter the water.

Lisbon: Lisbon was supplied by the *Acueducto de Aguas Livres* (18th century). Beauty and majesty were championed at the expense of functionality. As a result, some parts of the city lacked supply. The average allowance was 4.46 lpcd.

Source: adapted from Martínez Vázquez de Parga (2001a)

This author also exemplifies some cases in the United States (figure 2.3), where the context was quite different regarding water supply, which was a municipal duty. Public works were more developed that in Europe due to better economic and material conditions. Some of these cities had water allowances in the 18th century that even today could be acceptable.

Eventually, and in general terms, the private-led model of water supply of early 19th century failed in the medium term since most of the population was excluded from the service. In turn, this gave rise to the public delivery model widely spread in the western world in the 20th century. According to Esteban Castro (2009) the expansion of commodified domestic water services required the existence of the figure of the 'private consumer'. Thus, while privatization was one of the cornerstones, Esteban Castro argues that it was also needed to discipline the bodies in the Foucauldian sense to trigger the implementation of commodified social relation in the access to water. However, this project could not progress in the medium term because it was limited to a few 'well-off' citizens with the ability to pay for those services.

Figure 2.2. Examples of the water supply in some US cities

New York: until the end of the 18th century New York was watered with local wells. However, increasing industrialization forced to focus on continental sources. An aqueduct was build to connect the Croton river with the city.

Washington: by 1851 the allowance was as high as 240 lpcd. However, new works were drafted to bring more water to secure the future water supply for the citizens and other public uses (fountains, cleansing, etc.). It was finally decided to draw water from the Potomac river and conduct it through a channel of 22.5 kilometers by means of gravity. The work was finished in 1859.

Philadelphia: by 1831 it had an allowance of 163 lpcd thanks to the four big water tanks storing water pumped from the Skaylkill river.

Source: adapted from Martínez Vázquez de Parga (2001a)

2.2.2 The municipalization wave of late 19th and early 20th century

Apart from the reduced access to drinkable water (Castro 2009), sanitary and environmental degradation concerns, such as fire, disease, material impoverishment or social unrest (Gandy 2002) were other key factors that prompted the municipalization of urban water supply.

The 19th century water-borne epidemics, especially cholera, which wreaked havoc in urban Europe, unleashed an important debate regarding the need to generalize water supply to all the population. A wide consensus was forged (Castro 2009) among the different social classes and political parties and forces, encompassing even most of the business sectors: water was an essential service that could not be provided by the market as a commodity but actually needed state intervention to guarantee the supply.

However, there is not a consensus on whether water stopped to be a commodity or not. In that sense, Rogers et al. (2002) argue that despite the "sanitary revolution" of the 19th century required public ownership and management of most of these companies in the name of public health, water was still treated as an economic good. However, the authors acknowledge that the important emphasis on the public-good nature of water and its disposal led to the development of heavily subsidized public systems, under a command-and-control approach. This pattern was followed by most of the countries around the world except for France and other cities in Mediterranean countries, such as Barcelona.

This stimulated the implementation of the first modern hydraulic structures, with great quantities of water transported through a complex network of pipes and sewers (Gandy 2002). Against the backdrop of the sanitary reform, governments, with the goal of universal provision, progressively assumed the duty of installing and managing piped water and water-borne sewerage systems (Budds and McGranahan 2003); in other words, the public sector dominated water delivery during the first decades of the 20th century (Morgan 2004), with the municipality as a key player. Municipalized water and sanitation services were conceived, according to Davis (2005), as public goods, providing a multiplicity of functions: fire prevention, disease control, prevention of environmental degradation, etc. Since the industrialization, urban water services have been generally provided by the State (Morgan 2006). In his book *La Conquête de l'Eau: l'avénement de la santé à l'âge industriel* [The Conquest of Water: The advent of health in the industrial age] Jean-Pierre Goubert (1986) describes how water has been increasingly become a resource to be managed and employed for health issues and to facilitate everyday life.

Rueda Laffond (1994) proposes two different understandings of municipalization that could be drawn from the literature and documents of that period. On the one hand, this process could be envisaged as institutional strategies directed to regularize and enact laws and norms to supervise urban services, regardless of the management, or even of the ownership. On the other hand, municipalization may have pushed for a stricter intervention on the management and exploitation of such services, performing then a role as an active economic agent. According to this author, the municipalization of urban services, especially in Europe, was endorsed by different interests and networks of actors forming coalitions or sharing common goals. In the first place, municipalization can be seen as a direct consequence of the crisis of classic liberalism. Both conservatism championing industrialism, and Social democracy, endorsing Municipal Socialism, took for granted that some intervention in the economy was needed. In the second place, hygienists strongly backed the direct exploitation of urban services by the municipality as theses services lay at the heart of social reproduction.

2.2.3 Up-scaling the networks of government of the water supply

As Erik Swingedouw (2004, 2007a) describes, a third stage began approximately after World War I, when the water industry was seen as a cornerstone of national growth. Although uneven geographically, a wave of nationalization swept across most of western world. Budds and McGranahan (2003) argue that throughout the 20th century, these efforts crystallized and were institutionalized in countries around the world: the water sector was almost exclusively dominated by the public sector. That meant that the State was, in different degrees, the regulator and the manager of highly subsidized public water utilities. The State invested and funded the sunk costs of expanding and enlarging the supply of water (through networks, dams and canals) both to provide basic collective production and consumption goods at a subsidized price for citizens and industry and to generate demand for investment goods from the private sector (Swyngedouw 2007a). In the case of Spain, this wave did not exist. Instead the State had a key role in constructing large public works for water supply in agriculture and electricity production but generally not for urban areas.

As Bakker (2003b) remarks, the 20th century witnessed an increase in state dominance (both local and supra-local) of the water sector. However there was a diversity of water supply management systems worldwide, operating along a continuum of fully public and fully private, with repeated shifts back and forth between private and public ownership and management. These shifts notwithstanding, the State gained an important role as the owner, manager, and regulator of water supply infrastructure, due to different implicit needs or characteristics of the sector: large-scale capital investments in infrastructure networks, monopolistic control of the 'natural monopoly', symbolic and cultural importance of water, strategic, political, and territorial relevance, intense conflicts for its shared use, health and hygiene effects of the lack of access to water, etc. Thus, during most of the 20th century water was conceptualized as a merit good, that is, as a good necessary for both production and reproduction, to be supplied by the public sector due to the tendency of private companies to fail to extend the coverage of their networks to the poor.

2.2.4 The State retrenches, private capital pushes forward

The Economic recession of the 1970s marked the demise of the state-led growth orientation and the emergence of post-Fordist forms of development. These changes affected urban water supply provision as well, thus challenging traditional water management institutions. In this context, privatization tendencies and demand management strategies emerged as basic tenets of the governance of water resources. Budds and McGranahan (2003) contend that in the Global North, the shift from statist towards neoliberal policies in the late 1970s explains the move back towards private provision of water. Morgan (2006), while recognizing that urban water services are still widely institutionalized within the nation-state, points at the growing importance of the transnational dimensions of legal and regulatory water politics ('Global governance'). Thus, neoliberal ideas have had a profound influence on international development and policy debates in the water delivery sector (and also sewerage and sanitation) in the 1990s, with an increasing role of private-sector involvement. The Dublin Principles (ICWE 1992) are a clear example of such turn (figure 2.4).

Figure 2.3. Dublin principles regarding water management

1. Water is a finite, vulnerable and essential resource which should be managed in an integrated manner.
2. Water resources development and management should be based on a participatory approach, involving all relevant stakeholders.
3. Women play a central role in the provision, management and safeguarding of water.
4. Water has an economic value and should be recognized as an economic good, taking into account affordability and equity criteria.

Source: ICWE (1992)

Finger and Allouche (2002:21) argue that the Dublin Principles are "the cornerstone around which different international approaches to solving the global water problems crystallizes". These two authors see in the Dublin principles the turning point towards the dominance of economics in water management and the decrease of the role of the State. Therefore, we can argue that since Dublin, the notion of water as an economic good has been widely accepted by water resources managers, financial organisms, policy makers, etc. In parallel, some authors, such as Winpenny (1994), already in the mid 1990s, warned about the urgent need for a drastic change in the way we view and use water, recognizing its value to others and its potential scarcity through treating it, economically speaking, like other marketable goods and services.

In general terms, as we have argued before, water has been conceptualized as a public good. However, water is becoming to be seen as a private good due to its allegedly high excludability and high subtractability (Johnstone and Wood 2001)

The same discourse on water was reproduced in the UN Conference on Environment and Development in Rio de Janeiro in 1992, where water, apart from being considered as an integral part of the ecosystem, was also characterized as a social and an economic good. Both views impelled the application of market mechanisms (pricing), regulatory measures and demand side management strategies.

Nevertheless, there are still some discrepancies among academics in relation to the meaning of water as an economic good, with two schools of thought. Mainstream economists and financial organizations such as the World Bank advocate for the application of market mechanisms to ensure the most efficient allocation of water (since it is supposed to be a normal economic good such as the other goods (Rogers et al. 2002). On the other hand, there are authors, who, even accepting the idea of economic good, think that water is a special good (Savenije 2001, Savenije 2002, Savenije and Van der Zaag 2002). Finally other authors prefer not to enter into economic grounds to discuss the characteristics of water (Bond 2004).

2.2.5 The stages of urbanization of water supply in the Global South

In spite of the apparent differences and bearing in mind spatial and temporal unevenness, the urbanization of water supply in the developing world, or the global South, has gone through some of these steps. For instance, rapidly urbanizing areas, as Lindh and Gilbrich (1996) describe, widen the limited availability of clean water. As artisanal water sources become increasingly polluted, widespread concerns about poor water quantity and quality arise. Bakker (2003b) contends that in the context of increasing demand, water ‘production’ becomes industrialized and traditional methods of collecting and distributing water are replaced by piping systems connecting dams and reservoirs with consumers’ taps. As we will see in the case of Barcelona, urban watercourses are sometimes covered over or filled in. The water network is therefore, in part, “an artifact of urbanization” (Bakker 2003b:332).

2.3 From supply-side to demand side management

All these shifts in the choreographies of power have consequences in the techniques and technologies of management and governance of the urban water flow. In that sense, in most of Western countries[12] and especially in the European Union since the implementation of the European Water Framework Directive, important changes in the way water is managed have appeared. Most of the advanced capitalist economies are undergoing a transition from the "command-and-control" approach, led by state, towards a "demand-side management" where other stakeholders and partnerships have also a voice over the water flow.

These transformations of framework are not insolated but are shaped by the general change in the management and governance of environmental resources described in chapter 1. In turn these changes are deeply influenced by world political and economic changes occurring since the 1970s.

2.3.1 From Supply-side management…

The second and third stages in the history of the modern urban supply presented before exemplify the important role that the State (and other levels of the public sphere) had in controlling, regulating and developing water infrastructures. The large amounts of capital involved and the urgent need to enlarge water availability, combined with the dominant economic paradigms of early and mid 20th century (with Keynesianism having a hegemonic role in regulating economic life) led to the prevalence of centralized approaches to water supply. The urbanization process (Kallis and Cocossis 2003) is the key for understanding the origin and the evolution of this paradigm, which has received different names, from the general command-and-control approach and supply-side management to the more specific hydraulic paradigm (Del Moral Ituarte and Giansante 2000, Kallis and Cocossis 2003), state hydraulic paradigm (Bakker 2003c), hydraulic age (Saurí and Del Moral 2001) or old hydraulic paradigm (Pedregal Mateos 2005).

[12] This change began already in the 1970s in the United States, mainly in the more arid states, such as California and Arizona.

Pedregal Mateos (2005) identifies three main objectives of such paradigm. First, to reach a universal supply of drinkable water to the urban and rural population as well to the industries, including the treatment of wastewater. The development of irrigated lands was a second objective. Eventually, the production of hydroelectricity was another key aspect. Spain is a perfect example of how the command-and-control approach (López-Gunn 2009) has been articulated with its larger engineering systems and centralized forms of governance (Saurí and Del Moral 2001, Bakker 2002).

Under this paradigm, and due to its priority to maximize security of supply, linear extrapolations of short-term demand curves provided the basis for demand projection, legitimating therefore large-scale resource developments financed by the State (Bakker 2003c). The role of pricing strategies was seen, at most, as a tool to recover some of the costs of the infrastructure. Therefore, water tariffs were mainly based on average costs and water prices did not reflect resource costs, leading to excessive water consumption, much of it for low-value purposes (Winpenny 1994).

Undoubtedly, water-supply systems developed along those principles have produced large benefits to the population by improving the reliability of supply, reducing water-related diseases associated with poor water quality, and containing the impacts of extreme hydrologic events such as floods and droughts. On the other hand, they have produced large costs, including ecological and environmental degradation, social disruption associated with infrastructure, and economic problems (World Commission on Dams 2000, Gleick 2003).

Although the eradication of scarcity has traditionally been viewed as a techno-managerial problem, with supply being increased to meet rising demand, this is no longer possible as a general solution (Guy 1996). The shift towards demand side management could be seen as a shift towards “rationalization” of water management, including a cost-effective management of risk and waste. However, Kallis and Cocossis (2003) warn that a total change is not likely since the growth-serving objective remains intact and exogenous to the planning process.

2.3.2 … to Demand-side management

Despite the fact that new infrastructures, are and will be needed in some contexts, water managers are shifting their attention towards the other side of the equation, i.e. how society uses water (Gleick 2003). In the USA this approach began during the decade of 1970s, when an array of environmental and economic conditions contributed to the decline of the viability of traditional supply-side approaches in the provision of water, namely (Dziegielewski 1999):

- Introduction of more restrictive environmental legislation
- Resistances to water exports by donor basins
- Physical scarcity of high quality sources
- Depletion and contamination of groundwater sources
- Difficulties in financing major facilities for transmission, treatment and distribution of water. Especially, the increasing costs of treatment for regulated contaminants made supply-side options less viable.

Taking into account all costs, the rationale of the new paradigm would be to reach economically efficient outcomes by stimulating conservation up to the point where the incremental cost of demand reduction is the same as the incremental cost of supply augmentation (Gleick 2003). Pedregal Mateos (2005) qualifies this new paradigm as a "post-modern" approach to water management or a new hydraulic paradigm, including a set of features that were not common in the former paradigm (figure 2.5).

Often there is confusion on the exact meaning of supply management or demand management. Sometimes, it may be only a question of scale, such as actions aimed at a better use of an existing supply like rainwater. For this reason, Brooks (2006) proposes to treat local forms of supply management as if they were demand management oriented. That is, the use of alternative resources (rainfall water and 'grey' water) should be included into demand management according to this author (Heynen et al. 2007a).

Figure 2.4. Main features of the new hydraulic paradigm

- Water conservation and sustainable use of the resources.
- Integrated management of demand and supply.
- Consideration of quality and quantity in the different phases of the hydrological cycle.
- Preventive action and precautionary principle.
- Subsidiary and shared liability.
- Integration of the different policies in relation to the resource.
- Establishment of proper economic and financial tools.
- Public information and participation
- Research and applied development

Source: adapted from Pedregal Mateos (2005)

A review of the existing literature leads us to assert that there is not a common notion of what exactly water demand management is about. Instead, we find a high range of conceptualizations. As Brooks (2006) contends, it is possible to unravel some simple definitions such as "getting the most from the water we have" or more elaborated ones, for instance defining DSM as the "actions that reduces the amount of fresh water we use, or that keeps water cleaner in the course of that use than it otherwise would be" (p.522). The same author argues that water demand management can be defined as any method (technical, economic, administrative, financial or social) that will accomplish one or more of the following items (p.524):

1) Reduce the quantity or quality of water required to fulfill a specific task.
2) Adjust the nature of the task or the way it is undertaken so that it can be accomplished with less water or with lower quality water.
3) Reduce the loss in quantity or quality of water as it flows from source through use to disposal.
4) Shift the timing of use from peak to off-peak periods.
5) Increase the ability of the water system to continue to serve society during times when water is in short supply.

According to Brooks (2006), we could understand water demand management as a governance concept, which focuses on both moderating and managing water demand with the aim to ensure both human needs and a good quality of aquatic ecosystems, as suggested by the EU Water Framework Directive. Others speak about the development and implementation of strategies aimed at influencing demand, in order

to achieve efficient and sustainable use of a scarce resource (Savenije and Van der Zaag 2002). However, what is common to most of these discourses is the underlying hegemony of economics, especially through the concept of efficiency.

Water demand initiatives could encompass from education and information to regulation and sanctions, from individual actions to national policies, and from local community organizations to national institutions and international treaties (Brooks 2006). Among these initiatives, economic measures play a dominant role, despite the existence of other, non-economic measures (table 2.3).

Table 2.3. Demand Management methods.

Method	Crisis management (Drought, faulty payments)	Operational time-frame	Long-term (Planning and design)
Technical	Pressure reduction Schedule use Valve closure	Flow control End-uses	Metering Leak control Plumbing devices
Social	Attractive options Social persuasion Advertisements	Legislation	Consumer education
Economic	Fines Punitive measures	Differential tariffs Trade	Supply-and-demand economics Marginal pricing

Source: Stephenson (1999:118)

A very interesting debate emerges around the use of economic mechanisms and principles to regulate the demand of water, which is tightly linked to the characteristics of water presented at the beginning of the chapter. On the one hand, there are those who criticize the role of pricing to reduce water consumption claiming that water has some special characteristics (Pedregal Mateos 2005):

1. Water is a vital necessity and does not behave as a normal economic good.
2. Water consumption is related to daily habits. A change in the price will be irrelevant for users who will not link their daily routine with water consumption.
3. The small share of water bill in relation to the household budget will discourage the user, in the case that she/he is capable to respond to price increases.

On the other hand, there are those stressing the important role of pricing in regulating water consumption and reaching an efficient use (figure 2.6). Mainstream economists, state that the lack of transparency of subsidies may induce users to undervalue the service at its real cost since they are not aware of paying artificially

low rates (Fauconnier 1999). Thus, low-priced water encourages excessive consumption by those connected to the supply system (Rogers et al. 2002).

Figure 2.5. Benefits bring about by water pricing

1. Reduction in the demand: substitutes become cheaper, conservation becomes affordable and there appears a change in consumption preferences.
2. Supply increase: marginal projects become affordable and price provides economic incentives to reduce water losses.
3. Re-allocation between sectors: from irrigation to domestic and industrial and from off-stream to in-stream uses.
4. Improved managerial efficiency: increased revenues by improving maintenance, improving staff training and education, making modern techniques affordable and making modern management techniques affordable.
5. Sustainability as they reduce demand on the resource base and reduce pollution loads due to recycling of industrial water.
6. Reduction of the unitary cost of water: increases coverage of poor urban and peri-urban populations because additional water is available for extending the system, they also reduce dependency by the poor on water vendors.

Source: adapted from Rogers et al. (2002)

Historically, cross-subsidies have played an important role in order to promote some kind of equity in redistributing social benefits or income across different users. In defense of cross-subsidies, Gleick et al. (2002) argue that basic water requirements for citizens should be provided at subsidized rates when necessary for reasons of poverty. In the same line, the European Environmental Bureau (EEB 2002), while recognizing the complexity and political sensitive of water pricing, asks to set prices based on social and environmental concerns and not on pure revenue-driven goals. However, at the same time this organization claims for the application of other principles in the pricing structures (figure 2.7).

Figure 2.6. Principles for the water pricing of WSS services according to the European Environmental Bureau (EEB)

- Water and waste water fees for households should be socially acceptable;
- Prices should generally reflect the true costs, including environmental costs, and should not include major profits;
- Costs should be lowered by increased efficiency, but not by compromising safety or (environment/quality) standards or exceeding acceptable levels of risk;
- Cross subsidies between high and low-cost household consumers are unavoidable and necessary to make water affordable for all.

Source: EEB (2002)

Nevertheless, one thing is the theoretical debate and another very different is the *realpolitik*. Argumentations by the different group are neither pure nor essentialist

but hybridize and feed from different sources. Such pattern can be observed when we analyze the discourse of the European Environmental Bureau (EEB), comprising many environmental grassroots organizations On the one hand, the EBB argues for sound prices that reflect all costs; on the other, however this institution is conscious of the singularities of WSS, asks for socially acceptable pricings schemes, and recognizes the impossibilities of managing water under pure free market schemes:

> Since water services are regional monopolies, and water itself is an irreplaceable common good, no free market can be established whereby consumer choices are able fully steer water pricing. [...] Prices will therefore always be the result of political compromises between social, economical and environmental demands, and cannot be replaced by a purely revenue-driven pricing policy (EEB 2002:16)

We have to bear in mind that water demand management especially in developing countries is as much about equity as it is about efficiency. Then, water management could be a tool not only to achieve important water savings or improving the quality of the resource but to achieve several socio political goals such as improvement in equity (Brooks 2006), a wider participation in decision making, and reduced environmental impacts (European Commission 2000). We realize again the multiplicity of readings and understandings of what demand-side management.

Among the benefits of managing demand, Dziegielewski (1999) points out savings in energy, reduced capital expenditures, and environmental improvements. In some way, demand side-management has generated the definitive change in the planning scale. River basin has been seen progressively as the “natural” unit for water development and management (European Commission 2000). On the contrary, in the supply-led management paradigm, in most of the countries, this scale was exceeded. Many countries and regions adopted a larger planning frame, allowing the growth of certain areas limited by hydrological capacity through inter-basin water transfers. We will see two clear examples of this with the cases of Barcelona and Madrid.

From a more critical stance, Karen Bakker (2003c) analyses the transition from the “State hydraulic paradigm” to the “Market environmentalism paradigm” focusing on the English and Welsh privatization case (table 2.4). This author assimilates neoliberal resource management with market environmentalism, whose main characteristics are private property rights, markets as allocation mechanisms and, the incorporation of environmental externalities through pricing. All these actions, in

opinion of proponents of market environmentalism, would lead to a situation where environmental goods would be more efficiently allocated if treated as economic goods (Bakker 2005).

Table 2.4. Water management: state hydraulic versus market environmentalist paradigms

	State hydraulic paradigm	Market environmentalist paradigm
Economic regulation	Command-and-control	Market-based instruments
Resource management	Growth-oriented, supply driven	Scarcity-responsive, demand-led
Network manager	State	Market
Primary goals	Universal provision; quantity	Efficiency; quality
Provision ethos	Service	Business
Consumer identity	User	Customer
Method of charging	Un-metered	Metered
Raw water (pricing)	Resource (subsidized or free)	Environment (abstraction price)
Water supply pricing	Social equity (ability to pay)	Economic equity (benefit principle)

Source: adapted from Bakker (2003c)

The considerations advanced by Karen Bakker (2003c, 2005) give a cause for entering fully into the debate around the neoliberalization of the urban water flow. In the next section, we will see how what we have presented about the neoliberalization of environmental governance and the rise of market environmentalism crystallizes around water management.

2.4 The neoliberalization of the water supply

The empirical studies of Madrid and Barcelona will focus on how global strategies of nature Neoliberalism take place in a defined area, and if so to what extent. We want to ascertain whether there has occurred a convergence of techniques and technologies of the governance of the urban water flow departing from two different geographic contexts.

Maria Kaika (2005) in her book on the urbanization of water in Athens clearly differences water supply projects and initiatives of the first three quarters of 20th century from those unfolding during the late 20th century and early 21st century. The former were part of the provision of the "collective means of consumption" through the state rather than through market, aiming to secure the function of the economy, the reproduction of labor power and the growth of national economies. Regarding water supply projects and initiatives of the late 20th and early 21st centuries, Kaika (2005) points out that water is taken away from the public domain and increasingly treated as a means for capital expansion and for the endorsement of private enterprise. While during most of the 20th century water was seen and managed as a public good, and provided at subsidized low prices, at the beginning of the 21st century, water has become "discursively and materially constructed as scarce and valuable, and thus an inevitably expensive commodity to be bought and sold in the market" (p.143) regardless of the ownership of the service.

In this sense, casting nature as a source of crises and defining water as scarce resource provides the necessary backing to neoliberal rhetoric in water management, paving the way to the use of price as the dominant water demand management mechanism and private participation as the supreme configuration. The focus on demand side management steaming from reformist consensuses in the water sector (the Dublin Principles, and the conference of Rio de Janeiro in 1992, and The Hague Declaration in 2000) may involve a greater role for market forces which, according to Nickson and Franceys (2003) opens the door for greater participation of private sector In this "New Water Paradigm" (Finger 2005) the neoliberal processes affecting the environment exposed in chapter 1 crystallize to give place to a situation where the governance of water is privatized with the State playing and instrumental

role. This results in "[h]ybrid blends of public and private actors linked in routines of both formal and informal participation at multiple levels of governance" (Morgan 2006:216). Furthermore, as Swyngedouw (2007a) clarifies, we can come across models that maintain components of both private/liberal and statist/Keynesian water provision systems. Morgan (2004) develops the concept of "Global Water Welfarism" to label this institutional imbroglio between private and public roles

> "Global water welfarism envisages a regime where public aid supplements the private investment of multinational corporations to solve the social and environmental problems of global water provision. The hope is that corporate social responsibility, alongside the probing eye of government and civil society monitors, will be able to produce the necessary services" (p.11)

During this period, international financial institutions packaged reforms in the water sector with wider neoliberal policies, often through structural adjustment programs following the Washington consensus. Davis (2005) contends that only from the 1980s onwards, private sector participation in the water sector has become relevant. Until the mid-1980s, urban water supply was the basic urban service in which private capital was least involved. Nonetheless, from that moment onwards there has been a progressive increase of private participation in urban water services. The same author remarks the lateness and lightness of private Public Private Partnership arrangements in the water sector when compared with the steady grow of the private participation in other public-service delivery sectors since the 1980s.

Figure 2.7. Key principles of neoliberal water policy

- Water resources should be allocated through the market, with the subsequent creation of private property rights where formerly these did not exist
- Water service is conceived as an economic good
- Water services should be provided by private operator as they are allegedly more efficient than public operators
- Water services should be self regulated solely by market mechanisms and therefore state intervention should be completely ruled out
- Water services are not a natural monopoly as most of the services are subjected to open competence. In addition, despite some of them are recognized to constitute a natural monopoly, when this occurs is preferable a private natural monopoly rather than a public one, at the same time that any kind of regulation is avoided.
- Water users should be transformed into consumers

Source: adapted from Castro (2007)

According to Budds and McGranahan (2003), Neoliberal reforms in the 1990s have vigorously promoted private sector participation in water supply and sanitation

services, mainly in the Global South, and to some extent in the Global North as well. In the former context, where there is a general agreement that public utilities have been too slow in extending access to services (being inefficient and corrupt in some cases), the main aim is to achieve a greater expansion of the water sector. On the other hand, in the Global North, efficiency is the critical argument wielded to promote private sector participation. In figure 2.8 we present the key principles of neoliberal water policy.

It is important to take into account that, although the water sector has seen repeated shifts back and forth between private and public ownership and management, the characteristics of the current era of water privatization are unique. Thus, following Bakker (2003b) the main traits of the ongoing era of water privatization could be summarized in these four points:

1) The unprecedented scale of involvement of multinational and multi-utility companies
2) The growing large amounts of capital mobilized, both by multinational companies and by bilateral aid and multilateral lending agencies
3) The ideological and financial support from key mediators of international finance received by the private companies
4) Water privatization is a part of a wider debate over the sphere of legitimacy of the state and of process of delegation of formerly core state functions to non-state actors, against the backdrop of high levels of state indebtedness

2.4.1 Important actors under neoliberal governance

At the beginning of the 21st century, different corporations control private investments in the water sector (Morgan 2006): Ondeo (Suez), Veolia (Vivendi) and RWE-Thames (Thames) (Gleick et al. 2002) or even the Spanish AGBAR and FCC (Global Water Intelligence 2009). Public-Private Partnerships (PPP) in the water sector have provided new markets for European and American firms. In turn, in some cases those big firms have involved local providers, which have helped them to understand better local conditions (Johnstone and Wood 2001).

Hall and Lobina (2007) argue that the multinational companies in the water sector have been the most important actors in water governance. Their impact has been implemented through political strategies rather than through competition with rival local companies. These authors argue that, although supply of water is an activity very tied to geographic location more than most of the other goods, local actors are not only constrained by local context and local stakeholders, but also by national and legal systems and supranational directives, as well as by political and economic developments and international actors. According to this, Hall and Lobina (2007), point out the two main conglomerates of international actors have influenced to a large extent local-decision making on water in Europe since the 1990s: institutions, like the EU or the IMF, and Private Water Companies.

a) Institutions

The European Union (EU) plays an active role in shaping water governance through environmental legislation and economic, fiscal and internal market policies. Regarding EU environmental legislation, three directives appear to have an immense impact on water governance:

- Urban Wastewater Directive (91/27/EEC). This directive imposed huge costs on local authorities and created financial and technical difficulties by requiring large capital expenditures on a short time scale on wastewater treatment plants.
- Directive on Drinking Water (Council Directive 98/83/EC on Water intended for human consumption), which have affected municipalities and water authorities directly burdening them with direct costs on water supply and sanitation enterprises. These costs arise from the prescription of minimum water quality standards for human consumption and standards for water collection, treatment and disposal.
- Water Framework Directive (2000/60/EEC), imposing public participation in the planning process and full cost recovery from user charges.

The economic and market polices of the EU also have indirectly shaped water governance. The EU convergence criteria, the so-called ‘Stability Pact’ of 1992, required that members and prospective members of the EU reduce their general

government financial deficit to 3 percent of their GDP, and their national debt to 60 percent of their GDP (also mentioned in the art. 104 of the EU Consolidate Treaty 2003). Hall and Lobina (2007) observe that this policy has motivated the sale of public enterprises and utilities to reduce debt; on the other, it has encouraged restructuration, with the involvement of private sector financing in investment, for instance through Public-private partnerships. Our two case studies, Barcelona and Madrid, will cover to some extent both points (the sale of public enterprises and the role of PPP in water supply).

European Procurement Directive**s** have also influenced water governance. Hall and Lobina (2007) contend that the enforcement of such directives have increased the likelihood of municipal enterprises competing with private sector for business, while private companies may obtain concession without being exposed to full competition from others. These authors (2007:67) argue that "although the EU could not require member states to privatize water –partly because the treaty requires the EU to remain neutral on the question of public or private ownership, and partly because the EU could not command private companies to make themselves available –the environmental, economic and procurement policies created conditions which favored the extension of privatization".

On the other hand, other institutions able to shape the European water governance have been the International Monetary Fund (IMF) and other development banks through the policies and conditions attached to their loans.

b) Private Water Companies

The second group of international actors shaping water governance in the European ground is formed by international water companies. Their strategies of internationalization rely on obtaining tasks that have been performed by public sector operators (e.g. concession contracts). Those companies are mainly French, although some UK companies have increased their share in the European market. Suez (formerly Ondeo and *Lyonnaise des Eaux*) and Veolia (previously part of Vivendi, and also known as *Generale des Eaux*) are the biggest water companies for historical reasons; France is the only country in the world (with the exception of some cases such Barcelona or Valencia in Spain) where private companies emerging during the

19th century were not municipalized as it happened elsewhere in Europe and the United States. This factor permitted a noticeable accumulation of capital, which allowed these companies to expand in the late 20th century. On the other hand, UK companies emerged as competitor to the French companies as a consequence of the full privatization of the water supply and sanitation in England and Wales. The strategy of French and UK companies has implied the growth in other countries, as their home markets were already saturated, an entrenchment of internationalization, and a reduction the role of the public sector.

The number of large companies internationally active in the water sector is very small. This factor, in addition to the long-term nature of private lease and concession contracts reducing the opportunities for tendering, is the main reason according to Hall and Lobina (2007) for the low competiveness on the water sector. Notwithstanding the trends of increasing privatization, Castro (2009) highlights that an important share of water uses in the world are still under no mercantile principles, or at least not directly. Thus, he notes that even though in some aspects, water commodification has made astonishing progress (as in bottled water), in many others water still presents important features impeding commodification.

The intensive wave of privatization has also produced an important effect on how public water utilities (those not privatized), especially in the Global North, are managed and conceived. According to Esteban Castro (2009) the corporatization of many state-owned companies in the water sector is a by-product of the ferocity of the privatization movement. The application of neoliberal principles in the public administration also crystallizes with the New Public Management (NPM) schemes, whereby state-owned companies adopt management of private firms. For Nickson and Franceys (2003), three main tenets of the New Public Management (NPM) are accountability, performance and responsibility. In table 2.5 these authors present the links between these tenets and the ongoing reform of the urban water supply sector.

Hall and Lobina (2007) also highlight the case of some few corporatized public sector operators that have sought to operate internationally, for instance Nuon and Vitens, in the Netherlands, *Berlinwasser*, from Germany, or the public water supplier of Madrid, the *Canal de Isabel II*. According these authors, the internationalization of corporatized public utilities may be a first step towards privatization. We are going to discuss this point when analyzing the case of Madrid.

As we can observe, each one of the three tenets are divided in some NPM policies that can be translated into the urban water supply sector. The collaboration with private water vendors, the commercialization of state water companies management bodies, or the establishment of an independent body, are examples of manifestations of NPM policies in the urban water supply sector. The underlying argument to proceed with such reform is the weak capacity of the public sector to perform the role of direct service provider. However, against this apparent request for public sector retrenchment, Nickson and Franceys (2003:12) underline that "far from reducing the need for it, greater private sector participation requires greater governmental capacity as a pre-condition for effective regulation". Thus the State is has a critical role in enforcing such private participation.

Table 2.5. The relationship between the New Public Management and reform of the urban water supply sector

Building blocks of NPM	Related NPM policies	Manifestations in the urban water supply sector
Responsibility: ensure clarity of goals and purpose	Separate policy-making from service delivery functions	Split policy-making role from service delivery role
	Shift locus of controls to lower level managers	Bureaucratic commercialization: decentralization and autonomous state water companies
	Use contracts and performance agreements to promote transparency	Contracting and service agreements
Accountability: increase accountability of managers to customers	Promote client choice	Collaborate with private water vendors
	Develop customer charters	Establish water customer committees
Performance: create stronger incentives for good performance	Link reward to performance	Lease and concession contract management
	Strengthen feedback mechanisms	Establish independent regulatory body
	Stimulate competition	Promote international bidding contracts

Source: Nickson and Franceys (2003:11)

This chapter has attempted to introduce the singularities of water and at the same time show how changing management and governance frameworks apply to this resource. In the next chapter we will deal with the theoretical debates around the desirability or not of private participation in the private sector. The different forms of

private participation in WSS will be disclosed together with the pros and cons of such processes.

3 The debate on water privatization

Misunderstanding, misuse or overuse of the word *privatization* is fairly common in the case of water. Water privatization means in fact an array of different situations, whereby private capital is somehow present and may control management to some extent. For instance, the privatization process undergone in England and the current status of water utilities in that country is very different from the privatization of Barcelona water in the 19th century and its current situation, or the planned partial divesture of Madrid water utility. In the British case, water went through different stages during the 20th century (private, municipal, stated owned) until the full privatization (read "full divesture") in 1989. In the Barcelona case, what was privatized during the third quarter of the 19th century was not the water resource per se but the municipal delivery of water. Finally, in the case of Madrid, what will likely be partially "privatized" is not the delivery, but the state-owned firm that supplies almost the whole Region. In that sense, we can argue that while Barcelona constitutes a case of the "French Privatization Model" (Lease, Contract, etc), the case of Madrid, if it ever happens, may be closer to the "British Privatization Model" (Divesture).

The privatization of water has been an issue widely studied. However, we argue that it should be analyzed and understood from different perspectives, which is not always the case. We coincide with Budds and McGranahan (2003) when they assert that the debate on privatization (especially in the Global South) sometimes misses important issues: "the private versus the public debate obscures the variety of roles private enterprises can play in water and sanitation utilities, detracts attention from problems that have nothing to do with privatization and, moreover, makes it easy to lose sight of how processes of privatization are actually unfolding" (p.88). These authors call for avoiding the classic public-private discussion, since "dwelling on the public-private dichotomy can divert attention from the important roles often played by civil society organizations, and lumps together very diverse actors and agencies in both the private sector (e.g. informal vendors and multinational corporations) and the public sector (e.g. public utilities, regulators, local authorities and national ministries)" (p.92). Consequently, they argue that local contexts and the process (of

privatization) itself have much to say in the final outcome. In addition, Bakker (2003b) adds that privatization is in many cases a misnomer, as it is constituted frequently by an overlapping set of strategies. Thus, especially in the context of the Global South, though applicable in different terms to the Global North, "privatization is better read as an overlapping set of strategies –industrialization, corporatization, and internationalization –of water supply in zones where a high degree of non-corporate activity already exists" (Bakker 2003b:337). Therefore, she defends that privatization should be understood just as one dimension of a broad-based process of institutional, socio-economic and technical transformation, which in the Global South is a response to the needs of capital to extend and improve the physical infrastructure and at the same time acts as a mechanism of power redistribution amongst local elites.

3.1 Introduction to the debate

The word privatization may be polysemic, encompassing different connotations and meanings depending either on the subject using it or in the context, and may vary its meaning over the time. In that sense, Budds and McGranahan (2003) argue that privatization, when referring to a public service, may mean two different things. On the one hand, it may be used as a generic term to refer to increasing private sector involvement in the management of that service. On the other hand, however, it could be used to refer specifically to the model of divesture. Currie (2005:491), adhering to the latter definition, defines privatization as a process that "involve transferring ownership and control of assets, resources, means of production and services, from the state to the private sector". Similarly, but more concisely, Beesley (1997:26) arg uesthat "'privatization' is generally used to mean the formation of a Companies Act company and the subsequent sale of at least 50 per cent of the shares to private stakeholders". Elsewhere, Bakker (2008) notes that privatization refers to "the transfer of ownership of water supply systems to private companies" while private sector partnerships refer to "the construction, operation and management of publicly owned water supply systems by private companies" (p.44).

The rationale behind privatization is to improve the performance of the economic activity by increasing the role of market (Beesley 1997). Esteban Castro (2009) also emphasizes the importance of differentiating between "private participation" and "privatization", at least in the academic debate on urban water supply. The latter term is used when private property rights over water or over supply and sanitation services are created. Basically, he refers to the English, Welsh and Chilean experiences, but also mentions the case of Cochabamaba in Bolivia. According to this author, privatization points at rolling back the functions of the state. Thus, water privatization has to be seen a part of a much larger transformation of the public sector and the State (Finger and Allouche 2002).

We may find different situations where an activity or a service is said to be privatized. Currie (2005) stresses the multiple forms that privatization can take: floating public assets, the issuance of shares, the sale to the private sector be it domestic or foreign through a tender system, the subsidization of sale with assisted

loans, etc. If we stick to the Spanish or Catalan definition of the verb *to privatize*, as we have already mentioned in the first chapter, we refer to the transfer of a firm or a public activity to the private sector. In that sense, privatization in the water sector could mean the concession of the water supply (or the sanitation service) to a private partner. However, it could also mean the transference of the assets of a public water company to the private sector.

In Europe, most of the process of utility privatization emerged during a period when infrastructure was beginning to deteriorate. Rapid technical progress led to the need of more investments and the costs of complying with European Union directives were raising (Poltitt 2002). For water utilities, as Poltitt (2002:69) argues, the privatization process "reflected government's desire to shift in investment requirements to the private sector". Finger (2005) argues that despite not being on the agenda of the Dublin Principles, privatization has become tightly linked to water management, following the same narratives of urgency and the need of a 'better management' used to catalogue what was considered as an economic good, with the subsequent widespread deployment of economic mechanisms to regulate demand.

Nickson and Franceys (2003) distinguish between direct provision and indirect provision of urban water services (UWS). Direct provision comprises: abstraction from the water source, purification, transportation, storage, pumping through the pipe network, meter reading, billing, and payment collection. Contrarily, indirect provision of UWS covers legislating, policy-making, and standard-setting, regulation and monitoring of the direct provider. In addition it is also important to differentiate between production and provision. Thus in the case of water, we could speak about urban water provision or water production (desalination, reservoirs and treatment, etc).

Esteban Castro (2009) notes that, despite the common belief of the contrary, not all private arrangements of water supply are commercial and aimed towards capital accumulation. He points out that "a mechanic relationship between "public-state" and "non-commodified/mercantilized" or the other way round does not exist, but it is a dynamic process in expansion that is materialized differently according to the specific context" (p.38 own translation from Spanish). In that sense, there are private arrangements (as long as they are not organized by the State) that seek to provide the service without obtaining a profit; such is the case of some types of cooperatives or

other non-state models. The other alternative is also possible: not all state arrangements of water supply are supposed to be a non-commodified/mercantilized public service. As Castro explains, there is a growing trend towards the commodification/mercantilization of public state water supply services, for instance by means of floating shares in the stock market (cases of SABESP in Sao Paulo or CPASA in Minas Gerais in Brazil). This is a critical point in our research and we will try to validate this statement for the Spanish case, concretely when analyzing with the Canal de Isabel II of Madrid.

Next, we want to explore the discourses that support private participation in the water sector and the multiple configurations that such participation may have. Special emphasis will be put on the Public-private Partnerships as a hegemonic arrangement for water supply at the beginning of the 21st century.

3.2 The argument for private sector participation in urban water supply

Despite the predominance of public water suppliers during most of the 20th century, the effectiveness and legitimacy of these systems has been challenged since the mid 1980s. During the recent decades, as shown in chapter 2, a dramatic change in how water management was conceived took place with market logics impregnating and penetrating the governance of the resource. Baker (2003a:329) describes this transition in this way: "the state has increasingly relinquished management and/or ownership to private capital and cede regulatory control to markets and market-mimicking regulatory mechanisms through a combination of deregulation and reregulation". According to this author, the rapid increase of the participation of the private sector has been materialized through various forms, such as:

- The opening of the water supply industry to the private sector in the majority of the EU countries (Petrella 2002)
- The implementation of private-public partnerships in the South
- The creation of water banks and markets (Bauer 1997)
- The massive international growth of the bottled water markets

Although the decisions to choose the desirability of public versus private supply arrangements are taken at the national, regional or local level, steps to open the market by means of different tools (abolition of protection rules, WTO agreements, GATT agreements or the EU competition laws (EEB 2002) are increasingly used by the EU. In the Ministerial WTO conference in Doha 2001 the EU proposed the reduction or elimination of trade tariffs to environmental services and goods. In practice then, a firm could ask for the right to become involved in the water supply services of a country that protects public water services through national laws and regulations.

According to the EEB[13], the efforts to liberalize the European water sector respond to the objective to pave the way for the expansion of European transnational firms worldwide.

3.2.1 How ownership affects performance? Some orthodox economic theory

Mainstream Economics has widely studied the issue of public/private ownership and performance. There are at least three theories that examine differences in performance according to different types of ownership: Principal-agent theory, Property rights theory, and Public Choice Theory. All these orthodox economic theories have its translation in the water privatization debate, and are widely used by proponents of privatization.

All the theories summarized in table 3.1 defend that public sector management is outperformed by private management due to public lack of incentives and oversight.

Vickers and Yarrow (1988), in a very well-know study among mainstream economists dealing with privatization, reviewed several papers and reports on privatization processes and ended up concluding that private ownership outperformed public ownership in competitive markets (Vickers and Yarrow 1988). Elsewhere, Yarrow (1999) intends to set out a theory of privatization to explain the triggers of privatization and related reforms. This author argues that the costs of government finance, which results from higher levels of general public expenditure and taxation, have played a particularly critical role in stimulating privatization. He further adds that this variable also may explain the sequence in which ownership reform is preceded by a period of increased financial stringency for state-owned enterprises (SOEs).

[13] The European Environmental Bureau is a federation of Environmental citizens' associations. It seeks environmental improvements but rejects some of the principles of market environmentalism, such as privatization.

Table 3.1. Economic theories on the performance of public and private ownership

Economic Theory	Brief description	Implications for performance of publicly owned water utilities as compared with privately owned water utilities
PRINCIPAL-AGENT	Manager's efforts are difficult to monitor and it is hard to see whether public managers are doing the best for the owner (in the case of a public utility, this is the state).	Publicly managed water utilities' managers may not be doing their best to keep costs down or productivity. Privately managed water utilities can provide incentives to managers to ensure the company is profitable.
PROPERTY RIGHTS	Private-sector owners, as residual claimants, have more clearly defined incentives to push for efficient decision-making by managers.	Those who control utilities (politicians and senior bureaucrats) have little personal incentive to improve performance since they do not necessarily benefit from these actions. Privately managed water utilities gain from actions that enhance performance, especially profitability.
PUBLIC CHOICE	Public servants act in their own self-interest, which may mean bigger budgets and lower performance.	Public managers of water utilities may have personal goals that conflict with performance-enhancing goals of the utility. Tighter budgets and enhanced accountability diminish the scope for managerial discretion in the privately owned firm.

Source: adapted from Renzetti and Dupont (2004:1867)

Historically different arguments have been proposed to defend the performance of private management of urban water supply. According to Gleick et al. (2002) different pressures drove governments to consider private participation in the water sector (figure 3.1).

Figure 3.1. Drivers pushing privatization

- **Societal**: the belief that privatization can help satisfy unmet basic water needs
- **Commercial**: the belief that more business is better
- **Financial**: the belief that the private sector can mobilize capital faster and cheaper than the public sector
- **Ideological**: the belief that smaller government is better
- **Pragmatic:** the belief that competent, efficient water system operation require private participation

Source: Gleick et al. (2002: 22)

Among all these drivers, the underlying assumption and main argument for privatization is that the market is more efficient than government at providing basic

services and goods. To some extent, state failure could be supported by evidence from rapidly urbanizing Third World cities as Bakker (2003b) shows. In this context, water scarcity is conceptualized as a universal condition: it is simultaneously natural, justifying cost-reflective pricing and commercialization, and social, or the outcome of faulty public management. Hence, privatization arguments may coalesce with those which endorse the management of water as an economic good to promote water conservation. In that sense both commercialization and privatization introduce changes in the practice of deliberative democracy at the local level: privatization discursively rescripts users as individual consumers rather than a collective of citizens and puts emphasis on environmental water quality standards.

There are different economic theories and paradigms supporting private financing for public projects (figure 3.2). Poltitt (2002) quotes Property Rights Theory and Bureaucracy theories as relevant paradigms celebrating private financing, management and/or ownership of public projects/utilities. Property Rights Theory defends the creation of a market for ownership rights. The underlying logic is that assets tend to get allocated to the owners who can use them most efficiently. On the other hand, Bureaucracy theories champion private initiatives as well since government officials tend to focus on objectives such as maximizing the size of their budget rather than on efficiency maximization. Apart from these key theories, Poltitt (2002:77) quotes three desirable characteristics of participation of private finance in public projects:

- Liberalization may reduce lobbying by reducing the likelihood that government policy can be influenced
- Liberalization affects the nature of regulation relating to an industry, and this may affect in turn the efficiency of production
- Liberalization may increase the cost of subsequent government interference

Similarly, Currie (2005) mentions the following arguments in favor of privatization:

- Greater efficiency and more incentives to managers to achieve production efficiency
- Shift from monopoly to competitive markets
- Firms subjected to the scrutiny of capital markets

- Removal of public sector constraints on efficient behavior

International banking and financing organizations such as the World Bank (1995, 1997) or the OCDE (1999), among other organizations, have issued reports defending the necessity to privatize. An important number of scholars from the academic world have defended the benefits of handing out totally or partially water management to private capital.

According the World Bank (1997) to involve the private sector in water management means:

- To take advantage of private sector skills and know-how
- To improve the efficiency of service delivery
- To gain access to finance for new investments
- To improve the quality of the service
- To improve the availability of the service
- And to improve the cost-effectiveness of services

Figure 3.2. Arguments for water privatization

Efficiency argument: achieved either by a) introducing tariff systems based on volumetric and cost-reflective charging; or/and b) avoiding overstaffing. In addition to these arguments, Poltitt (2002) argues that private sector can improve efficiency by involving specialist project managers, designers, operators and financial risk managers, who may not be available in the public sector. Other authors however, such as Foster (1992), do not share this argument and argue instead that efficiency could be achievable both through privatization and through public enterprise reform.

Improvement of the fiscal balance of the public sector arguments: achieved either by a) reducing subsidies to loss-making utilities; and/or b) by reducing the public sector borrowing requirements through private sector financing of capital expenditure; and/or c) by increasing tax revenue through expanding the role of the private sector.

Effectiveness argument: it is said that private sector may improve water availability, water quality and consumer satisfaction by giving greater priority to network maintenance, greater priority to consumer standards and customer care.

Equity argument: private sector is said to improve the equity in urban water systems by a) introducing full cost recovery pricing to existing high-income households that are already linked to the network; and b) expanding the network with the removal of formal subsidies.

Source: adapted from Nickson and Franceys (2003)

Reviewing the main literature on privatization until the first half of the 1990s, Martin and Parker present the more recurrent arguments that justify the presence of the private sector in front of public utilities. In mainstream economic literature state enterprises are considered inefficient because of several reasons:

- Too much political intervention
- Conflicting objectives, i.e. political time frames are often incompatible with the longer time cycles required by investments
- Failure of the public sector to monitor managerial behavior as the market does, leading therefore to over-investment
- Trade unions are thought to receive better deals at the expense of consumers
- Bankruptcy does not represent a credible and likely threat for the public sector
- Managerial salaries are politically established
- Under public management there is a lack of performance rewards
- Insufficiently consumer-orientated when operating under monopoly markets

Beyond the more ideological reading of privatization, Poltitt (2002) argues that the primary reason for privatization is the need to raise funds for investment. This author also stresses that the most appealed reason to justify privatization is that frees companies from budgetary constraints, allowing them to borrow more freely on the capital market by issuing share capital and through debt financing. This need of capital is also highlighted by Foster (1992:133) when referring to the British and Welsh context: “water privatization might not have been attempted if the industry had not been starved of capital funds by successive governments”.

According to Beesley (1997) privatization could smooth the natural monopoly nature of the water sector by creating a market for corporate control, and introducing competition for the management of companies. This could be developed, as Poltitt (2002) proposes, through a competitive bidding process. However, this author also points out that when bidding process is dominated by a few large contractors the process may become collusive and that some of the potential benefits of private finance investment may disappear.

In their review of empirical studies on privatization, Megginson and Netter (2001) write that privatization processes improve the performance of the companies measured in many different ways, in many different countries. However, they do not provide or mention any report concerning its effects for the water sector. These authors recognize that "the justification for privatization is less compelling in markets for public goods and natural monopolies where competitive considerations are weaker" (p.330). From the literature review, the authors draw some conclusions; among them, there are four critical in our opinion:

> "The privatization programs of the last twenty years have significantly reduced the role of state-owned enterprises in the economic life of most countries" (p.380)
>
> "Research now supports the proposition that privately owned firms are more efficient and more profitable than otherwise-comparable state owned firms" (p.380)
>
> "Governments use three basic techniques to privatize their SOEs (state owned enterprises): share issue privatizations (SIPs), asset sales, and voucher or mass privatizations". […] "There is great variation within all the techniques, because privatization is a complex process involving a host of political and economic factors" (p.380)
>
> "We know that privatization 'works', in the sense that divested firms almost always become more efficient, more profitable, and financially healthier, and increase their capital investment spending" (p.381)

It is argued that the upsurge of privatization has been due to the convergence of different political and economic forces. Davis (2005), in her large review of private sector participation in the water sector, summarizes the set of drivers that have brought privatization of water services to the spotlight:

- A renewed enthusiasm for private enterprises
- A deficit-induced imperative to limit government spending
- Ideological arguments picturing the public sector as a costly and inefficient provider of infrastructure
- a), b) and c) have lead to a reduction of government involvement across different sectors in the western world from the 1980s onwards
- Private sector participation is envisaged as a solution to the need for capital investment in water and sanitation infrastructure

- In addition to this, in the Global South the World Bank and other financial organizations strive to implement market oriented reforms bounded up with the concession of loans
- There are political impediments to charge full cost-recovery tariffs, threatening the improvement of the networks
- Stringent environmental regulation requires increasingly sophisticated water and wastewater technologies
- The cost of capital (i.e. financing costs) is an important determinant to privatize service delivery
- In addition, immense capital investment is needed both in the Global South and North to build or rehabilitate and upgrade water networks

According to this author, to different extent, these features have led governments and international development agencies to incorporate private firms into the water and sanitation sectors. Davis also underlines the fact that flows of investment are not principally directed towards the poorest countries but towards middle-income countries. Thus this author argues that the world's poorest countries will capture little benefit from PPP arrangement. This claim contradicts those made by some financial organizations such as the World Bank (1994, 1997). In this sense, Clarke et al. (2004) argue against the criticisms that PPPs (or PSP as they call it) worsen poorest households, especially in developing countries. Working with different cross-country studies and within country comparisons, these authors conclude that, at least in terms of connections, PSP did not harm the poor. However, they also recognize that connections had improved in both PSP cases and in control cases (without PSP) alike.

Elsewhere, Johnstone and Wood (2001) argue that private sector participation in the water supply and sanitation services is justified principally by:

- The belief that the private sector is better placed to undertake the investments necessary to expand, rehabilitate and upgrade the water infrastructure
- The wish to relieve burdens on public finances

- The feeling that in some cases public authorities have been unable to manage efficiently WSS works: expansion has not progressed as rapidly as demand, in addition to the unreliability of the supply

Still, other reasons would be (Johnstone and Wood 2001:8):

- Gamekeeper-poacher problems: public water and sewage utilities will tend to be inefficiently managed since governments have multiple objectives but limited financial resources
- Flexibility and autonomy: public utilities are often constrained by bureaucratic requirements which do not affect private firms to the same extent
- Absence of competitive discipline: public utilities are not usually subject to the disciplines of the market, they have fewer incentives to minimize costs, and provide services in a manner which customers demand
- Access to capital: most public have insufficient financial capital to undertake the necessary investment to maintain services

In his study of flows of power and water in Guayaquil (Ecuador) Erik Swyngedouw (2004), reviews extensively the main factors for public inefficiency and the main triggers promoting privatization that have been advanced by pro-privatization campaigners to justify privatization schemes. Regarding the factors of public sector inefficiency, they are classified by the author according whether they are common to all types of public companies or are specific to water sector companies. In addition, within these two groups, economic, policy and political arguments are used to discriminate the factors further (table 3.2). Besides the economic, policy and political factors, the author adds an extra category regarding technical/environmental questions, including: a) high variations in sources and uses of water, b) high water losses and c) droughts or environmental change affecting the availability of water resources.

Table 3.2. Factors of public sector inefficiency

	General to all types of public companies	Specific to water sector companies
Economic and Financial	• Shortfall of capital • Inadequate funding provision to meet targets • Propensity to incur in excess indebtedness • Obstacles to access capital markets • Lack of irregular valuation of fixed and operational assets • Poor planning in the allocation of resources and priority setting • Poor management of targeted subsidies	• Centralized government that prioritizes expansion investments obliterating operation and maintenance • Socio-economic characteristics of the customer base that limit revenues or induce social and labor problems • Financial constraints to meet demand growth • Spiraling operational and maintenance costs • Inadequate tariff structures
Policy and Organisational	• Inadequate legal framework • Over-dimensioned structures • Prevalence of short-term approaches to long-term requirements • Lack of precision and consistency in objective setting • Lack of managerial experience • Excessive turnaround of personnel owing to political interests • Lack of monitoring and supervision of performance (internal and external) • Excessive bureaucratization • Corruption • Deficiency in the personnel's aptitudes and attitudes (lack of commitment: low motivation (e.g. owing to low salaries)) • Limited professionalism • Inadequate career structures	• National framework prohibits or constraints business orientation in running the utilities • Institutional complexity and overlapping of responsibilities (national, regional and local levels)
Political	• Government interference in the management process • Influence of external (mainly political) factors on decision-making • Politization of managers	• Legal political, and social limits to tariffs increases

Source: Swyngedouw (2004:129)

Budds and McGranahan (2003) , mention two issues considered to be the most important triggers for private participation in water supply, namely the characteristics of water as an economic good and the failure of the state.

Economic Goods: considering water as an economic good to be managed by market forces is argued to bring efficiency and highest value to its use. Karen Bakker (2003b) holds that that the notion of water as an economic good has been used to justify a shift from treating water as a public service to a good for which users must pay. Along these lines, Budds and McGranahan (2003) observe that the economic nature of water is often mentioned to promote full cost-recovery of water and sanitation infrastructure and services from users, on the grounds that only then will provision be economically sustainable. Cost-recovery is preferable on an individual basis, while subsidies are opposed because they distort the true cost of service provision. Both the World Bank and the Multi Utilities Companies have been promoting the idea of water as an economic good (EEB 2002).

Budds and McGranahan (2003) also present two possible meanings of the economic value of water and its subsequent consequences. On the one hand, recognizing water as an economic good appears to justify a strong private role. If “economic goods” are taken to mean the sort of goods idealized in economic theories of the perfect market, then the case for their private provision is strong. On the other hand, if economic goods are simply taken to be goods that have an economic value, and to which economic principles may apply, which happens with most of public goods including water, the State could allocate them without the need of private participation. In this sense, Budds and McGranahan (2003) question the need to privatize water management on the grounds of the economic nature of water.

State failure: the second argument to justify private provision of water is often related to a broader claim that private enterprises are more efficient than public enterprises. In some places, public water utilities are blamed to have failed to supply services of an adequate quality and coverage. The main drivers to such failure are said to be the lack of government capacity (weak performance and low payment levels for poor services) and the lack of funds and access to finance improvements and the expansion of services.

Government failure to provide a proper service is, thus, often mentioned to justify privatization. However, less said is that, as Johnstone and Wood (2001) argue, a private monopolistic supplier may exacerbate and worsen the situation taking advantage of its privileged position in the market at the expense of users. Thus, although these authors favor private participation, they acknowledge the existence of public utilities, even in developing countries, performing properly. Hence they do not blame the public sector *per se* of poor performance and mismanagement, but other factors such as faulty incentive structures, the politicization of management and other bureaucratic weaknesses, In the same vein, some authors (see for instance Nickson and Franceys (2003)) underline the need of the application of *vertical unbundling* to avoid the abuse of monopoly power by the private sector. Vertical unbundling involves "breaking up a chain of activities that were previously performed by a single entity and separating the monopolistic from the non-monopolistic activities of the sector" (p.55). In the water sector, "unbundling involves a basic separation between water production, which is more amenable to competition 'within the market', and water transportation and distribution, which are monopolistic in nature" (p.55). In the latter case, competition 'for the market' has to be promoted instead. However, the same authors highlight the limitations of the efficiency gains by market unbundling due to the existence of important economies of scale of a monopolistic nature in water production. Where competing private suppliers provide water to a single distributor, the authors refer to the increase in transaction costs (both 'hold-up' costs[14] and quality control costs) as another restraint to efficiency.

Demsetz (1968) argued that even when natural monopoly precludes competition within a market, competition for the market via contracts between public and private agents could lead to an efficient allocation of resources avoiding regulation failures. Chong et al (2006) quote Williamson (1976) to challenge Demsetz's assumption. Williamson (1976) criticized Demsetz saying that organizing competition for the market is not easy, pointing out the incompleteness of contracts due to transactions costs, and underlining the fact that switching costs make public authorities who enter contracts vulnerable to ex-post contractual opportunism. In Chong et al. (2006:153) words:

[14] Resulting from the breakdown of the coordination characteristic of a vertically integrated organisation.

"if operators are selected according to price bids, then public authorities are vulnerable to 'winner's curse, since the best offer may come from the most 'optimistic' operator who unintentionally underestimates productions costs or overestimates future revenues. Alternatively, public authorities may also be victims of aggressive bids when prospective operators strategically underestimate productions costs or overestimate futures revenues in order to win the deal and then provoke renegotiation with a 'captive' local public authority in the future"

3.3 The range of institutional arrangements with Private Capital

Private participation in the water sector could adopt a multiplicity of forms, stretching from punctual participation in non-core water activities, e.g. billing, to the full ownership of water facilities. The transition from the strict public participation in the delivery of water services to the opening of the sector to the private initiative could follow up a multiplicity of scenarios and paths, encompassing planned and formal changes to more informal changes (table 3.3).

Table 3.3. Spectrum of changing ownership structures and regulatory model

Scenarios	I	II	III	IV
Formal change (planned)	Guided or unguided wind down from 100% state ownership to PPP	Transfer of functions to the private sector via a Private finance initiative (PFI) structure	Privatization of all or part of a previous 100% state owned entity or PPP or PFI	Privatization, PPP and PFI used together with minimal government involvement in the provision of goods and services
	Existing agency or government given greater powers of prudential supervision while protective measures removed	Regulatory agency given oversight to ensure adherence to contracts and non abuse of market power	Some regulatory oversight	Stripping of all protective measures of regulator which maintains prudential supervision according to government goals
Informal deregulation (evolutionary)	Non enforcement of regulations with transfer of functions through contracting out	Life cycle effects –failure to provide goods, services, no supervision		

Source: adapted from Currie (2005:436)

In turn, the interplay of forces between the private and the public spheres could lead to very different models. As a result, there is a wide range of arrangements between public administration and private capital to provide urban water services. Public-private partnerships (henceforth PPP), called 3Ps arrangements, comprise a set of configurations that stretch from contract services, where the public retains the most important functions, to full divesture settings, where the public part has not anything to do anymore with the supply except in what concerns regulatory issues. The latter is an extreme case of private participation, and will be analyzed in more detail in the next section. In table 3.4 we present the different arrangement options with the

corresponding business models, i.e. the ownership and organizational structure, and allocation of responsibilities and risks.

Table 3.4. Allocation of the key responsibilities under the main private sector participation options

Option	Asset ownership	Operations and maintenance	Capital investment	Commercial risk	Duration
Service contract	Public	Public and private	Public	Public	1-2 years
Management contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Concession	Public	Private	Private	Private	25-30 years
BOT/BOO	Private and public	Private	Private	Private	20-30 years
Divesture	Private or private and public	Private	Private	Private	Indefinite (may be limited by license)

Source: adapted from World Bank (1997:3)

To systematize such different articulations, Nickson and Franceys (2002:18) propose four different categories, ranging from the fully public to the fully private configurations, which take into account the heterogeneous organizational arrangements for water supply (table 3.5):

1. Public ownership, financing and provision: the government both, funds urban water supply, and adopts the direct role of service management and delivery – with significant differences between the approaches of government/municipal departments and corporatized state-owned enterprises;
2. Public ownership and financing, with private provision: the government funds urban water supply, but adopts and indirect role of service provision by contracting-out activities to the private sector (for example, by means of a service/management contract or lease);
3. Public ownership, with private financing and provision: government hands over the financing and provision of urban water supply to the private sector

while retaining asset ownership and price control (for example, through a concession, or build-operate-transfer contract);

4. Private ownership, financing and provision: urban water supply is transferred completely to the private sector and the government role is confined to regulation (for example, divesture).

It is important to insist that each real arrangement may have its particularities and may not follow totally the theoretical model. The World Bank (1997) admits the hybrid nature of some real case arrangements, blending elements from different models in order to reflect best local circumstances.

Table 3.5 Institutional options for water and sanitation services

Option A					**Option B**		**Option C**	**Option D**
Public ownesrhip and operation					Public ownership, private operation		Private ownership, private operation	Community/ user provision
Public enterprise								
Government department	Traditi-onal	Corporatized Commercial	With service contract	With Manage ment contract	Lease contract	Concession contract	Private ownership and operation	User or community provision

Source: Adapted by Castro (2007:768) from the World Bank (1994)

We present next one by one these ideal conceptualizations of private participation in the water sector. We leave aside for the moment the full divesture option, which is will be revised in section 3.4 due to its singularities. In what follows we will focus on what is commonly known as Public-Private Partnerships.

3.3.1 Service contract

A service contract (in French: *prestation partielle*; in Spanish: *contrato de servicio*) is the low-end and lightest form of private participation in the water sector. Nickson and Franceys define it as

> "an institutional arrangement whereby a private company is contracted to provide a clearly defined technical (for example, a mains rehabilitation exercise, emergency repairs, the hire of specialised equipment, design engineering) task or administrative task (for example, meter billing, payment collection) for the public sector water utility" (Nickson and Franceys 2003:56)

Instead of service contract, other authors name this operation 'outsourcing of individual tasks' (Davis 2005). In general, this type of contract functions under a 'fee-for-service' basis, i.e. the administration providing a given amount of money to the private part to perform specific tasks, such as installing or reading meters, monitoring losses, repairing pipes, or collecting accounts, and the assets remain in the public sector. As shown in table 3.2, competition in contract bidding and contracts lasts no longer than one year, and the private contractor does not assume any commercial risk or capital investments. According to the World Bank (World Bank 1997) these kinds of arrangements are "at best a cost-effective way to meet special technical needs for a utility that is already well managed and commercially viable" (p.3), taking advantage of private sector expertise for technical tasks.

3.3.2 Management contract

A Management contract (in French *gérance*, in Spanish *contratos de gestión*) is "an institutional arrangement whereby a private company is contracted to take over core operations and maintenance responsibilities within a production unit" (Nickson and Franceys 2003:59). According to Davis (2005) it is a more comprehensive form of contracting: most or all the operations once carried out by a public agency are shifted to the private sector, which from then on bears the operational decision making duty. The World Bank (1997) defines management contracts as a transfer of "responsibility for the operation and maintenance of government-owned businesses to the private sector" (p.4). The simplest scheme involves paying a private firm a fixed fee for performing managerial tasks. Nonetheless, as the World Bank (1997) describes, more sophisticated management contracts, functioning under a regime of 'fee-per-unit' base may exist in order to introduce greater incentives for efficiency such as, for instance, defining performance targets and basing remuneration, at least in part, on the accomplishment of these targets. A variation of a management contract is the so-called *régie intéressé*, whereby "the private contractor receives a fee that is calculated as a percentage of gross turnover" (Nickson and Franceys 2003:59). This fee is added to the productivity bonus if benefits materialize.

There is some controversy on the issue of commercial risk. Although the World Bank (1997) states that this kind of arrangements leave all the responsibility for investment to the governments, who also bear the commercial risk (table 3.2), there

are authors (see Nickson and Franceys 2003) arguing that the private contractor bears part of the financial risks as its remuneration depends on the profitability of the overall operation.

Despite handing out the responsibility for the operations and maintenance, ownership is retained in public hands and customers remain clients of the public utility as well, under a contract that lasts between 3 and 5 years. Some authors state that the private part does not bear any financial risk, but others, sucha s Nickson and Franceys, argue the contrary, since some part of the risk may be transferred to the private contractor.

The World Bank (1997) recommends applying such schemes previous to greater private involvement or in the cases where the main aim is to enhance rapidly the efficiency and technical capacity of the utility.

3.3.3 Lease contract

Progressing through the private participation ladder we come across the lease contract (in French *affermage*; in Spanish *contrato de arrendamiento*). Nickson and Franceys (2003:61) define it as "an institutional arrangement whereby, as in the case of the management contract, a private company is awarded a contract to undertake the core operations and maintenance responsibilities of the public water utility". Under this scheme, the private contractor bears the legal responsibility for operating the service in exchange for payments to the public administration for the use of the fixed assets. In this case, customers become clients of the private company to whom they pay. The private part must provide capital for the replacement of basic components as well as for ongoing operations, but does not have to finance new investments. Which are assumed by he public sphere .

Greater commercial risk is shared with the public partner, but, as compensation, the private contractor receives a share or the total revenue stream; hence the creation of incentives to improve operating efficiency. Contract periods last between 8 and 15 years (World Bank 1997), although some companies lobby to have longer contracts (up to 20 years) to reduce their risk (Nickson and Franceys 2003).

The World Bank (1997) recommends leases for those cases where there are prospects for large gains in operating efficiency but only limited need or scope for new

investments. Leases are the most common institutional arrangement for urban water supply in France, and have become used throughout the world since the 1980s (Nickson and Franceys 2003). However, "pure" leases are rare, since most of them remain a hybrid between a lease and a concession contract (World Bank 1997).

3.3.4 Build-operate transfer contract (BOT)

Build-operate-transfer contracts (including other variations), which to some extent resemble concessions, are increasingly used to finance the construction or rehabilitation of some infrastructure projects, e.g. example water treatment plants, wastewater treatment plants, dams, or desalination plants (Davis 2005). Under a typical BOT arrangement, the private part is required to design and finance the investment project, to construct and commission the asset, and to operate and maintain it to an agreed standard for the concession period (around 20-30 years). Once this time has passed, at the end of the concession, the private firm may relinquish all rights and hand over the asset to the public utility in good working order.

Nickson and Franceys (2003:63-64) present the four key principles of such arrangements:

1) The water provider commits to purchase water from the facility on a long term basis;
2) Long term capital for construction is provided by the private investor and is secured by the non-revocable revenue stream generated by the completed project;
3) Timely construction is guaranteed by tying the construction loan to requirements that the project is constructed and commissioned within budget and on time;
4) Performance guarantees ensure that the new facilities will be operated efficiently

In the World Bank's (1997) view, these arrangements tend to work well if the main problem a utility faces is related to water supply or wastewater treatment. But "if the problem is a faulty distribution system or poor collections performance, a BOT is

unlikely to remedy it –and may even aggravate it [the problem]" (p.7). Different variations of the BOT model, although less common, comprise the following: build-operate-own (BOO) where the assets remain indefinitely with the private partner; design-built-operate (DBO) both the public and private sectors share responsibility for capital investments; and ROTs (rehabilitate-operate-transfer).

3.3.5 Concession contract

The concession contract (in French *contrat de concession;* in Spanish *concesión*) is "an institutional arrangement that has all the characteristics of the lease contract, but with the significant addition that the *concessionaire* also finances a detailed investment programmed for expansion and/or rehabilitation of the urban water supply system" (Nickson and Franceys 2003:65). In other words, "a concession gives the private partner responsibility not only for the operation and maintenance of a utility's assets but also for investments" (World Bank 1997:6). In the urban water sector the term concession is used to describe a citywide contract with a private operator for the commercial management of abstraction, treatment, financing and constructing new assets, sale of water and distribution (Nickson and Franceys 2003). That said, we can find different variations of the arrangement, for example the case whereby government agencies supply bulk water (Barcelona) or the case where sewerage responsibilities are combined with water supply.

Concession contracts pass full responsibility for operations and investments to the private sector with the aim of providing incentives for efficiency. Still, asset ownership and full use rights to all the assets remain with the public administration. This arrangement requires strong regulation of prices, quality of services, drinking water quality, environmental quality and customer care. The operator assumes full risk, and pays a fee to the 'asset holding authority" (generally a state owned company or a government department). Alternatively, the private part either pays no fees as part of an agreement to direct additional funds into new investments or pays for the use of the assets through amortization of existing loans.

Theoretically and ideally it is the pressure of a competitive market, in the form of competition for the market rather than competition within the market, which finally delivers the benefits of private sector involvement (Nickson and Franceys 2003). In this sense, the concession contract uses to be awarded on the basis of international

competitive bidding (ICB), and often bid by price: the bidder that proposes to operate the utility and meet the investments targets for the lowest tariff wins the concession. Thus, customers are directly billed by the concessionaire, which usually captures the entire revenue stream.

The World Bank (1997) qualifies such arrangement "attractive where large investments are needed to expand the coverage or improve the quality of services" (p.6). Although less common in France, lease contracts have been the norm in some Southern European cities, such as Barcelona, under a concession contract for water supply since 1867. In Nickson and Francey's (2003:75) words, "the goal of private companies that operate concession contracts is to maximize the financial return to their shareholders by providing what customers want at a price that they are willing to pay". The same authors quote six drivers they considered as key for 'best value' in the process of contracting out the private sector: 1) output based specification; 2) the long-term nature of contracts; 3) competition; 4) performance measurement and incentives; 5) private sector management; and 6) risk. While the World Bank (1997) and other organisms associate concession with success, other scholars have contrasted them with failures (see for instance Castro (2007)).

3.3.6 Joint venture arrangement

A Join venture lease/concession is a well known model in Spain. In fact, the World Bank (1997) qualifies Spain as the country *par excellence* in this respect. Basically, joint ventures are institutional arrangements whereby a special purpose company is created and owned jointly by the public administration (central or local government) and the private sector. The company then is run under a lease or a concession contract.

The percentage of shares by the public and private sector may vary, from cases where the state entity holds more than 51 percent of the equity (World Bank 1997) to cases where the private sector owns a majority of the share although with the public sector holding a 'golden share' option and thus retaining the edge in final decisions (Nickson and Franceys 2003).

Nickson and Franceys (2003) and the World Bank (1997) among others, however note that such arrangements could lead to a conflict of interests for the public sector

partner, as the government entity might be both the regulator of the utility company and its partial owner. According to the World Bank (1997), by limiting the private sector's control, these arrangements can help and facilitate stakeholder's agreement to private sector participation. At the same time and by demonstrating the public commitment towards the arrangement, joint ventures may reduce the perception of the risk by the private sector.

3.3.7 Co-operative agreement / Independent service providers

Though not widespread (mostly found in Bolivia and Argentina), this model implies that the households connected to the pipe network are the exclusive shareholders of the water utility (Nickson and Franceys 2003). Therefore, the users elect a management board that, in turn, selects a management team to operate the utility.

Davis (2005) points out the relevance of independent service providers in some parts of the world, where supply networks do not cover the entire population. These private agents, either individuals or firms, supply services on a commercial basis, assuming full revenue risk and almost all the responsibility for capital investments. Small-scale independent providers may include vendors, tanker truck deliverers, and kiosk or standpipe operators. Davis (2005) observes that this category does not only refer to water vendors in the Global South but also to bottled water vendors in both the developing and developed world. For instance, Ferrier (2001) calculated that, at the end of the 1990s, world bottled water moved an annual volume of 89,000 millions liters, valued at more than 22 billion US dollars.

3.4 The extreme case of private participation in the WSS services: full divesture

A full-divesture is an organizational arrangement by which the entire infrastructure and the assets of a publicly owned water utility are sold to the private sector, which becomes therefore the exclusive provider of urban water supply (Nickson and Franceys 2003). According to the World Bank (1997) (table 3.2) this kind of arrangement,, gives the private sector full responsibility for operation, maintenance, and investment in the waterworks. In this sense, it is quite similar to the concession regime; however, unlike a concession, a full divesture also transfers the ownership of the assets to the private sector. Although in terms of management there are similarities between a comprehensive concession and a divesture with a time-limited license, Nickson and Franceys (2003) underline that the political implications of selling public water assets could be immense and contested. Moreover, the implications in terms of government tasks vary sharply (World Bank 1997). A concession assigns the government two primary tasks: "to ensure that the utility's assets –which the government continues to own –are used well and returned in good condition at the end of the concession and, through regulation, to protect consumers from monopolistic pricing and poor service" (p.8). A divesture leaves the government only with the regulatory task.

Foster (1992) presents the unique features of privatization. For instance it is strongly emphasized the irreversibility of the effects generated by such processes as legislation to reverse would be very complex to raise and the many interests created would oppose renationalization. Interestingly, Foster differentiates between the situations of taxpayers under both schemes regarding risks. Thus, while under privatization the shareholder chooses his or her own portfolio as he/she pleases in order to reflect his personal assessment of risk and risk aversion, under public enterprise the taxpayer is forced to invest in certain enterprises as well as to assume their losses through increased taxation. However, and against such claim, the same author argues that although they have no real choice over the risks they take, taxpayers do not have to be forced to accept these risks even if there is no privatization: a reformed public enterprise may shoulder much of its own risk. Foster (1992) also refers to how the relationships toward financial markets also change as

stock market valuation is achieved with less effort under a privatized utility. In addition, he contends that "the possibility of a hostile takeover effects a fierce discipline and provides a powerful incentive to good managers because a takeover usually lead to many changes near the top" (p.353).

According to Curry (2005), two of the main problems that appear when privatizing a state-owned-enterprise, are the allocation of property rights and the valuation process. We will see again such processes in chapter 8 when analyzing the privatization of the Madrid's public supplier. The most used methods of valuation are the floating of the shares and the discounted cash flow. When offering shares in a public float the price is determined by retail shareholders within a range of bidding set by institutional shareholders. It is important to bear in mind that these methods rely on the profitability of the companies at the time of the float resulting from efficiency audits conducted during a corporatization phase. In the case of bad performance, the loss-making public enterprise may be sold even with zero compensation to the government. On the other hand, the Discounted Cash Flow (DFC) valuation calculates the value of the firm as the presented value of after-tax net cash flows. A problem that arises is the subjectivity in the estimates of future net cash flows and estimating the average cost of capital. Eventually, the capitalization of earnings through rates implicit in the price/earning ratios for the industry can be used. Alternatively, Curry (2005) adds that modern management techniques can be used to forecast the future income of the enterprise, and replacement cost and value engineering to value the assets.

Probably, the most well-known example of full divesture for urban water supply is the British and Welsh case, and to a lesser extent the Chilean case. Both are reviewed next.

3.4.1 The privatization of the water supply industry in England and Wales in 1989

Together with its counterpart in the US by Ronald Reagan, the mandate of Margaret Thatcher in the UK from 1979 to 1990 remains, the principal exponent of roll-back Neoliberalism. The retrenchment of the State was explicit, with the privatization of state-run sectors, ranging from the steel, iron and coal sectors to the electricity and

gas, railways or public housing. The water industry was not an exception of this privatization wave.

In the context of the United Kingdom, Martin and Parker (1997) point out some internal and external pressures (to government) that prompted the huge wave of privatization, under Thatcher during the 1980s:

- The disillusionment with the results of state ownership
- The belief that private ownership would bring substantially economic benefits
- The fact that state ownership was portrayed as highly inefficient, subjected to political intervention, slow in the introduction of state-of-the-art technologies, and dominated by trade unions
- An ongoing policy to reduce the public sector borrowing conditions

An interesting account of the 20th century British water industry is presented in the book *Privatization: The UK experience and international trends* (Fraser and Wilson 1988). This book examines the background and growth of nationalized industries and of other public-sector industrial, service and commercial activities in the UK, mainly since 1945, and the rapid process of sales that took place from 1979 onwards with the Conservative government. Other interesting accounts, through different prisms, are those by Bakker (2003c, 2005) or Gómez-Ibáñez (2003). As Karen Bakker shows, throughout most of the 20th century, water supply in England and Wales had been regulated as a public service, and most of the infrastructures owned by the government (first municipal and afterwards national) under a monopolistic basis, with water pricing set according to the principle of 'social equity'.

By 1940 water was managed by a mix of local authority together with private statutory or non-statutory water undertakers, operating under a monopoly in a given area. In June 1945 an act was raised imposing on the Minister of Health, and later to the Minister of Housing and Local Government, the following duties (Fraser and Wilson 1988:92):

- The statutory duty of promoting the provision of and proper use of water supplies in England and Wales and the conservation of water resources;
- Setting up a Central Advisory Water Committee and local joint advisory committees;

- Creating machinery for the combination of water undertakings, by compulsion if necessary;
- Providing for the mandatory acquisition of land and water rights;
- And enlarging the powers and duties of local authorities with regard to the extension of mains and the provision of piped water in houses.

As reported by Gómez-Ibáñez (2003), from the mid 20th century onwards important economies of scale in the water sector led to the reduction of water companies to 198, out of which only 33 were private. By that moment, Scotland and Northern Ireland had already different legislation than England and Wales.

In 1963**,** growing environmental concerns prompted the enforcement of a Water Resources Act, establishing the Water Resources Board, and the creation of 27 river authorities responsible for the management of basic resources. In addition to this, most abstraction of surface water was made subject to license by the competent river authority. Later, in 1973/4 a new Water Act was raised, enabling the creation of 10 regional water authorities in England and Wales responsible for all water and sewerage services and that replaced the former 29 river authorities and basins (Fraser and Wilson 1988). These authorities absorbed both the river authorities and the municipally owned water and sewage companies, leading to the control of all water uses for each region in a single body (Gómez-Ibáñez 2003). Moreover, the Water Resources Board was abolished and the National Water Council was established. Bakker (2003c) notes that the integration of water supply and regulatory functions in the Regional Water Authorities had the unforeseen effect of discouraging the enforcement of water quality regulations.

The second half of the 1970s saw the creation of the Department of the Environment, and the Drinking Water Inspectorate (DWI), responsible for setting and monitoring standards for drinking water (Gómez-Ibáñez 2003). In 1977 the Water Charge Equalization was raised. The same year, the Labour Government presented the White Paper proposing the establishment of a National Water Authority with the responsibility of preparing a national strategy for all water services in England and Wales, but deferring for the time plans to integrate and bring private water companies into public ownership.

By 1985, Ian Gow, the Minister for Housing and Construction, addressed to the chairman of water authorities in England and Wales a discussion paper on the implication of the possible introduction of a measure of privatization into the water industry. A year later, in 1986 the White Paper setting the plans for the privatization of the 10 Water Authorities was issued. This paper advanced the reasons for the subsequent privatization of the British Water Industry. Finger and Allouche (2002) summarize these arguments as follows:

- Water authorities would become free from intervention in day-to-day management
- Water authorities would be protected from fluctuating pressures
- Water authorities would be released from the constraints on financing imposed by public ownership
- Access to private capital markets would be easier
- Water authorities would be in a better position to compete abroad
- Privatization would enable the comparison of water authorities performance through financial markets
- A system of economic regulation would be created
- Privatized water authorities will be better off to attract high-quality management from other parts of the private sector
- Employees would be more closely involved with their business
- Water authorities would no longer combine both regulatory and supply functions

One of the main arguments was the need of important investments (between 24 and 30 million pounds) needed to bring the industry up to modern standards and the will of the government to hold down public sector borrowing (Bakker 2007a). Thus when the European Commission began to set stricter environmental standards (for drinking water, urban wastewater treatment, bathing and coastal water) the government saw privatization as a way to meet such requirements without raising public debt and taxes (Gómez-Ibáñez 2003). Thus, the decision of the European Union to prosecute Britain for non-compliance with European water quality standards in the 1980s

(Hassan 1998) was a trigger of privatization. Here we can note the clear nexus between Ecological Modernization and Privatization processes. The same justifications to privatize emerge in the Madrid case study (chapter 8). In the other case study, Barcelona, we will see that the compliance with European regulations of the early 1990s would unleash social contestation due to the sharp increase in taxes (the alternative to privatization).

In the English case, that first proposal, in addition, foresaw the privatization of the ten water authorities in their existing form, i.e. maintaining their commitment for regulating river water extraction and quality apart from supplying drinking water and treating sewage (Gómez-Ibáñez 2003). This arrangement could likely trigger a conflict between regulatory and commercial responsibilities, and contradicted the commitment to separate supply from regulation presented by Finger and Allouche (2002).

The year 1987 was crucial in this process: after the re-election of the Conservative Government, a policy paper was published setting out the government's revised proposals for the restructuring of the 10 Water Authorities. The paper envisaged that the utility function of water supply, sewerage, and sewage treatment and disposal would be transferred on a first stage to Public Limited Companies, which in a later phase would be offered for sale to the citizens (Fraser and Wilson 1988). However, the government decided that it was easier to maintain the existing private water companies (adding up to 29) as separate firms rather than to merge them with the 10 regional authorities (Gómez-Ibáñez 2003). On the other hand, the regulatory and river management functions would be held by the public sector, concretely by the new National Rivers Authority, which later would be absorbed by a new Environmental Agency (Gómez-Ibáñez 2003).

This will to privatize the water industry was emphasized even during the Queen's Speech of 1987 which may help to understand the sheer political importance of such process. Eventually, in 1988**,** the privatization process was materialized with the Public Utility Transfers and the enactment of the Water Charges Bill. According to Fraser (1988:IX) the main reasons that Thatcher used to justify the privatization of public utilities, and in our concrete case, the water industry, were the following:

- To stimulate the economy

- To submit government monopolies to the 'discipline of competition'
- To reduce the public-sector borrowing by providing financial resources
- And to establish 'the first post-socialist society'

In 1989 the process of privatization was set in motion. The government wrote off more than 5 billion pounds of water authorities' debt and injected over 1 billion in cash into the authorities to make them more attractive for private capital (Gómez-Ibáñez 2003). Subsequently, shares were floated. On the other hand, the Water Act of 1989 set out three new regulatory bodies (Finger 2002) as well as the basic terms of the privatization:

- The Drinking Water Inspectorate (DWI), entrusted with the regulation of drinking-water quality;
- The National River Authority (NRA) entrusted of the regulation of wastewater discharges;
- The Office of Water Services (OFWAT) entrusted with the economic regulation. The role of OFWAT is critical since it is the organism that issues the licenses for the core business of private water companies (water supply and sewerage treatment) for 25 years and has the power to revoke them.

Bakker (2003c) argues that issues such as underinvestment in infrastructure and industrial water pollution, with the ensuing decline of river and tap water quality for decades, triggered privatization in Britain. Such investment needs were fulfilled after privatization to some extent. Thus, from 1990 to 2000, 31 billion pounds were spent by companies in improving the water supply system (Bakker 2007a).

After privatization, the economic regulator established a price cap formula. Price cap regulation, which began to be used in Britain after the privatization of utilities in the 1980s, is an alternative to cost-of-service approach. Under this scheme, "the regulator sets prices so that the firm can cover reasonable costs, including a fair rate of return on its investments" (Gómez-Ibáñez 2003:273). Concretely, price cap could be seen as a hybrid of the discretionary and contractual approaches to regulation, according to Gómez-Ibánez (2003). Price cap conducts price reviews at fixed intervals (usually each 5 years) and sets a formula to 'cap' the annual price increases allowed between reviews. According to Gómez-Ibánez (2003:217) "the commitment

to a five-year price cap motivates efficiency improvements because a firm can increase its profits by cutting costs between reviews". This supposes a clear advantage of such regulatory system in front of cost-of-service regulation. For Ramamurti (1996) price-cap regulation constitutes a strong incentive for the private owner of the utility to reduce costs, without the fear that the resulting profits might be expropriated by the regulator as happens with rate-of-return regulations.

The common formula to set de price was P=RPI-X, where RPI is the retail price index and X the expected rate of productivity improvement in the industry. However, for the water industry, the price cap formula was slightly different: RPI+K, where K was expected to be positive to pay for the capital investments needed in water and sewerage treatment.

Price revisions (the revision of K) where carried out each 5 years. The first review was in 1994, and pretended to reduce K to 0, after years of real annual price increases averaging over 5 percent, with some cases over 10 percent for some companies. Finally average K was reduced to 1.5. Water companies, by that time, were raising important benefits, which prompted the shareholders to press for earnings before a new tougher regulatory environment took place or underinvestment affected those earnings.

Due to the lack of a national interconnected grid, the economic regulator administered 'comparative' or 'yardstick' competition. Price caps were established in advance and were calculated through econometric models and detailed assessments of individual company performance to identify potential reduction in operating, capital maintenance, and capital enhancement expenditure.

During 1995-1996 Britain suffered an important drought. The drought made visible structural weaknesses in some water companies, especially Yorkshire Water, which had to bring water by tanks to maintain essential supplies (see Bakker (2000)). Other water companies were forced to impose bans on outdoor water use. Criticism boomed when it was known that some companies were losing 40 percent of the water due to leakage (in part due to the increasing length of pipes needed to accommodate to the rural nature of the country). Subsequently, in July 1997, after the victory of the Labour party after 18 years of Conservative Party Rule, a windfall tax was imposed on utility profits. By then, water industry's value was 1.8 billion pounds (Fraser and Wilson 1988). With the Labour's victory, measures to protect vulnerable consumers

were raised and a review of prices took place. Both facts led to a profit decline of water companies from the 10 to 6 percent (pre-tax) (Bakker 2001).

Two years later, in 1999, the government issued a new Water Industry Act whereby the government increased protection for residential customers by requiring that meters were optional and its installation free. In addition it was mandated that OFWAT would develop tariff schemes to protect 'vulnerable groups' of customers, prohibiting water companies to shut off households who had not paid their water bills. Despite these actions, Bakker (2001) underlines the move from social equity principles toward economic equity principles, or in other words, the prioritization of economic efficiency over equity.

Gómez-Ibáñez (2003) draws some conclusions of the application of the price cap regulatory system. On the one hand, the author reports efficiency improvements. However, he also admits that "it is difficult to determine how much of the productivity gains achieved by British utilities in the last twenty years were due to price-cap regulation and how much to the fact that the utilities were privatized" (Gómez-Ibáñez 2003:240). In addition, the author argues that if efficiency gains had existed, price increases (which the author attributes to the environmental requirements) would have been much higher. On the other hand, however, he also contemplates some limitations of such regulatory system. In his opinion it has been less successful in providing incentives for capital investment and has failed to reduce the burden of regulatory proceedings. In addition price-cap regulation presents incentives to under-invest:

> "Price cap does not encourage efficiency improvements that have payback periods longer than the interval between price reviews. Indeed, firms are unlikely even to make improvement with short paybacks as the review date approaches, since by delaying until after the review they will capture the savings as profit longer. Firms will make improvements with long payback periods only if they are convinced that the regulators will recognize them as worthwhile investments and enter them into the regulated asset base to be recovered in future review prices" (Gómez-Ibáñez 2003:241)

As price-cap regulatory regimes have tightened, profits of companies have been decreasing, which has lead to subsequent drops in share prices (Shaoul 1997, Saal and Parker 2001). Mergers have been present during the post-privatization period of 1989-2004, with a drop of the number of companies from the original 39 to 22 in 2004 (Bakker 2007a). This phenomenon prompted the UK's Competition

Commission to prohibit new mergers, claiming that a given minimum number of companies were needed for the economic regulator to carry out comparative competition.

Back again to the analysis of the effect of privatization, Martin and Parker (1997) point out that arguments presented by mainstream economic studies tend to confuse the regulation of activities of the industry with the role of ownership. In addition, these authors prefer to conceive water ownership as a continuum rather than a discrete public versus private sector as in most cases. In this sense they argue that, once the sector is privatized, the State continues to retain an interest in the operations of an enterprise. To exemplify this, the authors quote the case of the regulators established after the privatization of some monopolies in the UK. In this context there are different regulators setting out the public service obligations and granting the licenses, and also determining the pricing formula to regulate maximum benefits.

Several studies have focused on the British case not only because of privatization but also because of the regulatory framework established later. For instance, Finger and Allouche (2002) note that "the British model is an interesting one, not so much because of the total privatization of the water sector, but rather for its regulatory framework" (p.199).

According to Parker, who has studied the effects of privatization in the UK (Parker 1999, Parker 2004), although privatization may bring about efficiency gains, these gains are not always guaranteed as efficiency is more associated with the introduction of competition and better regulation than with privatization per se. Elsewhere, Saal and Parker (Saal and Parker 2000, Saal and Parker 2001) analyzed how privatization affected labor and total productivity, reaching the conclusion that no obvious increases in productivity or decrease in costs appeared after privatization although they certainly surfaced after regulatory price caps were tightened in 1995. Shaoul (1997) focusing on the water industry in UK and the changes in costs and outputs after privatization, reached the interesting conclusion that greater efficiency gains, that is lower cost per output, appeared prior to the 1989 privatization. In addition, there was some effect of privatization on labor (Bakker 2007a) such as the reduction of labor levels, the significant change of labor relation and the dismantling of the collective bargaining mechanisms.

Although the privatization process has been the main axis of the water supply industry in England and Wales, Bakker (2003c, 2007) argues that focusing solely on privatization has concealed the broader transformation of water supply over the last three decades (Bakker 2007a:101). This author summarizes the main changes undergone during that period apart from privatization:

- Demand management prioritized over supply-side management strategies
- Environmental scientists and economists have substituted engineers in managerial positions
- A water scarcity discourse has been adopted, that is, water should no longer be considered as universally abundant
- Efficiency and cost-effectiveness prioritized over social equity in water pricing
- Disappearance of national cross-subsidies
- Consumers identified as 'customers' rather than 'citizens'
- Improvement of environmental and drinking water quality
- River quality in Britain is at its highest level since the Industrial Revolution

Bakker (2007a) argues that the water industry, from privatization onwards, has been reinvented as an 'environmental services' industry, with a prioritization of environmental concerns (a proof of that is the creation of a separate environmental regulator). This shifting power geometry under market environmentalism schemes has conceded more importance to environmental concerns over labor and consumer's concerns. Bakker summarizes very well such sea-change in priorities: "whereas the social costs of water production were previously externalized from the sphere of the politicized citizen and borne by the environment, the environmental costs of water production are now (to a greater extent) externalized from the sphere of capitalized environment and borne by consumers" (Bakker 2007a:112)

In Karen Bakker's words "market environmentalism in water supply in England can thus be characterized as a case of successful privatization, retrenched commercialization, and failed commodification" (Bakker 2007a:111). The motives Bakker develops for the commodification failure are related to the particular geography of water, the lack of true competition between firms and the lack of full-

cost reflective pricing as well as to the low implementation of metering (for instance, in 2000 only 20 percent of households were metered). Therefore, England and Wales water has proved to be "a life-giving, continually circulating, scale-linking resource whose biophysical, spatial, and socio-cultural characteristics render it particularly resistant to commodification" (Bakker 2007a:111).

3.4.2 The Chilean divesture case

The other paradigmatic case of total water privatization is Chile (Bauer 1997, Bauer 1998, Bauer 2004, Budds 2004). Under Pinochet's rule in 1981, the Water Code reform was enacted. This reform was clearly inspired by Chicago School of neoliberal economics (see Bauer (1998) and Klein (2007)). Once this legal framework was set, water rights were totally separated from land ownership and could be transferred, bought, sold and mortgaged, and fully protected as private property under the Constitution of 1980 (Bauer 1998)

The language deployed to justify Chilean water reform enabling fully private rights was the same of what we have reviewed at the beginning of the chapter: increase efficiency by means of price incentives and private trading, allocation water to the higher uses, reduced state intervention, and water savings,

According to Bauer (1997) the problems of such model derive from 'market failure' issues, for instance social and environmental failures or vulnerability to high transaction costs. Although water rights are separate from land, the market has been very limited because of various factors such as the physical geography and the infrastructure; the legal and the administrative complexities; the ambiguous or even contradictory economic signals of value and price; or due to cultural attitudes (Bauer 1997). Thus, some of the original objectives of the 1981 reform have not been fulfilled (Bauer 2004):

- Water use efficiency has barely improved, especially regarding irrigation
- Subsidies have been necessary for the construction of irrigation channels
- Water reallocation has been limited to a few areas
- Property rights have not improved the conditions of poor peasants and farmers, but actually may have harmed them

On the other hand, Bauer (2004) argues that some of objectives have been attained. For instance, the legal security granted by property rights has encouraged private investment in infrastructure (especially regarding productive economic activities); governmental legislation regarding water management has been restricted; and the agrarian counter-reform has been achieved and completed.

From a political ecology prism, Jessica Budds (2004) critically analyses the socio-environmental outcomes of Chilean water management hydro-politics, especially in the agricultural sector. According to Budds, the expected benefits for farmers laid out to justify water reform have not been accomplished. Rather the contrary: the 1981 Chilean Water reform has produced negative socio-environmental impacts on peasantry; their vulnerability to drought has increased and their possibilities of access to legal water have diminished. The absence of institutions and legal mechanisms, combined with illegality, has derived in aquifer overexploitation. It is important to mention that the public administration has almost no authority over private water use, with the exception of official drought emergencies (Bauer 1998)

Budds concludes that the Chilean model widely used as an example for other countries, especially by the World Bank, needs to be critically appraised. From the Chilean case Budds extracts some conclusions regarding market environmentalism:

> "It can be argued that markets in water rights bring some economic benefits to water resource management, such as water transfers between sectors with minimal bureaucracy; but this does not imply that these benefits can necessarily be extended to social equity and environmental management. Indeed, I argue that natural resource management under market principles diminishes, rather than fosters, social equity and ecological concerns" (Budds 2004:337)

3.5 Outcomes of the privatization wave

After two decades of massive private participation in the water sector in the different ways presented before, we review next different studies of the performance and outcomes of water privatization. Prior to this review, however, we present what we think is one of the most important and unintended outcomes of this process: the reregulation of the water sector.

3.5.1 The (re)regulation of the water sector

The widespread introduction of PPP contracts in the water supply does not only change the role of the different stakeholders but also modifies deeply how they relate one to another (Johnstone and Wood 2001). In what concerns the public sector, more rather than less intervention is required, as many aspects of the service will not be truly competitive due to the technological characteristics of the provision. Three mandates are critical: to regulate of over and under-pricing, to ensure the meeting of environmental objectives and to guarantee that social objectives will be reached.

To guarantee that a private monopoly does not take the place of a public monopoly justifies the need of regulation (Currie 2005), i.e. the need of a significant degree of public intervention to reach a socially equitable, economically efficient and environmentally sustainable water provision (Johnstone and Wood 2001). It is argued that private participation in the water sector would place more, rather than less, emphasis on effective public sector intervention. This fact takes us back to the reregulation processes exposed in the first chapter. Some authors, such as Nickson and Franceys (2003) even affirm that governments carry out a more effective and tight control under privatization schemes than they did when water management was a duty of the public administration.

In situations that are close to or a full natural monopoly, there is little possibility for competition to regulate economic behavior. In such situation, regulation is said to be needed. Accordingly, Nickson and Franceys (2003) highlight the importance of the existence of regulatory body regardless of the water provider is private or public, in order to monitor its performance with regard to water quality, service quality and coverage, and to monitor price levels in order to limit monopoly abuse. They

underline the need of regulation for public suppliers as well since they argue that "the failure of government providers to set adequate tariff is the root cause of many of the ills of the urban water supply sector" (p.128). Thus these authors conclude that "the establishment and monitoring of performance agreements between indirect and direct government providers or the monitoring of contracts with private operators is therefore the critical new role of government in the water sector" (p.129). In the same vein, Johnstone and Wood (2001:21) argue that public sector regulation is needed to carry out two key tasks: provide mechanisms whereby aggregate water use is sustainable and allocated efficiently between alternative uses, and internalize the externalities associated with adverse effects on public health and environmental quality. Regulation also has to serve as a guarantor of a level of service provision, which is consistent with a basic standard of living.

Nickson and Franceys (2003) propose two different types of public regulation: Regulation by contract enforcement or regulations by specialized agencies. The responsibilities of such regulatory organisms comprise a set of key actions:

- Licensing operators
- The key task of price setting
- Performance monitoring, aimed at ensuring that the quality of the service meets the commitments established in the contract: that is to monitor the effect on the environment, to monitor the financial performance (to ensure that the investments can be financed), to control the level of profits, and ensure that operational efficiency increases.
- Adjudication of the contracts. The regulator must behave as an impartial referee when interpreting or renegotiating the contracts and agreements between the private operator and the public administration. According to Johnstone and Wood (2001) there are three basic means of awarding contracts available to public authorities: competitive bidding/tender, competitive negotiation, and direct negotiation
- Issuing of sanctions, if failures in carrying out specific activities committed by the operator within a specified time are detected

Despite his clear pro-privatization point of view, Beesley (1997) envisages the creation of a regulatory in cases of natural monopolies such as the water industry. In this sense, mergers of companies (that is the ownership of more than one major water public limited company) should be prohibited, and price-control mechanism and rivalry between managements (enhancing efficiency) should be established. Elsewhere, Ramamurti (1996), in the context of telecommunications and transport privatization in Latin America, also emphasizes the need of regulation when handing over the ownership of public utilities to private sector.

This author concludes by stating that "changing a firm's ownership from public to private while holding industry structure and regulation unchanged would make relatively little difference to its performance" (Ramamurti 1996:38). Indeed, Ramamurti warns that in developing countries privatization might even worsen the situation due to the limited regulatory capacity of governments. These statements notwithstanding, this author defends that ownership matters as privatization imposes discipline on the state and may pave the way to improvements in the regulatory framework. The author raises the question as to whether it may be possible a reform of the sector without privatization, and suggests different barriers to such process in the context of South America:

- Governments may have difficulties with labor except during economic crisis
- Difficulties to raise prices; the author argues that these increases will only be tolerated in the case privatization goes along with them
- Difficulty to apply price-cap regulation to state enterprises since government performance contracts have not produced the expected results

While not holding an anti-privatization discourse, Finger and Allouche (2002) plead for a re-regulation of the water sector to ease the worst effects of private participation and privatization. They argue that what really must matter is not privatization in the widest sense (i.e. the participation of the private sector) but the subsequent organizational and institutional adjustment that is the creation of institutions to manage privatized water. Interestingly, they complain that:

> "so far, perhaps with the exception of the United Kingdom's regulatory authorities, most governments, and above all the World Bank, have been mainly interested in

> promoting private sector participation without worrying much about how to re-regulate the dynamics they have unleashed" (Finger and Allouche 2002:211)

According to Johnstone and Wood (2001), the main barriers to the regulator effectiveness, especially in the developing countries, are technical expertise, rent seeking, and regulatory capture.

3.5.2 The debate on the performance of water supply privatization: a review

Davis (2005) points out the main drawbacks of the available literature on public and private participation in the water sector. In the first place, most or at least part of the literature available (principally in the form of case studies) have been directly produced, financed or ordered by organizations with a clear stance (pro or con) regarding the privatization of water and sanitation services. This leads the author to ask for a rigorous, independent and systematic evaluation of local, regional and global experiences with private sector participation in the water sector. In the second place, the author underlines another flaw: the available literature features comparisons of performance over a too short period of time, normally following the transition from public to private sector management. Eventually, Davis argues that when performing comparisons it should be included what would have likely happened if the service remained public.

In this section we review some of the most notorious studies on whether or not privately run water utilities outperform public utilities. Before engaging in the debate, some considerations about what influences performance, aside from the alleged role of ownership, will be discussed. Renzetti and Dupont (2004) point at the scale of operation and other intrinsic characteristics of the supplied area, and also the regulatory environment, as main influential factors on the performance outcomes of a water utility.

The scale of operations does matter. Large firms achieve greater technical efficiency due to economies of scale in the provision of the service. However, this does not mean that these firms do better regarding allocative efficiency, i.e. a greater scale does not guarantee that the firm is producing the output at the lowest cost. On the other hand, the physical environment in which the firm operates is also decisive. In this sense, the type of water source (groundwater, surface water, desalted seawater, etc.) and the quality of the source are critical variables. Other important issues that

may influence the performance of the water supplier are population density, physical conditions such as topography, and also the customer mix (industrial, residential, agriculture, etc.) of the supplied area. In the third place, we find regulations and government policies, concretely, tax rules, accounting and pricing requirements and health and safety regulations. Renzetti and Dupont (2004) criticize that differing regulations and tax rules do not help in comparing the performance of public and private utilities. Thus, the regulatory environment (drinking and water quality, environmental regulation, health and safety and other regulations) may affect the performance of private firms and their cost saving strategies, and may affect also the choice of technology and capital. In addition, inefficient pricing policies not accounting for the full costs (both in private and public firms) are constructed as critical factors for differences in performance. Likewise, Davis (2005) argues that "it is reasonable to suspect that the values of some explanatory variables (e.g. scale of service are) may be highly correlated with a utility's being privately (or publicly) managed" (p.159).

Briefly, Renzetti and Dupont (2004:1876) summarize these points as follows:

> "it may be that ownership variables are less important for day-to-day operation than the size of the utilities (small vs. large), their geographical locations (rural vs. urban), the source of their water supplies (surface vs. groundwater), and features of their customer base (population density, the ration of residential to commercial customers, etc.)"

Against such claims, Renzetti and Dupont (2004) present a series of counterarguments. First of all, they point out that we must be careful to separate the role of ownership from the important role played by the degree of competition faced by the firm. In other words, it is important to separate ownership from the structure of the market. Renzetti and Dupont (2004), referring to the water sector, argue that companies operate largely under natural monopoly conditions and that therefore privatization is unlikely to lead to increased performance. Second, these authors challenge the assumption that capital markets impose the necessary discipline to private firms in a context of incomplete information and existence of transaction costs.

In their review, Renzetti and Dupont (2004) consider both extremes of the public and private ownership spectrum, paying less attention to some PPP arrangements. They observe the lack of conclusive evidence from the empirical literature to assert the

better performance of private utilities with respect to public utilities. Apart from the likely factors affecting performance exposed before, Renzetti and Dupont (2004) attribute such lack of conclusive results to the generally poor data available on operations (cost of capital, quality of the output, etc.), to the fact that we rarely see a purely private or purely public utility as most are PPP, and, eventually, to the lack of a strong competitive environment, which is a common feature of water supply. Regarding the US case, where public water systems serve 86 percent of American households (Renzetti and Dupont 2004) these authors did not find any evidence of these systems being outperformed by private utilities.

Regarding the complex UK case, many studies have been carried out with different results. Sometimes they show trade-offs between improvements in some aspects and worsening in others. Shaoul (1997), for instance, in his comparative pre/post-privatization concludes that full divesture of water utilities has entailed higher costs, a raise of prices but little improvement in the level of net investment and service quality. Elsewhere, Saal and Parker (2001) in his productivity analysis of the privatization in England and Wales disclosed labor productivity gains and higher profits, but losses in total factor productivity and few efficiency gains. These authors strongly suggest that environmental and price regulation improved performance, especially after 1995, when a tightening of price regulation took place. Stringent environmental regulation improved drinking and river water quality as well (Saal and Parker 2001). In a former study, Saal and Parker (2000) ranked price regulation as the most important factor influencing industry costs.

When reviewing the French case, Renzetti and Dupont (2004) underline that the possibility of different firms taking place in the bidding process is a factor that could enhance the degree of competition and therefore the efficiency of water utilities. Aknowledging this improvement, they regret the fact that only French firms could put in a tender and the existence of large subsidies.

Despite the lack of conclusive evidence of outperformance by either public or private sector, Renzetti and Dupont (2004) conclude that many of the key sources of inefficiency could be solved without a change of ownership but with the existence of "pricing rules, investment rules, forecasting methods, and rules for dealing with droughts and other circumstance when the outputs must be rationed" (p. 1876-1877).

In what concerns PPP (or Private Sector Participation, PSP) arrangements in the water sector, the literature has treated both the improvements and failures associated with those arrangements. In his paper on water supply in the Global South Castro (2007) raises the following questions (Castro 2007):

- What was the historical evidence informing the claim that promoting private sector participation in the water and sanitation sector (henceforth WSS) would be the best instrument for reducing poverty?
- What are the principles that provide the foundation for this claim?
- What has been the empirical record of the resulting WSS policies?

Regarding the first question, Castro (2007) notes that, at the outset of the neoliberal wave on water policies, the expansion of the service to the poor in the Global South was not an objective. Hence there was not any evidence that privatization of water supply would alleviate poverty. It was during the 1990s and early 20th century, for instance with the Millennium Development Goals, when the expansion of the supply and the subsequent alleviation of poverty became an aim of such policies. Castro adds that the recognition of failed neoliberal policies is acknowledged to some extent. However, big inertia still shapes the institutional reforms and policy decisions, frequently deepening the inequality and poverty gap. Over time, the term privatization has progressively lost ground, giving place to other expressions such as the 'private sector participation' and more recently to 'public-private partnerships' or 'tri-party partnerships'

Castro (2007) asserts that these policies have contributed to deepening existing inequalities of power through the weakening of the state, local government and civil society capacities to exercise democratic control over private water companies. Thus, "although mainstream WSS policies were supposed to enhance democratic governance and citizenship in a sector of activity characterized by top-down and paternalistic practices, they have actually reinforced existing power asymmetries and further deepened the alienation of common citizens" (p.757).

Dealing with the French model, Chong et al. (2006) explore the empirical link between organization choice (public ownership and operation or public ownership and private operation) and performance in water distribution, finding out that consumers pay more when municipalities choose PPP arrangements. Their findings

suggest that high transaction costs make the use of PPPs inefficient as well, although the authors also point out that "institutional and contractual solutions may reduce hazards enough that PPPs could be the most efficient organizational choice for providing public services in some cases" (p.154).

Figure 3.3. Cartoon denouncing the PPP arrangements in the water sector in Perú

Source: Carlin, in the Peruvian *La República* newspaper

In her extended review of the literature Davis (2005) suggests that imperfection in both competition for contracts and regulation often lead to negligible effects on efficiency under privatization within natural monopoly sectors such as water supply and sanitation. Davis argues that market structure rather than the dichotomy public-private is more important to understand the differences in efficiency found in the water sector. Referring to the studies carried out in developing countries, the author asks for caution when analyzing the effects of privatization. In this case Davis suggests that when considering efficiency-related indicators after privatization in the Global South, dramatic improvements may have been reached with relatively low effort. However this is mainly due to the formerly very poor performance of such utilities. Moreover, few evidences are presented regarding how efficiency gains are maintained over time. According to her what really matters is the policy and regulatory framework that the firms face. Regarding capital investment, she recognizes that with private involvement, flows of capital to the water sector seem to be enhanced, although the improvements brought about fall short of the contractual targets established between the firm and the government. Contrarily, David Hall and Emanuele Lobina (2006) collect data from developing countries to demonstrate that the promises of capital investment by private capital have not been accomplished. All

but the opposite: most capital has been granted by the governments or development banks. Gains have been privatized, and the losses socialized (figure 3.3).

Although concession contracts theoretically involve commitments to expand the supply network, Castro (2007) reports that most of these commitments are abandoned or modified. Privatization, contrarily to the widespread belief, will not contribute to attain the Millennium Development Goals for water supply, rather the contrary. It must be remembered that the Millennium Development Goals (United Nations 2000) set, among many other objectives, to halve the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015.

In 2009, the private sector provided water supply and/or sanitation services to over 800 million people across the world (Global Water Intelligence 2009a), most of them located in South Eastern Asia, Western Europe and North America. Western Europe is by large the area where private participation is stronger due to its long trajectory in water supply (table 3.6).

Table 3.6. People served by private water or sanitation services in 2009 and forecasts for 2015/2025

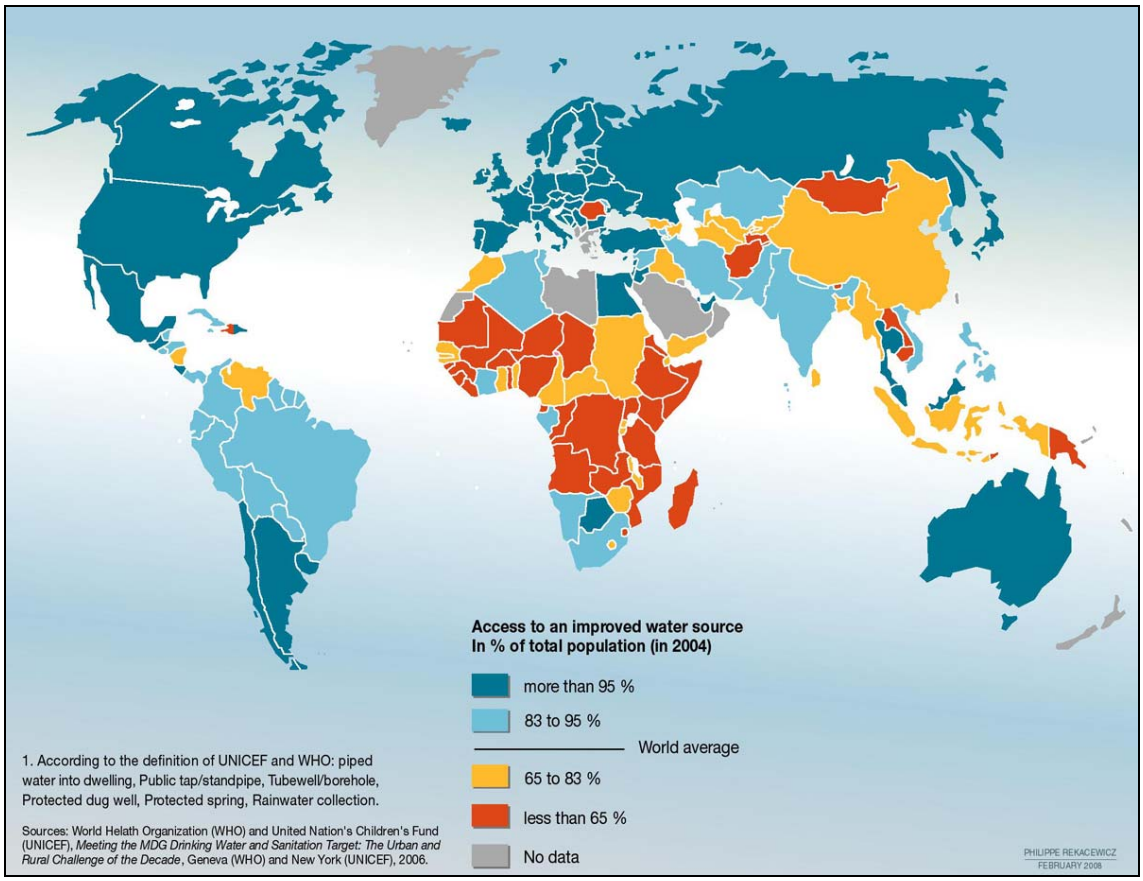
	2009		**2015**		**2020**	
Region	In millions	In %	In millions	In %	In millions	In %
Western Europe	181.4	45	219.5	54	226.6	55
Central and Eastern Europe	33.8	10	64.4	20	81.1	27
Middle East and Africa	69.2	5	123.1	9	217.8	13
South and Central Asia	10.1	1	43.1	2	97.4	5
South East Asia	314.6	15	443.6	20	605.2	26
Oceania	10.1	28	12.1	32	14.7	36
North America	100.4	22	136.2	28	209.0	40
Latin America	86.0	18	121.5	24	158.0	29
World Total	805.6	12	1163.4	16	1609.8	20

Source: adapted from Global Water Intelligence (2009a)

Paradigmatically, we observe that where water problems are higher and where the Millennium Development Goals must bring real improvements, i.e. in Africa or the

Middle East or in some parts of Asia (figure 3.4), coincides with a meager presence of private companies. A simplistic assessment would lead us to conclude that the lack of good supply and sanitation services is precisely due the low implementation of the private sector. Contrarily, we want to suggest that this may be the cae because the private sector is simply not interested in "doing business" in these places. This could be partly explained by the past failures, mainly in South America, but also because private management does not report many benefits in these areas.

Figure 3.4. Access to an improved water source



Source: UNEP, World Health Organizaiton and UNICEF

3.6 The counterargument: public sector participation in urban water supply

Esteban Castro (2009) qualifies water privatization (or rather, private participation) policies during the 1990s as total failures. The main arguments defended by the World Bank and also the *Banco Interamericano de Desarrollo* [Inter-American Development Bank] to justify privatization referred to the better performance of the private over the public sector in efficiency terms; to the lack of financial capacity of the public sector to develop and maintain the infrastructures; to the fact that subsidies create distortions and that privatization would reduce private deficit; and finally to the claim that privatization would be the best option to extend water services to those without access and even would reduce social inequality. As Castro notes, the same World Bank has recognized that those objectives were not fulfilled.

Wilder and Romero Lankao (2006) reunite privatization and decentralization of water resources in Mexico with the neoliberal reform strategy in place in that country. Drawing on rural and urban case studies the authors assess whether private sector management lead to a more efficient, sustainable and accountable management and governance of water. Especially for urban cases, there is not a clear and direct linkage between private participation and a more efficient management of water. Instead, they conclude that "privatization appears not so much an instrument aimed at improving efficiency as it does a channel for preferred treatment for capital accumulation by private entities as well as a legitimized way for the state to transfer the financial and politically charged burden of water management to non-state institutions" (p.1991). Indeed, they disclose that in some case private services result in an additional burden for water users without significant improvement in the services.

These authors criticize that when implementing water reform in Mexico, and elsewhere, deregulation, privatization and decentralization focus all the attention while other important aspects are dismissed:

> "It may be that water reforms have been insufficient to deal with the complete spectrum of factors that contribute to water scarcity and quality because promoters of reform centered on economic issues such as cost recovery, water markets, and privatization. They did not adequately consider cultural factors, such as the

> capabilities of water users to achieve self-organization, efficiency and sustainability. They neglected to pay close and careful attention to core sociopolitical issues such as equity, institutional or governance settings, power relations, and the diversified socio-economic character of Mexican water systems" (Wilder and Romero Lankao 2006:1992)

Although in the first chapter we have argued that sometimes environmentalist and neoliberal economist and police makers coalesce in some positions, there are still important divergences among them. At the European level, the European Environment Bureau, a federation of environmental citizens' organizations based in all EU Member States, is one of the clearest examples. The EEB is against privatization, even if strong regulation is set: The EEB does not believe that regulations will succeed in curbing in time the negative environmental consequences of water service liberalization, but believes that regulations will put an undue burden on state authorities and taxpayers (p.19). These authors argue that what is necessary is not to liberalize but to improve existing public structures. They put emphasis in four key reforms: public participation, resource protection, highest standards, and sound water prices. As we see however, water pricing is used as one of the main reforms to be carried out, in accordance with the European Framework Directive and most of market environmentalism and ecological modernization thinking.

Focusing on the environment and public health the EEB (2002:20) argues that

> "The EEB believes that this focus on deregulating the water sector is not likely to result in better water management, but instead in long-term problems for democratic control, and human and environmental health. Private water services are, due to their commercial approach, less fit to meet the basic environmental principles of public participation and integration of environmental and health protection and service provisions."

In this sense Johnstone and Wood (2001) do not see in public mismanagement a good argument to justify the increase of private participation in the water sector. Elsewhere, Budds and McGranahan (2003) review the arguments mobilized for public sector provision. They consider three elements tightly associated with urban water that call for a public management of urban water supply. Namely: public goods, natural monopoly, and human rights. All these justify the necessity of public water management.

Public goods are those that present three critical characteristics (Bannock et al. 1987): 1) non-rivalry (i.e. one person's use does not deprive others from using it); 2) non-excludability (i.e. if one person consumes, it is impossible to restrict others from consuming) and 3) non-rejectability (i.e. individuals cannot abstain from consumption even if they want to). If a good shares these distinctive qualities, in principle, it must be provided by the public sector since private enterprises supplying market demand may fail to provide these types of goods because when they are produced, provide a benefit to the public at large (and not only to the single user) and cannot be sold to or used up by individuals (Budds and McGranahan 2003). In other words, public goods refers to those services whose "benefits are shared across the community in such a way that those who do not wish to buy the service cannot be excluded from the benefits created by those who do buy the service" (Poltitt 2002:78). Gómez-Ibáñez (2003) similarly speaks about the existence of non-user benefits or positive externalities, i.e. benefits beyond those that users obtain. Clean water and sanitation enhancing public health would be a perfect example of public goods.

However, urban water supply, drainage and sanitation networks are not pure public goods, since water provision clearly provides private benefits to households and is possible to charge people on the basis of their water use. Drainage and sanitation systems may be closer to the definition of public goods presented before. Still, Budds and McGranahan (2003:93) argue that water provision may behave as a public good:

> "if people are unwilling or unable to purchase enough water to protect their own health, and contract infectious diseases as a result, then the health of other is also put at risk. The public benefits of water provision only really become significant where the private benefits are insufficient to finance adequate provision"

One of the most important arguments used to promote public ownership and management of water supply has been the existence of natural monopolies in the water sector. Natural monopolies arise when "total costs are lower when a single enterprise produces the entire output for a given market than when any of two or more enterprises divide the production amongst them" (Budds and McGranahan 2003:93). Commonly, the most quoted reason for the existence of such phenomenon is the issue of economies of scale: the larger the producer, the lower its average costs for the provision of the output. When this occurs, economists warn that natural

monopolies will normally require some form of public regulation to prevent overpricing. At times, this argument has been used to justify public ownership and operation. The predisposition towards (natural) monopoly produces weak competition and inexistent consumer choice (Hart et al. 1997, Poltitt 2002). Therefore, the government must either provide the infrastructure itself or must regulate the prices and quality of services of private infrastructure (Gómez-Ibáñez 2003)

For water and sewerage networks unbundling has proved difficult, and competition is generally restricted to "competition for the market" rather than "competition within the market". According to the Budds and McGranahan (2003), while natural monopolies area an issue, "public ownership and operation is by no means the only response" as "while private monopolies raise a number of regulatory issues, so do public sector monopolies" (p.94). Despite such claims, Gómez-Ibáñez (2003) assumes "that private provision of infrastructure is generally desirable, particularly if the problems of regulating monopoly can be solved in a politically acceptable and economically way". Indeed, in front of monopoly the author claims for more market-oriented solutions: "the more market-oriented the remedy, the more closely it is likely to approximate the agreements that infrastructure companies and their customers would reach voluntarily in a world without no transaction costs" (p.35). He adds that market-oriented mechanisms have the potential to provide stronger protection against opportunisms as they rely on some form of explicit contract, either private or concession. In addition, the author argues that they are "more stable as they raise fewer concerns about the use of government powers and the fairness of regulatory proceedings" (p.35).

The right of access to clean water and sanitation at an affordable price is acknowledged in the Dublin Principles (ICWE 1992), as well as in a number of other international statements. However and according to Budds and McGranahan (2003), "recognition that adequate water and sanitation are human rights does not itself imply that the public sector must be the provider of these services" (p.94). Thus, "the view that human rights are violated by privatization is often based on the assumption that privatization is accompanied by full cost-recovery through user fees" (p.95). For these authors, the key issues revolve around "how privatization is implemented, to what extent, and in what context" (p.95). For them, there is not any conceptual

contradiction between private sector participation and the achievement of human rights as Karen Bakker (2008) also stated.

Other authors, even those keen to defend privatization, point at some situations when public ownership or at least the intervention of the government is desirable. For instance, the difficulty of assembling the right of way[15] required for an infrastructure network is one of the reasons (Gómez-Ibáñez 2003). Eventually, economic development and equity considerations are also important (Bakker 2001).

Table 3.7 presents a review by Erik Swyngedouw (2004), of both the factors promoting and discouraging privatization.

[15] "railroads, highways, and power, water, and telephones lines all require long, linear, and contiguous rights-of-way that would be difficult to assemble without the government's power to expropriate private property through process of eminent domain" (Gómez-Ibáñez 2003:5).

Table 3.7. Factors promoting and discouraging privatization of the water sector.

	Factors promoting privatization	**Factors discouraging privatization**
Economic and Financial	• The economic and financial needs of the country in the face of scarce resources and increased demand • Reducing the financial burden of the public sector • Capacity to attract foreign loans • Increased productivity gains expected from introducing competition • Promotion of economic growth expected from private investment • Assistance to development of capital markets • Generating resources that can be applied in cross-subsidization to fund other projects (e.g. network expansion, wastewater treatment, etc.) • Reduction of taxes through raising revenue from water	• Lack of interested and reliable investors • Unreliable economic environment (e.g. inflation, volatile exchange rates threatening returns on investment) • Poorly developed capital markets • Prospect of price increases or excessive profits • Potential creation of monopolies • Difficulties in collecting water payments, uncertainties on levels of return to be achieved • Higher than average rates of return requested by private investors • Fiscal deficits that limits financial capacity
Technical and Environmental	• Expanding the service to unserviced areas • Quality improvements (e.g. new water treatment technologies, etc.) • Tackling the increased complexity of water supply activities and their environmental impacts	• Unreliability or inadequacy of resources availability, geographical obstacles, etc.
Policy and Organisational	• Reducing the administrative burden and direct responsibility of the public sector • Improvement of the capacity for response to local needs • Transparency of information (on funding sources, guarantees, risks, conditions) • Increased private sector confidence inducing investment and repatriation of capital	• The complexity of the preparatory work (legal, institutional, economic, political, etc.) • Legal or constitutional prohibition • Inadequate or unpredictable institutional and policy environment • Inefficient or nonexistent regulatory structures • Political interference • Low motivation of the staff, salary problems • Corruption
Socio-Political	• Pressure and conditioning from multilateral financial institutions • Pressure from powerful interest groups that may benefit from privatization • Expected enhancement of the government's credibility (internally and externally	• Weight of tradition (government as provider) • Governments interest in keeping control over services (for social, political, or economic reasons) • Uncertainty about privatization prospect in the face of inconclusive evidence • The scope of the changes involved • The protection of social equity aspects (distribution issues, welfare, health, etc.) • Opposition interest groups that have stakes in public enterprises • Political opposition • Private sector distrust of long-term viability (e.g. fears of re-nationalization)

Source: Swyngedouw (2004:130-131)

3.6.1 The alternatives to privatization: from corporatization and NPM schemes to PUPs

Rhetorics defending public ownership and participation in the water sector could end paradigmatically adopting neoliberal strategies such as New Public Management schemes or the corporatization of public firms, mimicking private corporations and taking for granted pure market mechanisms to deliver such resource.

Following the first option, Foster (1992) raises the external prerequisites to reach an efficient public enterprise, i.e. the corporatization of public enterprises to become efficient. According to this author, "public enterprises are to be given the clarity and singleness of purpose of private enterprise" (p.336). Hence Foster already establishes an overriding weight to economic efficiency, and also claims for the interconnection as a way to enhance competition, while championing the establishment of an independent economic regulator, and asking for the existence of yardstick competition to improve economic efficiency. The author argues that appropriate measurements are needed to test whether or not performance is improving. Hence, other various financial and performance targets are desirable. In relation to the last point, Foster contends that "if the objectives of a public enterprise are to be monitored, even if only indirectly, then there must be confidence in the information by which they are to be monitored and indeed set" (p.341). To make things more transparent, the author suggests that the public enterprise's powers and duties should be defined in a contract or license. Some freedoms have to be granted to the public utility such as freedom to optimize factor mix, freedom to diversify and freedom to raise capital. Regarding the latter point, the author argues that public firms should have free access to as much capital as they can demonstrate they will employ profitably. Finally Foster argues that such kind of corporatized public enterprise should have secondary objectives other than making profits.

Apart from those external prerequisites, Foster also sets out the internal prerequisites that should be fulfilled, if an efficient and optimal performance of public enterprises is pursued. The author highlights the critical need of incentives as the public interest is not considered a sufficient motive (figure 3.5).

Figure 3.5. Internal requisites to reach an optimal performance

- Incentives to boards, i.e. incentives to pursue profit and their other financial objectives actively. According to the author that could be achievable by setting the remuneration with achievement of objectives
- Incentives to other managers, who should be paid at market rates and should receive a part of the salary based on appropriate rewards
- Incentives to employees, be it with share-ownership (shareholding) or with income varying with profits

Source: adapted from Foster (1992)

Finally Foster foresees the need to establish equivalents to receivership and bankruptcy if public enterprises cannot meet the objectives.

At odds with the model of Public-private Partnerships and following a different path than the corporatization of public firms, we find models that are based on non-profit seeking cooperation between public authorities or organizations: the so-called Public-Public Partnerships or PUPs (Lobina and Hall 2006, Hall et al. 2009, Hoedman 2009). These types of arrangements are based on solidarity and not on profit seeking and attempt to build operative, technical and financial management capacities, especially in developing countries.

There are many examples around the world, some of the in Latin America. In Peru an agreement was reached in 2009 for the constitution of a public-public partnership, between the second most important public Argentinean firm supplying Buenos Aires Aguas Bonaerenses S.A, with the Peruvian local firms EPS de Arequipa, Sedapar and FENTAP (*Federación de Trabajadores de Agua Potable y Alcantarillado del Perú*).

In Spain we have the example of the recent creation, in October 2009, of the A*sociación Estatal de Operadores Públicos de Abastecimiento y Saneamiento* (AEOPAS)[16] [Association of Public Water and Sanitation Operators]. In general terms this association pretends to serve as a platform to promote and defend public management of the WSS services in Spain, but also solidarity and international cooperation. At the regional level, we find in Catalunya the *Consorci per a la Gestió Integral de l'aigua a Catalunya* (CONGIAC) [Consortium for the Integral Management of Water]. CONGIAC, founded in 2005**,** is a public entity based on an association of municipalities which are directly involved in the integral water cycle

[16] *Article 3, Estatutos de la Asociación Estatal de Operadores Públicos de Abastecimiento y Sanemiento.* Source: http://www.aeopas.org/ , last accessed 17th December 2009

and the environment through their municipal companies. The initial aim of this association was to achieve synergies and share experiences of public water management among its constituents. However, they are increasingly offering support and experience to other municipalities[17]. Such is the case of the municipality of el *Figaró*, in the Metropolitan Region of Barcelona, that has shifted from a concession to a mix-economy firm (CASSA) to a concession to this consortium. However, it is important to mention that among the inspiring principles of the group we can find many influences of the private sphere (figure 3.6), such as the stress on efficiency or the incorporation of private sector techniques.

Figure 3.6. Principles inspiring the Congiac model

Efficacy: matching targets with results
Efficiency: optimizing resources and results
Responsibility: achievement of objectives, not only justification and norms performance
Public management: selective incorporation of the private sector's operative ways

Source: adapted from Congiac webpage, www.congiac.com

At any rate, CONGIAC clearly distances itself from private operators, as one of its key commitments is to focus on quality rather than economic profitability. Currently this public consortium supplies some 37 hm^3 to almost half million people in several municipalities of the province of Barcelona (Mataró, Manresa, Vilanova i la Geltrú, El Prat de Llobregat or Vilafranca del Penedés) and Tarragona (Tortosa and Reus)

A similar concept, in the sense that does not seek for benefits, is that developed by the United Nations Secretary-General's Advisory Board on Water and Sanitation (UNSGAB) in the Hashimoto Action Plan issued during the 4th World Water Forum in Mexico city (UNSGAB 2006): the Water Operator Partnerships (WOPs). These arrangements are intended to provide support for capacity building of public water operators in order to achieve Millennium Development Goals and are slightly different than PUP. The latter is strictly bounded up to public partners, while WOPs though prioritizing agreements between public operators do not exclude the participation, under non-profit logic, of private partners (private firms or NGOs).

[17] http://www.congiac.com/index_uk.htm , last accessed 17th December 2009

PART 2:

CASE STUDIES

4 The urbanization of modern water supply in Barcelona

In this chapter we will trace the history of the urbanization of the modern water supply system in Barcelona and its metropolitan area. Although our narrative will fully begin with the moment of the creation of a centralized supplier of water for the city, first we will briefly present how the pre-modern water supply in Barcelona was organized. Subsequently, we will focus more explicitly on the creation of a centralized and monopolistic water supplier, and the ensuing debate over the public and private control of the water monopoly. The history of the expansion of the city and the expansion of the water infrastructure go hand in hand during the 20th century, with the quest of water from beyond the urban limits since the 1960s. Drought and quality issues have been two keys drivers to understand the recent debates on the "water problem" of Barcelona.

The aim of this chapter is to provide the basis to understand how the water supply of Barcelona became centralized and controlled by a private operator or, in other words, how the city council did not succeed to municipalize the service. The chapter will also deal with the evolution of the infrastructure and the colonization of water resources to feed the hydrosocial cycle of the urban fabric. Eventually, it also intends to provide some thoughts regarding the evolution of discourses around drought and quality problems of the water served to the city.

4.1 Pre-modern water supply in Barcelona

The antecedents of the modern water supply in the city of Barcelona can be traced back to the *Rec Comtal*. There are references of this ditch already in the 10th century, and, in 1076 as the '*Rec Comtal'* appears in a document of the Count of Barcelona Ramón Berenguer I (Capel 1999b). The ditch captured water from a diversion dam in the Besòs river located in the municipality of Montcada (north of Barcelona). This water was mainly used for agriculture and for industries such as mills. In 1778, and in order to improve the *Rec Comtal,* the Mine of Montcada was built and water became to be used not only for agriculture and industry but also for drinking. The mine was expanded in 1823 by the town councils of Barcelona, Sant Andreu and Sant Martí and another aqueduct was built in 1824 (Capel 1999b).

Martin Pascual (1999) examines the conflicts generated around the use of water from the *Rec Comtal* for the different uses.. From the mid 19th century onwards water withdrawals from the Besòs basin increased, and dwindling water flows from the Mine of Montcada followed (Capel 1999b). There were even proposals to bring water from other sites to the Mine. Until 1878, the mine of Montcada and the *Rec Comtal* supplied two thirds of the water consumed in the city of Barcelona, the rest coming from groundwater from the city wells or from other ephemeral streams crossing the city (Masjuan et al. 2008). Cerdà's *Eixample*, unleashing the rapid urbanization and expansion of the city beyond the medieval walls, signified the termination of this model of water supply (Masjuan et al. 2008). The alternative and ultimately defeated *Eixample* plan of the architect Rovira i Trias (also one of the official architects of the *Sèquia Comtal*) had foreseen the preservation of the aqueduct for the continuity of the water supply for Barcelona. However, Cerdà planned to cover the Rec Comtal and urbanize the agricultural land nearby. Thus, with this urban project, the aqueduct was covered and the agricultural lands were urbanized, changing existing water uses. Industrial and urban demand sharply increased to the detriment of agricultural use, and urban growth became the decisive factors behind the search of more water resources for the city.

4.2 The constitution of a centralized water supplier in Barcelona

Acknowledging increasing needs of water to feed the dramatic population growth of Barcelona, in 1878 the City council initiated a search for new water resources in the Besòs river and also constructed new wells to bring more water to the *Rec Comtal*. This public initiative, however, prompted the opposition of landowners and industrialists[18], concerned about water supply for industrial uses supposedly threatened by residential demand (Masjuan et al. 2008). To solve the tension the local government granted a concession to the water company *Compañía de Aguas de Barcelona* to excavate more wells in the Besòs basin. This company would eventually monopolize the water supply of Barcelona.

4.2.1 Urban expansion and search for water at the end of 19th century: the concurrence for the water market

The *Compañía de Aguas de Barcelona* (CAB) was constituted in Liege (Belgium) on the 19th June of 1867, with Belgian and French participation, and a capital of 4,500,000 francs, mainly from *Crédit Général Liégeois* and *Compagnie Générale des Conduites d'Eau* (Voltes Bou 1967). A precursor of this company was the society *Palau, García y Compañía* (1857-1865), which obtained the rights to draw water from some properties in the Dosrius basin (located some 25 kilometers north-east of Barcelona) and to conduct it to Mataró (Voltes Bou 1967, Jové 1995, Piera 1995, Martin Pascual 2007). In 1865 the society transferred all its rights to Miguel Costa, and in turn, Costa transferred these rights to the CAB two years later (Voltes Bou 1967).

At the first stages, the CAB, had three main sources of supply Voltes Bou (1967):

> a) Dosrius: From 1867 onwards, the company improved the infrastructure of capture of water in Dosrius; transportation (by means of new aqueducts); storage (water tanks with 1,700 m^3 storage capacity in Sant Martí de Provençals, 95 m high), and distribution. The general

[18] Especifically the *Sociedad de Propietarios Interesados en el Aprovechamiento del Agua de la Acequia Condal* [Society of Landowners interested in the use of the Acequia Condal]

director of the company claimed that the State, Province or Municipality had given no financial help, and that water would be metered as it was done for gas[19]. Agreements between the company and the town council were established to water some fountains of the city and public places.

b) Besòs: In 1878 the company rented for 40 years some properties in the north of Barcelona, where the aqueduct from Dosrius crossed the Besòs river, in order to explore for groundwater. Despite the reluctance of the municipality, the company obtained the right to do so in 1879 by means of a *Real Orden* and built some installations to draw and store the water extracted. In the 1880s, as we have mentioned, the company obtained three new more concessions totaling some 200,000 m^3 of water from the Besòs river.

c) Vallès: In 1881 the company also bought the rights of exploitation of the Vallès aqueduct, with a capacity of 1,700 m^3 per day. Therefore, by 1881, the Company extracted water from three sources (Dosrius, Vallès and Besòs), guaranteeing some 17,000 m^3 per day through a network 115 kilometers long (Voltes Bou 1967).

By the time the CAB began to operate, other private water companies existed in Barcelona and in the towns of the Barcelona Plain, which were mostly bought by the CAB later on:

BARCELONA AND OTHER MUNICIPALITIES

- In the Llobregat, the *Empresa Concesionaria de Aguas Subterráneas del Río Llobregat* had a concession to draw groundwater from the Llobregat since 1871 (Jové 1995). The CAB tried to buy the firm to avoid concurrence but it was unsuccessful at first. In 1887 the firm was granted a concession to supply part of Gràcia (Voltes Bou 1967). Eventually, in 1897 the CAB took control of the firm, despite the opposition of the trade unions (Voltes Bou 1967, Jové 1995)
- Another company was the *Compañía General Anónima de Aguas de Barcelona (Orilla Derecha del Besòs)*, founded in 1881, in Sant Martí de

[19] *Diario de Barcelona*, 29th March 1871, quoted in Voltes Bou (1967)

Provençals. However, in 1890 the municipality cancelled the activities of such company due to problems of water quality. In 1892 the activities of this company were transferred to a British society, *Barcelona Besòs Waterworks Company Limited*. This company had envisaged building a dam in the Besòs basin; however, due to the lack of economic resources it transferred all its activities and rights to the CAB in 1886. That year a conflict between the municipality and the CAB emerged regarding the ownership of the channels in the right bank of the Besòs. Finally, in 1887, the municipality cancelled the concession to use these channels and declared its ownership over them. However, in 1899 the governor, backed by the *Consejo de Estado and the Tribunal Provincial de lo Contencioso y Administrativo,* cancelled the decision taken by the municipality.

BARCELONA (Eixample and downtown)

- Part of the Eixample (for instance Passeig de Gràcia or Rambla Catalunya) close to the town of Gràcia, was supplied by the *Compañía de Aguas Potables de Montaña* (maximum capacity of supply: 600 m^3 per day).
- Another company supplying the Eixample was the *Associació de Propietaris de l'Eixample. Torre de l'Eixample* (also known as Torreón), founded in 1867 (maximum capacity of supply: 350 m^3 per day).
- The company *Calvet i Arce & Cia. Societat d'Aigües Potables de Barcelona, de l'Eixample i de la Barcelona*, founded in 1872. It later changed its name to *El Fénix d'aigües potables* (maximum capacity of supply: 300 m^3 per day).
- The *Empresa de Aguas del Bajo Vallés* was born in 1861 and became a pioneer in water projects in the *Eixample***.** In 1881 it was sold to the SGAB.

SANTS

- The *Compañía de Aguas de Sants* supplied the town of Sants. In 1887 was bought by the CAB and was integrated in the CAB network.

HORTA

- The company *Mina Mates, Montenys i Cia*. supplied the municipality of Horta

SANT MARTÍ DE PROVENÇALS

- In 1878 the *Compañía de Aguas de San Martín de Provensals* was founded. It was sold to SGAB in 1892.
- Another company was the *Empresa del Alto Vallés*, with the project to bring water from the Ripoll river to Barcelona through and aqueduct 25 kilometers long. The SGAB also was involved in this company.

SANT ANDREU DE PALOMAR

- *Societat d'Aigües de Canyelles*, constituted in 1851.

In January 1882 the *Compañía de Aguas de Barcelona* (CAB) was dissolved to give birth some days later in Paris to the *Societé General des Eaux de Barcelone*, more commonly known as *Sociedad General de Aguas de Barcelona* (henceforth SGAB) (Voltes Bou 1967, Jové 1995). In this society the *Sociedad Lionesa de Aguas y Alumbrado* [*Societé Lyonnaise des Eaux*] had a key role. In the articles of association of the Society, as Voltes Bou (1967) reviews, it was shown that the company had not only a Barcelonan perspective, but the scope of business was the whole of Spain (article 3), and the duration of the society was established in 99 years (art. 4). We observe that already by the end of the 19th century the company had a globalization mentality.

Despite private initiatives to supply water to different parts of the city, the public administration was also interested in controlling the flows of water. By 1880s there was also an important municipal water service, with an average quantity of water supplied of 12,000 m^3 per day (Martin Pascual 2007), although dwindling through time and losing and important share of supply. It is important to mention that the *Ley de Aguas*[20] [Water Act] of 1879 declared that all surface waters were a public good and its use for particular uses had to be approved, and that, subsequently, concessions had to be issued. According to the law (article 171) town councils had the jurisdiction to enact ordinances to regulate urban water supply within the municipality (Martin Pascual 2007). By the turn of the century, in Barcelona two strategic visions of the water supply problem competed. Both visions agreed with the need to increase the water supply for escalating domestic water consumption. However, they strongly differed regarding the legal nature of the supply (Masjuan et

[20] *Ley de Aguas de 13 de Junio de 1879*

al. 2008). Thus while industrialists and landowners saw water as an economic good to be managed by the private sector and a lucrative business, with the State building new dams to enlarge the supply, others saw water as part of the public domain outside the free market to be distributed fairly.

The 1880s were years of important concurrence between the companies to enlarge the supply and increase their share in the "water market". The prospects of increasing demands fuelled by the urbanization process, the emerging health issues and the booming industrialization converted water supply in a lucrative business and stimulated the emergence of private water suppliers. In addition, other companies and particulars presented different projects to bring water from places as far as the Segre, Noguera Pallaresa or Ter rivers (Martin Pascual 2007). The local administration also wanted to keep an important role as water supplier. In this sense, the town council of Barcelona tried to manage the developments of the aqueduct *Alt de Montcada* in 1891. This project was ridden with several conflicts with other municipalities and with the Spanish government. In 1896 the town council of Barcelona opened a public tender to search for more water. Proposals included several Catalan rivers: the Ter (north-east Catalunya), the Llobregat, the Besòs, or even streams and wells from other neighborhood municipalities. Despite the alleged urgent need to solve the "water problem" the results of the tender were quite deceiving (Martin Pascual 2007). As Masjuan et al. (2008) argue, most of the proposals were not feasible, due to either the high costs or to the bad quality of the water offered. For instance the project envisaging the transfer of "good quality water" from the Ter river despite being accepted by the local government was rejected by the Spanish government due to the alleged high costs and lack of funds for its development.

4.2.2 Towards a private monopoly of water supply in Barcelona

While in the late 1870s and early 1880s there was a booming concurrence for the water supply in the city of Barcelona and other neighboring municipalities, the late 1880s and 1890s brought about a radical change of this situation. On the one hand, many private suppliers were undergoing important technical, financial and legal difficulties that threatened their presence in the competitive Barcelonan market. On the other hand, the SGAB planned an important expansion strategy (Martin Pascual

2007), taking advantage of the critical situation of many of the failing smaller companies with a double objective: to incorporate new water flows for the general supply as well as the pipelines, and, due to the varied geography of the water companies, to ensure a wide area of supply from the Besòs to the Llobregat basin. The aforementioned *Ley de Aguas* of 1879 favored the existing companies and consolidated water exploitations in front of new projects. In this sense, the SGAB captured the control of these areas for the future (see table 4.1).

Table 4.1. Private water companies existing in Barcelona by late 19th century

Name of the company	Parts of the city supplied	SGAB acquisition
Compañía de Aguas de Sants	Sants	1897
Compañía de Aguas Potables de Montaña	Eixample	1890
Compañía General Anónima de Aguas de Barcelona (orilla derecha del Besòs)	Barcelona and neighboring municipalities	1986
Compañía de Aguas de San Martí de Provensals	San Martí	1892
Empresa d'Aigües de l'Alt Vallès	Project to supply the city and neighbouring municipalities	1896
Empresa de Aguas del Bajo Vallès	Eixample	1881
Empresa Concesionaria de Aguas Subterráneas del Río Llobregat	Gràcia	1897
Empresa del Alto Vallés	Water from the Ripoll river, Barcelona	Involved from the outset
SGAB	Les Corts de Sarrià (1877), Barcelona (1882), Gràcia (1882), Sant Andreu (1882), Sant Gervasi de Cassoles (1884), Horta (1886, 1903), Sant Vicenç de Sarrià (1888), Sant Martí de Provençals (1889), Tibidabo (1901), Eixample de Sarrià (1902)	Involved from the outset

Source: adapted from Voltes Bou (1967), Piera (1995) and Martin Pascual (2007)

The company obtained different agreements of water supply concessions with the town councils of Les Corts de Sarrià (1877), Barcelona, Gràcia, Sant Andreu (1882), Sant Gervasi de Cassoles (1884), Horta (1886), Sant Vicenç de Sarrià (1888), Sant Martí de Provençals (1889), even to water the Tibidabo (1901). A second concession

by Sarrià was granted in 1902 to supply the Eixample area belonging to this town. In 1903 the town council of Horta granted another concession for distribution in the whole municipality (Voltes Bou 1967).

With the acquisition in 1897 of *Empresa Concesionaria de Aguas Subterráneas del Río Llobregat*, the SGAB started to focus in a fourth source of water: the Llobregat valley groundwater (Voltes Bou 1967). By that time, health authorities estimated the water necessities of Barcelona of around 80,000 m^3 per day, i.e. some 200 liters[21] per capita per day (henceforth lpcd). Thus, by the late 19th century, the SGAB saw the Llobregat as an important source of water to quench the thirst of the Barcelonan population. The company obtained a concession to draw some 86,000 m^3 per day of groundwater in Cornellà de Llobregat. The works of the water extraction in Cornellà de Llobregat were not finished until 1909 (Voltes Bou 1967).

Back to the late 19th century, and after purchasing most of the companies supplying Barcelona and other neighboring towns, SGAB had the supremacy over the private supply of water in the Barcelona and its area. According to municipal reports, SGAB had a capacity of some 45,000 m^3/day plus 6,000 m^3/day provided by the town council (Masjuan et al. 2008), the latter being an obsolete supply system associated with the failing project of the *Aqüeducte Alt de Montcada* (Martin Pascual 2007). However and despite the alleged monopoly held by the SGAB, an important event took place in 1899 that could have changed the choreographies of powers in the water supply of Barcelona and vicinity. The municipality reopened the failed tender of 1896, and this time it received several proposals, among them an outstanding one: the offer by the French-Belgian society to sell the SGAB to the municipality. Martin Pascual (2007) has two different hypotheses to explain this offer: either the SGAB did not obtain the expected benefits from selling water in Barcelona (due to the low consumption of citizens) or the SGAB saw the municipal tender as something threatening its monopoly.

Most of the proposals presented in 1899 had similar failures and issues to those presented in 1896, and only the proposals presented by the SGAB and by Duran to bring water from the Ter were taken seriously (Martin Pascual 2007). The former,

[21] Some 60 liters per domestic uses, 60 for agriculture and fountains and 80 for sanitation purposes and cleansing.

the offering of the SGAB to the municipality, would shape the debate of the early 20th century, i.e. the municipalization of the water service.

4.2.3 The public struggle to control the water flow in Barcelona

The outset of the 20th century experienced the definitive union of Barcelona with Sant Andreu, Sant Gervasi, Sarrià, Hostafrancs, Les Corts, Sants, Poble nou, Sant Martí, Pedralbes, la Barceloneta, Gràcia, and Horta (see table 4.2), and the *Eixample* was wowing the urban fabric (see the table 4.3 for population growth). The tramlines were helping to articulate this process and also the *Plan de Enlaces* (Plan Jaussely) of 1905 foresaw an integral planning of the "new" space of Barcelona.

Table 4.2. Evolution of the urban surface of Barcelona

Year	Urban Surface (in hectares)	Municipalities and lands incorporated
1860	1,467.85	Surface of Barcelona when it was approved the project of the Eixample of Idelfons Cerdà in July 1860
1897	6,045.55	Annexation of the municipalities of les Corts, Gràcia, Sant Andreu de Palomar, Sant Gervasi de Cassoles, Sant Martí de Provençals and Sants
1904	7,016.35	Annexation of Horta
1920	7,924.95	Annexation of the Zona Franca
1921	9,600.05	Annexation of Sarrià
1929	9,827.05	Annexation of the right bank of the Besòs: municipality of Sant Adrià del Besòs
1933	9,880.05	Annexation of south-west of Hospitalet de Llobregat

Source: Martin Pascual (2007:46)

At the turn of the century, Barcelona had over half a million people (table 4.3), mostly working class citizens. Its sanitation problems were still important, and mortality was high, as the *Plan de Saneamiento* of 1891 was being developed at a slow pace (Capel 1999a). In parallel to the development of *Eixample*, Barcelona was initiating the construction of some neighborhoods following the model of garden-city (e.g. Torre Baró and Roquetas in 1908 or Sant Pere Màrtir in 1919) (Capel 1999a).

In 1902 the town council considered again to restart the works for the *Aqüeducte Alt de Montcada*, abandoned in 1897. In 1903, when the aqueduct was almost finished,

water was still scarce, which urged the municipality to buy the waters from the *Sèquia Comtal* in 1905 (Martin Pascual 2007).

Table 4.3. Evolution of the population in the city of Barcelona

Year	Population	Year	Population
1880	256,110	1910	587,411
1885	267,803	1915	619,083
1890	343,614	1920	721,508
1895	462,169	1925	817,859
1900	535,306	1930	1,005,565
1905	561,755		

Source: Martin Pascual (2007:36)

Around 1905 and according to Martin Pascual (2007), there was a first approach by the municipality to acquire the SGAB and municipalize the service. If the tenders of 1896 and 1899 were opened by the town council with the idea to buy flows of water important enough to compete with the SGAB, the proposal of 1905 raised by the municipality aimed directly to municipalize the supply[22]. The municipalization of the supply, as we have seen in chapter 2, was a common feature by the early 20th century in many European and American cities. However, the process of municipalization was frozen in 1906. Political turmoil between 1905 and 1910 combined with the huge economic costs jeopardized such process (Martin Pascual 2007).

Against the chance of a possible agreement between the municipality and the SGAB, the later played a role in the legalization of the municipal wells of Montcada (built in 1879) and the development of the *Aqüeducte Alt*[23]. By doing that, the SGAB maintained a privileged position in the case the municipality reopened the debate to municipalize the service. This movement also served to limit the development of the municipal service of water[24].

Rapid urbanization and health issues raised concerns about the need of more water for the city. To search for such flows, in 1909 a Special Commission of waters was

[22] For an in-depth analysis of this proposal see Martin Pascual (2007)
[23] During the late 19th century, the SGAB had raised several legal impediments to develop this municipal infrastructure. Contrarily, in the early 20th century the company collaborated tightly to solve these legal issues.
[24] The municipality had to focus its efforts in such venture.

created and subsequently opened a public tender in 1910. Finally, two proposals were accepted. Both took the Besòs river basin (30 km away from Barcelona)[25] as a source of water. Gonzalo de Rivas offered some 140,000 m^3 per day, while Joan Saus Fainé offered some 122,000 m^3 more. With the acquisition of 262,000 m^3 per day, the city council of Barcelona ensured twice as much the amount of water required in that moment (Martin Pascual 2007, Masjuan et al. 2008). However, the town council neither considered the externalities caused by the projects to areas where water was supposed to be extracted, e.g. the Vallès Oriental and Vallès Occidental zones, nor took into account the real pressures on the resources of the Besòs river Basin. The favoritisms of the republican local politicians related to the acquisition of water flows and the obscure deals with particular owners (some authors even talked about corruption (Martin Pascual 2007)), raised significant scandals and controversies. In turn, these scandals contributed to the loss of legitimacy for the municipalization of water supply services, a process of general interest for the population (Albertí 1972). Different appeals were made to the results of the tender (Voltes Bou 1967) and the works were eventually paralyzed.

The Spanish State had to intervene in such conflict. In a first moment, the Spanish government wanted to reach a definitive solution to the problem of water supply in Barcelona similar to what had been done in Madrid with the Canal de Isabel II (Martin Pascual 2007) some 50 years before (see chapter 7). Therefore the "*Comisión para el abastecimiento de aguas de Barcelona*" [Commission for the water supply of Barcelona] was created to definitely solve the "water problem" of Barcelona.

The Commission for the water supply of Barcelona commissioned a consultancy the task to determine the criteria to analyze the future necessities of Barcelona. This consultancy performed a complete and exhausting revision of the existing infrastructures, quality of water, legal concessions, etc. in order to finally determine the necessary volumes and quality of water to guarantee the supply (Gadea et al. 1913a). Projections of population were made taking as a reference past growths, though recognizing the singularity and exceptionality of some periods (for instance the *Exposición Universal de Barcelona* of 1888).

[25] First, Gonzalo de Rivas offered 140,000 daily cubic metres coming from the Besòs river basin (30 km away from Barcelona). Second, Joan Saus Fainé offered to bring 122,680 from Sabadell, also in the Besòs river basin

The consultancy estimated that Barcelona needed some 300,000 daily m^3, or an allowance of 500 liters per capita. It is important to mention that by 1911 the water allowance of Barcelona citizens was around 80 lpcd (Medicina Social 1911). We recall that the *Ley de Aguas* of 1879 established a minimum threshold of 50 lpcd. In table 4.4, some figures of contemporary allowances in other areas of Spain and Europe are presented. Interestingly, the consultancy argued that:

> "[i]t has to be also taken into account that water scarcity has produced a lack of habits of high consumption among the population […]; or contrarily, the lack of explicit wish to use it has contribute to postpone the solution to the problem of supply in Barcelona […]. [I]t is needed that the increase of water supplied go hand by hand with the wish to consume it." (Gadea et al. 1913a:49), our translation

According to statements by SGAB collected by the authors, this company had never the need to supply more than 60,000 m^3 per day (115 lpcd), so the remainder 21,000 m^3 was not used. Actually, the SGAB assured to have much more water available from the new wells in the Llobregat basin but argued that this water had not been supplied because of low domestic consumption. According to the water company, there was not any need that the municipality searched for more water. However, the figures provided by the SGAB raised some mistrust among the public opinion and some experts. The position of the SGAB clashed with the local administration and other sectors that aimed to compete for the water distribution that this company held in virtual monopolistic conditions[26].

For the conservative sectors, the low domestic water consumption was related to certain apathy of the citizens regarding personal hygiene. Maluquer y Salvador (1920) strongly criticized the widespread statement that the problem of water in Barcelona was the lack of demand/consumption rather than the lack of water. The author argued that lower consumptions (compared to Madrid) were caused by the high prices Barcelonans paid for water. Water access and use was argued therefore to be too much mediated by market mechanisms, which prevented some citizens to consume more water.

[26] A detailed report in favour of these arguments can be found in the discourse of the municipal councillor of the Lliga Raimon d'Abadal: " La questió de les aigües " (The water question), *Suplement de la Veu de Catalunya*, 27 January 1913.

Table 4.4. Water allowance per day per capita during the first decade of the 20th century

Spanish Cities	Liters per capita	Other cities	Liters per capita
Madrid	280	Paris	262
Cádiz	37	Berlin	77
Vitoria	158	London	160
Pamplona	216	New York	300
Burgos	292	Brussels	110
Bilbao	100 (drinkable water)	Saint Petersburg	150
San Sebastián	230	Geneve	230
Málaga	136	Rome	1,000
Coruña	188		
Alicante	80		
Santander	262		

Source: adapted from Gadea et al. (1913a)

For the members of the conservative bourgeoisie such as Raimon d'Adabal or the industrialist and politician Lluís Sedó, there was no real water deficit and the intervention of the public sector in the water supplied had to be restricted to the area of health control[27]. Industrialists worried about the possibility of a public water monopoly, which could force the manufacturers to buy and pay for the water when they already had their wells and did not pay anything[28]. The industrial lobbies performed a decisive role in the opposition to new acquisitions of water by the local administration. They were convinced that these planned new acquisitions of water by the city council were addressed to increase the supplies and therefore to create some kind of competence for the SGAB and themselves. In sum, they thought that this situation might end in a monopoly of the water resources by the city council.

[27] Lluís Sedó, "Lo de les aigües" (About water), *La Veu de Catalunya"*, 30 July 1912, pp, 1-4.

[28] Regarding industrial water consumption, the volume available only in the wells excavated in the industrial district of Sant Martí de Provençals (Barcelona's industrial heart) was estimated in some 100.000 m^3, according to manufacturer Antoni Rosés. The same Rosés warned against the perils of municipalisation (i.e. public ownership) of water. For him this would entail an increase in industrial costs. Antoni Roses "Las Aguas (Una protesta en nombre de los intereses fabriles de Barcelona)" [Water: A protest in the name of manufacturing interests of Barcelona], *Diari de Barcelona*, 5 February 1913.

Table 4.5. Water flows available and supplied by the SGAB, 1910

Localization	Concession (daily m^3)	Real extraction (daily m^3)	Concession date
Dosrius	8,000	8,000	1867
Besòs, near mine of Montcada	30,000	26,000	1886
Ripoll, Baix and Alt Vallès	7,000	7,000	1869/1881
Cornellà de Llobregat	86,400	33,000	1905
Concessionària del Llobregat	30,000	7,000	1866
Concessionària del Llobregat	34,560	0	1866
TOTAL	195,960	81,000	

Source: adapted from Martin Pascual (2007)

The initial goal of the 1910 public tender was to ensure water for a city with a foreseen population between 1.5 and 2 million people in the near future (Masjuan et al. 2008), estimating a necessary flow of some 300,000 m^3 per day. The municipality expected to canalize the future waters arising from the tender through the *Aqueducte Alt de Montcada* (Martin Pascual 2007).

By the first decade of the 20th century, the water supply of Barcelona (all coming from groundwater[29], except for those flows coming from Dosrius, a small reservoir in Vallvidrera or Vallès) amounted to 88,570 m^3 per day [30] (148 lpcd) and was distributed by the following suppliers (Gadea et al. 1913a, Gadea et al. 1913c):

- **Private water companies**, chiefly the *Sociedad general de Aguas de Barcelona* and *Compañía del Llobregat* with a extraction of some 81,000 m^3 (table 4.5)
- **Town Council** (from the Besòs: Rec Comtal from Montcada mines and wells): 6,200 m^3 (table 4.6)
- **Small owners:** 1,370 m^3

If all existing concessions entered into force, the supply could be increased to 178,130 daily m^3 (205 lpcd). However, Gadea et al. *(*1913a, 1913b, 1913c) argued

[29] Water was captured by means of *"galerías filtrantes inferiores al lecho de los ríos"* or by means of wells

[30] It is interesting to note that already at the dawn of the 20th century water consumed by the citizens supplied by the SGAB frequently received mixed water from the Besòs, Llobregat, Dos Rius and Vallès. (Gadea et al. 1913a)

that in the case the concession granted in 1905 to the SGAB would be legalized, the supply could increase to 231,530 daily m^3 (386 lpcd). The authors clarified that, as some citizens still did not have piped water, the real allowances per capita could be even higher.

Table 4.6. Water flows available and supplied by the municipality, 1910

Localization	Concession (daily m^3)	Real extraction (daily m^3)	Concession date
Mine of Montcada	10.000	6.000	1824
Wells of Montcada	24.000	Punctual, as a complement to the Mine	1879
Collserola	200	200	1720
Total	34.200	6.200	

Source: adapted from Martin Pascual (2007)

Apart from Barcelona, the SGAB also reached agreements with other neighboring municipalities to supply them (table 4.7).

Table 4.7. Municipalities with agreements with the SGAB by 1911

Municipality	Agreement date
Badalona	1891, 1911
Cornellà	1907
Hospitalet	1888, 1906
Montcada	1890
Sant Feliu de Llobregat	1909
Santa Coloma de Gramenet	1909
Sarrià	1886, 1902
Tiana	1910

Source: adapted from Martin (Pascual 2007)

The report by the consultancy (Gadea et al. 1913b) showed the good quality of water regarding bacteriological parameters. In chemical terms it was more difficult to obtain data due to the lack of analysis for the Llobregat river. Regarding the network, the SGAB and the Water Company of the Llobregat had an urban network 650 kilometers long made mostly of iron but in some cases of reinforced concrete. The report mentioned the lack of water deposits of high capacity.

Water tariffs were another aspect reviewed by the report of the consultancy. Prices varied according to the geographical location and also to the volume consumed (by that time pricing schemes used to be regressive, i.e. the more the consumption, the cheaper the unity of water). The report already insisted on the importance of pumping costs in the price of water. For instance, the normal water price in the *Eixample* was around 60 cents of peseta per m^3 for a consumption of 250 liters (Gadea et al. 1913a, Gadea et al. 1913c). It is important to mention that metering was already widespread in the case of the SGAB (Martin Pascual 2007). Contrarily, the town council sold the water for 3,000 pesetas each *pluma*: meaning the right of 2 m^3 per day forever. Actually, and as contradictory as it may seem in the 21st century drought-prone Barcelona, one of the conclusions of the consultancy strongly suggested to adopt pricing schemes that promote an increase in the consumption "up to the thresholds required for the hygiene and necessities of modern life" (Gadea et al. 1913b:64, our translation). Nowadays, this discourse could be found in some third world cities or rural areas.

The report (Gadea et al. 1913b, Gadea et al. 1913d) also manifested the little involvement of the town council in water supply and the supremacy of the private companies in water supply either from their own resources or from State concessions:

> "The municipal intervention in an issue so important for the life of Barcelona is almost inexistent; the municipality does not have jurisdiction on water tariffs; neither to regulate the systems of selling nor to introduce water reforms in the distribution. The consultancy does not have jurisdiction to insist on the inconveniences of such disadvantageous situation. Everybody knows them, and are the main reason for the initiatives of the town council to improve this situation" (Gadea et al. 1913b:63), our translation

The authors proposed some scenarios of water supply (see Gadea et al. (1913a) for more details of such scenarios). Briefly, they included the scenario of integral water supply carried out solely by the Municipality (the driving forces behind this proposal where mostly economic, due to the high costs that would have to be faced by the administration when buying the water to private owners), and they suggested some strategies to achieve such goal. In this case, the baseline was a stock of 34,200 m^3 per day; in order to supply the population (over 600,000 people in 1915), the town council should increase their resources by 145,800 m^3 daily. In the case the future scenario reached 1 million people, the water needed should increase in 265,800 m^3

daily. The authors of the report argued that Barcelona could have enough water to supply a population of 1 million people with 300 lpcd (meaning 300,000 m^3 daily). Concretely, Gadea et al. (1913e) pointed out that the existing resources (by the first decade of the 20th century) be it from public or private entities, plus a renegotiation of the concession rights of the right bank of the Besòs river, the *Rec Comtal* and a new concessions of groundwater from the Llobregat in Cornellà, would suffice to provide for such consumption (table 4.8)

Table 4.8. Available water flows in Barcelona, different scenarios, 1911

	Origin	Water flow (m^3 per day)	Water allowance per capita
Real available resources, 1911	SGAB	81,000	148
	Town council	6,200	
	Others	1,370	
	Total	88,570	
Available resources if the concessions were optimized, 1911	SGAB	14,250	295
	Town council	34,200	
	Others	1,370	
	Total	17,810	
Available resources in the case the concession of SGAB in the Baix Llobregat was legalize	SGAB	195,960	386
	Town council	34,200	
	Others	1,370	
	Total	231,530	

Source: adapted from Martin Pascual (2007)

The origin of this supposed water was not discussed by the report, as it did not examine the proposals presented in the last tender opened by the *Comisión de abastecimiento de aguas de Barcelona*. However, the report raised some conditions that future supply should meet (Gadea et al. 1913b):

- To guarantee the volume of water needed by Barcelona according to the findings raised by the report
- To supply clean, tasteless, clear, drinkable water with chemical properties that comply with the existing health legislation

- To supply optimal water from the bacteriological point of view and distribute it while preventing its pollution
- To plan general works (conduction and distribution) to cope with present and future needs
- To change tariffs in order to promote consumption

After the controversies generated by the municipality tender of 1910, the State Commission opened another tender a year later. Several proposals were presented, among them one to bring water from the Valira river (in Andorra). However, the most important feature was that of the SGAB offering itself for sale to the municipality. The water company had the intention to hand out its water flows, assets and facilities to the municipality provided that there was an interesting compensation for the investments carried out as well as for the expectancies of future growth. The Society even set a price: 100 million pesetas if the deal was done before July 1912 (Martin Pascual 2007). The Commission eventually recommended the acquisition of the SGAB by the town council in 1912.

> "This Commission does not doubt in proclaiming the immense superiority of the municipalization with monopoly in front of the rest of the solutions presented for the water supply of Barcelona", *Commission for the water supply of Barcelona*[31]

The driving forces underlying the proposal were mostly of an economic nature because of the high costs faced by the administration of buying the water[32] from the proposal of private owners (Masjuan et al. 2008). They also included the need to obtain the monopoly of water supply to be able to stimulate water consumption among the citizens (Martin Pascual 2007)

As Martin Pascual (2007) reports, the Commission fixed the price of the SGAB in 72 million pesetas (according to the yardstick of 450 pesetas cubic meter). Despite a process ridden with difficulties, an agreement was reach in which the SGAB would hand out all his assets as well as 160,000 m^3 of water (106,600 m^3 immediately and 53,400 m^3 to be extracted within 3 years). Not only the municipality of Barcelona would become the water supplier of the city under monopolistic conditions but would also provide service to the municipalities formerly supplied by the SGAB

[31] Ajuntament de Barcelona. Comisión para el abastecimiento de agua de Barcelona: *Dictamen emitido por la Comisión para el Abastecimiento de Aguas de la Ciudad*, Barcelona, Imp. de Henrich y Cia, 11 noviembre 1912, p.86. Quoted by Martin Pascual (2007), our translation.
[32] The Commission fixed in 450 pesetas the price of each cubic meter of water (Martin Pascual 2007)

through the virtual control over the Llobregat and Besòs water concessions. If the municipalization was to be implemented, the Commission proposed the establishment of a Water Board to manage the municipal firm, behaving the town council as a board of shareholders. The control of water had to be entirely public and future initiatives of supply would be strictly supervised by the town council.

Nonetheless, the proposal of municipalization was not free of resistances. During the summer of 1913, the hostility to municipalization was so persistent that the town council and the State had to put off the final approval of the proposal. The opposition was mainly constituted by the *Cambra Oficial de la Propietat Urbana*[33] [Chamber of Urban Property], industrialists and merchants associations[34], small private water suppliers[35], the owners that had presented proposals to increase water supply in Barcelona[36] and even some scientific institutions as the Medical Association[37]. From 1913 on, conservative political parties reluctant of municipalization controlled the town council of Barcelona, and led the opposition to the municipalization[38]. By 1914, it was almost sure that the proposal would not progress. Eventually, the arrival of World War I in 1914 complicated even more the takeover of the SGAB as the owner's countries (France and Belgium) were involved in the conflict. Most of the water supply concessions the *Crédit Général* and the *Societé Lyonnaise* had in Europe were located in occupied land or were threatened by the war. The water business in Barcelona became their most important and safest asset; therefore, they renounced to the selling of the company to the municipality.

By the second decade of the 20th century, hygiene and health dominated the discourse on water supply (Martin Pascual 2007, Masjuan et al. 2008). We recall that in 1914 there was an important outbreak of typhus in the city due to the poor

[33] The owners of real state thought that this municipalization, with the subsequent stimulus to water consumption, would suppose a decrease in the benefits in their business of renting homes. They were also afraid of the likely municipal inspections to check the health and hygiene of the homes.
[34] Martin Pascual (2007) argues that the reasons for the opposition of this group could be very heterogeneous. Among the most likely was the fact that most of them could be also real state owners. Sanitary and health control by the municipality to their private wells was another important reason.
[35] The small companies were afraid to lose their water exploitations and in turn to have to consume water from the town council to comply with the health requirements.
[36] They complained about the election of the municipalization of the SGAB instead of their proposals by the Commission.
[37] The Medical Association opposition was instigated by the merchants. For instance they warned about the poor condition of Cornellà's water from wells.
[38] Martin Pascual (2007) presents a very detailed genealogy and chronology of the opposition to the project.

condition of water coming from Montcada mine (Capel 2007). This episode supposed the discredit of municipal services and shelved the project of municipalization in the short term, as the municipality had to concentrate on modernizing the water supply from the Mine of Montcada and buy most of the water flow owned by farmers and industrialists.

As Martin Pascual (2007:497, our translation) succinctly summarizes "the war and the typhus converged as factors jeopardizing in a serious way the municipalization of water supply in the city". This concern is shown for instance in a paper published in the *Revista de Obras Públicas* in February 1920 (Maluquer y Salvador 1920), which analyzed the deficits of water in some Spanish cities, especially in Madrid and Barcelona. As a curiosity, this work develops a simple cost-benefit analysis to demonstrate that the economic costs of deaths are higher than the amount of money needed to improve the supply of water[39]. To these costs the authors add those of morbidity and shorter life expectancy.

Comparisons between Barcelona and Madrid's water supply began to appear. Maluquer y Salvador (1920) praises the supply of water in Madrid: "water supply in Madrid constitutes a very good solution, not only in the health but also in the financial arena" (p.66, our translation), "writing one of the most brilliant pages in the history of the Civil Engineers corps of Spain" (p.66, idem). The author compares this case with that of Barcelona, concluding that the latter was in a worse situation: "there has not been the same wise solution to the problem of water supply in Barcelona" (p.66, idem). Actually, the author reviewed empirical studies that showed a higher degree of mortality in Barcelona than in Madrid and linked this fact with the chemical (and also bacteriological) water quality. Barcelona presented much higher degrees of salinity, especially in the waters from the Llobregat and from the aqueduct of Vallès. The author concluded arguing that "Barcelona does not even have one third of the water amount required, and the available ones are expensive and suspicious" (Maluquer y Salvador 1920:74, our translation).

[39] The economic value of human life in Spain according to the authors was around 5,000 pesetas (a third part of the value given in the United States)

4.2.4 The "nationalization" of the *Sociedad General de Aguas de Barcelona*

World War I provided a favorable context for Spain to accumulate important amounts of capital. Under this situation, Spanish capitalism became progressively nationalistic. The main objective of the economic elites was to make the most of this advantageous position and capture the control of the economic activities owned by foreign capital in Spain since the last decades of the 19th century.

The main private water supplier of Barcelona, the SGAB, did not escape such nationalistic and patriotic trends. As Martin Pascual (2007) comments, there was a radical change in how the economic elites saw the strategic value of water: "a tough opposition to the municipalization gave place to consider the nationalization of the water company as a patriotic measure" (p.524, own translation). Note, however, that by nationalization the author meant the takeover of the society by Spanish capital, but not the transference of the company from the private to the public sphere. Thus, during 1920 an attempt to buy and convert into a Spanish company the SGAB was carried out. Until then, the company's shares had been owned by French-Belgian capital. The initiative to buy the shares taking advantage of the low price of the French currency at that moment was undertaken by a group of bankers[40], led by Josep Garí i Gimeno (table 4.9).

According to the memories of Amadeu Hurtado (1969), a well known lawyer and Catalan politician, the purchase amounted to 45 millions pesetas, far below the municipal offer of the 1910s, and took advantage of the poor performance of the French currency. The SGAB became the second most important Spanish water group after the Canal de Isabel II, which supplied Madrid (Chapter 7 and 8). Once they finished the operation, this group of bankers offered the municipality to buy a third of the ordinary shares, and the entire company in the long term (20 years). Meanwhile, the firm would become a mixed company, with the municipality having 5 counselors in the board of the firm. Plus, during that time the municipality would have water at a reduced rate and would have the right to 20-40 percent of the benefits of the company (Voltes Bou 1967). According to Martin Pascual (2007), the first and most important reason the bankers were buying the SGAB was the speculative financial benefit derived of the buying-selling of the company.

[40] This group was made up by the Banco Hispano Colonial, the Banco de Bilbao, the Banco de Barcelona, the Banco Arnús Garí, Banca Arnús and the Sindicato de Banqueros (Voltes Bou 1967)

Table 4.9. Group of bankers acquiring the SGAB in 1920

Shareholder	Share (%)
Arnús-Garí S.A	29.4
Banc de Barcelona	17.9
Banc de Bilbao	14.6
Banc Hispano-Colonial	13.3
Banca Arnús	12.4
Sindicat de Banquers de Barcelona SA	12.4

Source: adapted from Voltes Bou (1967) and Martin Pascual (2007)

Although at the early stages after the buying, some of the bankers did not have the intention to enter the water business but preferred instead to transfer the company to the municipality, as Amadeu Hurtado (1969) mentions, they increasingly realized the potentialities of the business. The financial crises of the 1920s changed definitively the mind of the bankers, and eventually, the municipality desisted from undertaking such adventure (Voltes Bou 1967) so that in 1923 the process was revoked (Martin Pascual 2007).

The SGAB started to diversify activities and began the acquisition of foreign societies operating in Spain devoted to the water supply service. For instance, in 1924 SGAB bought most of the shares of the French *Sociedad para el Alumbrado de Gas de Málaga* [Societé pour l'Eclairage de Malaga, Society for the gas lighting of Malaga] (Voltes Bou 1967). In 1925, the SGAB bought the firm *Eléctrica Real Portuense*, located in Cádiz, and also an important percentage of the shares of the French gas firm *Compagnies Centrale d'Éclaireage par le Gas. Lebon et Cie* operating in cities such as Valencia, Granada, Cadiz, Santander or Murcia (and having operated in Barcelona until 1923). Eventually in 1930 the SGAB took over the control of Gas Lebon (Martin Pascual 2007). The expansion of the SGAB together with the emissions of shares in late 1920s gives us an idea of the magnitude of this company in the Catalan and Spanish context. We will return to the diversification strategies of the company in chapter 6 with the expansion of the company from the mid 20th century until the early 21st century.

An outstanding legal change regarding water planning and management took place by the mid 1920s in Spain with the creation of the *Confederaciónes Hidrográficas* [24]

[Water Basin Agencies], water agencies for each river basin that were participated by the state, the local authorities and the influential stakeholders. In March 1929 the *Confederación Sindical Hidrográfica del Pirineo Oriental*[41] was created, in which Barcelona would have much power of decision and influence due to its high water consumption.

Regarding the urbanization of the water supply, in the 1920s there was a new period of expansion and modernization, with two new wells in Cornellà that would maximize the concession granted in 1905 to the SGAB (Martin Pascual 2007). In 1923, chlorination was introduced in the brand-new water treatment plant of Cerdanyola del Vallès that received Vallès waters (Voltes Bou 1967). During the decade water tanks and lifting stations of Besòs and Cornellà improved, and the distribution network was renewed and expanded, reaching 900 kilometers by 1929 (Martin Pascual 2007). In 1932 the SGAB supplied the following municipalities: Barcelona, Hospitalet, Cornellà, Esplugues, Sant Joan Despí, Santa Coloma de Gramenet, Sant Adrià de Besòs, Badalona, Montgat, Tiana, Premià de de Mar, Montcada, Mataró and Cerdanyola del Vallès (Voltes Bou 1967).

As shown in the table 4.10, the water supplied increased year by year mainly due to urbanization of the city. An important trigger of those urban changes was the *Exposición Universal* of 1929 (where water and electricity were key features); by then, for instance, the concession the SGAB in Cornellà of 86,500 m^3 per day was fully exploited (Martin Pascual 2007). During the same year the *Reglamento de Sandidad Municipal* was approved regulating minimum allowances of water and rights of the tenants regarding water use.

By 1930 the average water allowance per capita, including domestic and urban uses (not industrial) was around 110 lpcd (Martin Pascual 2007), while the Spanish legislation required a minimum of 200 lpcd. The non-fulfillment of such premise was one of the main critiques against the monopoly hold by the SGAB as well as the quality of waters, which carried important concentrations of salt.

Already in the 1930s, another alternative to the monopoly SGAB seemed to emerge: the project of *Aigües Potables de Barcelona* (Martin Pascual 2007) with promises of water from the Mogent river, a subsidiary of the Besòs, and of better quality.

[41] The Pirineo Oriental basin comprised the rivers completely flowing through Catalunya and not being tributary of the Ebro river.

However, this proposal did not plan to substitute the role of the SGAB but just to supply the wealthy parts of the city. The circumstances that followed the break of the Spanish Civil War jeopardized the progression of such project.

Table 4.10. Water supplied by the SGAB, 1920-1934

Year	Water supplied, in m^3 per year	Year	Water supplied, in m^3 per year
1920	18,120,000	1926	27,114,230
1921	18,860,000	1931	37,084,000
1922	22,580,000	1932	37,084,000
1923	23,508,000	1934	38,250,000

Souce: own elaboration from Voltes Bou (1967)

According to the data presented in table 4.10, in 1934, Barcelona was supplied by the SGAB with some 38.25 hm^3; if we add the 3.8 hm^3 supplied by the municipality (Voltes Bou 1967) this results in a consumption of some 42 hm^3. For a city roughly exceeding one million people, that meant some 100 lpcd, a rather low figure when compared with the statistics of water allowances in other Spanish and European cities (table 4.4).

4.2.5 The Civil War and water supply in Barcelona

The Spanish Civil War (1936-1939) triggered important economic reforms in Catalunya, and especially in Barcelona, implemented by anarchist and socialist trade unions. The SGAB did not escape this trend. In July 1936 the company was confiscated by the workers as other industries and services in Barcelona[42]. As a result the Board of Managers was dissolved and the *Comité Obrero de Incautación* took the directing functions. At the same time the *Comité del Sindicato Obrero de las Aguas de Barcelona* (linked to the C.N.T) was created. A year later, in 1937[43] the company was legally collectivized, changing its name to *Aguas de Barcelona Empresa Colectivizada* [Collectivized firm of Barcelona waters]. Many reforms were undertaken during this three-year period; the most controversial and radical was the unification of the water tariff (to 0.40 pesetas per m^3). Curiously, this policy,

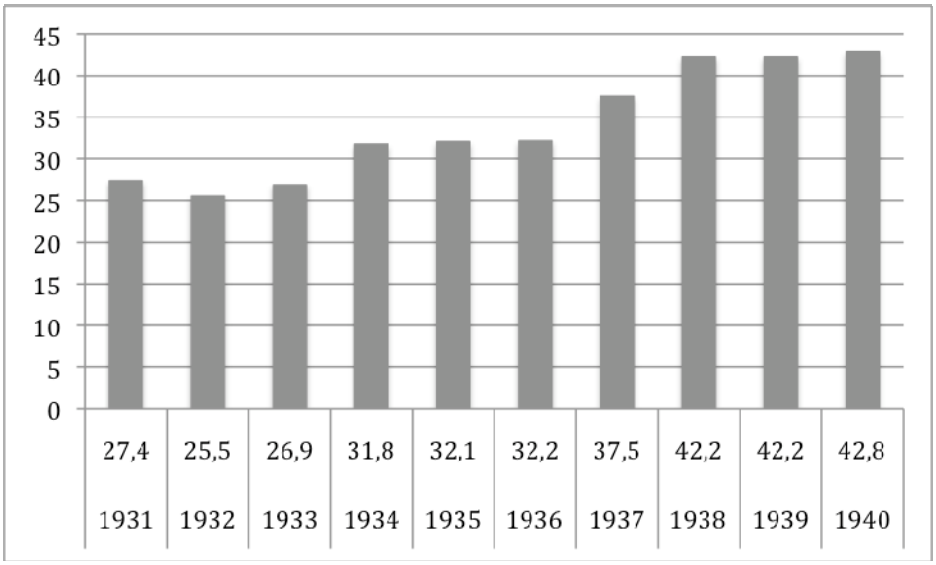
[42] For an extended and in-depth revision of the process of collectivization of the SGAB see Gorostiza (2009)
[43] *Diari Oficial de la Generalitat de Catalunyam 15 de Juliol de 1937*

implemented by the revolutionary left, was one that the capitalists controlling the company (before the collectivization) wanted but never dared to do. The historian Voltes Bou (1967) gave expression to this major change:

> "¡Never the members of the board of the capitalist company would have dared to do that much!" (p.200, our translation)

At the infrastructure level, the collectivized firm improved the wells of Cornellà to increase the extractions (figure 4.1). It was also envisaged the construction of a brine collector to diminish the salinity (Gorostiza 2009) of water due to mining activities upstream the Llobregat river although the project was not finished until late 20th century.

Figure 4.1. Evolution of the extraction of water from the Cornellà wells by the SGAB, in hm^3, 1931-1940



Source: adapted from Ferret (1985) and Gorostiza (2009)

From 1937 until the end of the war many people escaping from Franco's offensive arrived in Barcelona. The same year, in February, bombings against the city began. The situation worsened a year later when the Nationalist captured the water reservoirs of the Pyrenees. These installations did not provide water to Barcelona but were the main source of electricity for the city. Apart from having a critical effect on the industry, this "blackout" had direct impact on the water supply as electricity was needed for pumping and distributing groundwater, especially in some parts of the city. As a solution the water company recovered the steam engines formerly used to pump water from Cornellà; in turn and in order to defray the costs the company was authorized to increase the prices set in 1936 to 0.70 pesetas per m^3. As the war was

developing, water supply became more precarious and water-borne diseases such as typhus had a critical effect on the population (Gorostiza 2009).

The end of the war was approaching and the former owners of the SGAB were reinforcing its links with the military rebels. Gorostiza (2009) reports a promised donation by Josep Garí (one of the bankers owning the SGAB) of land in Barcelona to General Franco in May 1938. Few days before the fall of Barcelona, the former director of the SGAB, Soler Nolla, put together a foreign technical staff to enter Barcelona together with the rebels.

4.3 Expanding the water footprint of Barcelona further and annihilating the public-private debate

In this section we want to trace how water was governed and urbanized after the Spanish Civil War and until the end of the Franco's dictatorship. In the title appears the concept "water footprint" (Chapagain et al. 2006, Hoekstra and Chapagain 2007). To some extent it wants to emulate the "ecological footprint" (Wackernagel and Rees 1996, Wackernagel and Rees 1997), which quantifies the surface needed to sustain a given population in terms of energy, emission and materials. The water footprint concept has a direct connection with the assessment of virtual water flows (Allan 1998). Here, we do not pretend to quantify the virtual water flows of the Barcelona region. We only take this concept to show how Barcelona has been requiring water coming from distant sources to sustain its metabolism.

4.3.1 The post-war period and the dictatorship: the reconfiguration of the physical flows of water to keep pace with urban growth

On the 26th January 1939 Franco's troops seized Barcelona. The private executive board of SGAB was restored, and the company reassumed its role as the main provider of urban water for Barcelona and its surroundings. Despite this, some of the reforms carried out during the collectivization period were maintained, such as the unification of water tariffs in the city and neighboring municipalities.

At that time, the main sources of supply for this area were the groundwater of nearby aquifers (Besòs and Llobregat) ant the surface water of the Dosrius and Vallès aqueducts. During the 1940s and 1950s, the abundance and the quality of water stimulated the increase in the number of customers and therefore total water supplied (Masjuan et al. 2008), as we can observe in table 4.11 and figure 4.2.

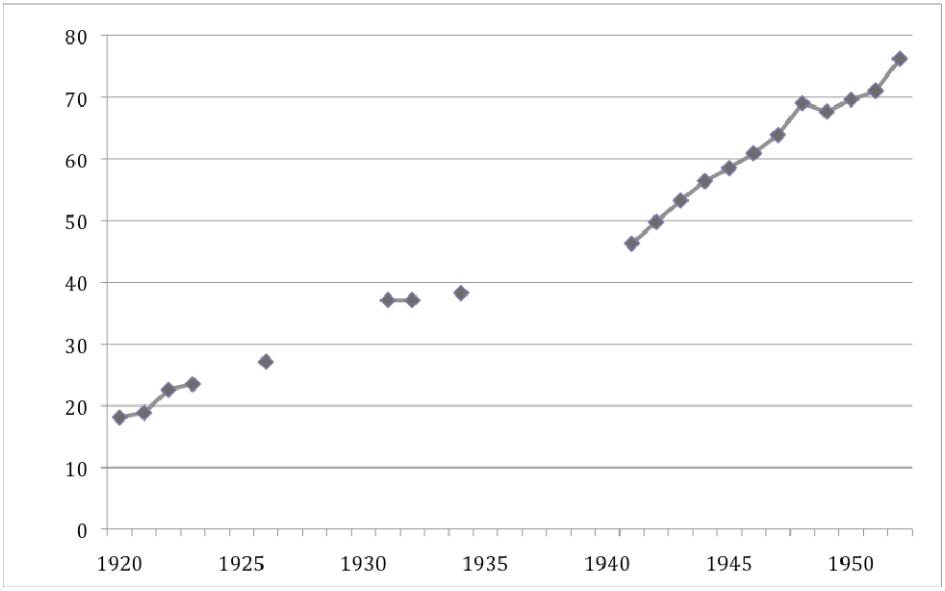
Table 4.11. Number of customers and water supplied by the SGAB, 1941-1950

Year	Number of customers	Water supplied, in m^3 per year	Year	Number of customers	Water supplied, in m^3 per year
1941	75,597	46,266,000	1947	117,366	63,844,693
1942	82,905	49,728,757	1948	127,560	69,000,000
1943	90,827	53,237,205	1949	145,866	67,600,000
1944	97,536	56,389,566	1950	153,070	69,600,000
1945	97,386	58,471,492	1951	155,915	71,000,000
1946	106,221	60,889,032	1952	163,212	76,190,000

Source: adapted from Voltes Bou (1967)

In the 1950s and 1960s large numbers of migrants from other areas of Spain searching for job opportunities arrived in the area of Barcelona. This period observed the highest rates of population growth recorded in the history of the region, with urban development took the form of high density, low quality housing blocks built in the periphery of Barcelona to accommodate immigrants and their families (Masjuan et al. 2008).

Figure 4.2. Evolution of water billed by the SGAB, in hm^3 per year, 1920-1952.



Source: adapted from Voltes Bous (1967)

4.3.2 Turning to Llobregat surface waters: drought and population growth as triggers

At the outset of the 1950s, the company built new pumping and lifting plants in the wells of Sant Feliu de Llobregat. However, in 1952 lack of rains in the Besòs basin, combined with an important increase in consumption, led to exploit Llobregat wells above the feasible rates, to a maximum of 300,000 m^3 per day. This situation obliged in turn to apply restrictions from May 1953 onwards, with reductions on the service hours of around 30 percent. However, in 1954 precipitations returned to normality and the supply was stabilized by midyear. Such was the abundance of water that the system was able to supply a record of 329,370 cubic meters the 23rd June (Voltes Bou 1967).

The water restrictions that Barcelona suffered in 1952 and 1953 were the trigger that forced the municipal government to ask to the Ministry of Public Works to study the transfer of water from the Ter River[44]. We recall that Barcelona and its metropolitan area were supplied until mid 1950s principally with groundwater from the Besòs and Llobregat basins, and also with a small quantity of water coming from the Vallès and Dosrius.

At that time Spain was undergoing a period of dictatorial rule and technocratic "policy-making" with the focus on the mobilization and the domestication of water resources for economic purposes. Dams represented a very centralized control of resources, necessary for the continuation of the regime:

> "In the Spanish post-war context, the remaking of Spain's hydrosocial landscape was part of an effort to create a socioculturally, politically and physically integrated national territorial scale and to obliterate earlier regionalist desires. Yet, this nationalistic sociophysical remaking of Spain was predicated upon forging networked national and, in particular, transnational socio-political and economic scalar arrangements" (Swyngedouw 2007b:11)

At the end of the 1940s a dam in the Cardener river (a tributary of the Llobregat river) with the capacity to regulate some 24 hm^3 began to be built. This dam, known today as *Sant Ponç*, was finished in 1954, and combined with the concession granted in June 1953 to the SGAB to extract 2,2 m^3/s (Voltes Bou 1967) established the foundations of surface water use for Barcelona. However, it is important to mention

[44] La Vanguardia, Martes 17 de Marzo 1987, p.25, "La conexión del acueducto Ter-Llobregat alterará el suministro de agua a Barcelona este fin de semana"

that the quality of Llobregat surface water was very poor due in part to natural conditions (salt) and to the discharges from manufacturing and mining companies upstream, making mandatory the construction of two treatment plants along the low course of river near Barcelona to render the water drinkable (Masjuan et al. 2008). Thus, works to build a new water treatment plant to filter and treat Llobregat surface water began in 1953 and were finished in 1955 (see figure 4.3). From 1955 the SGAB added 2.2 m^3/s to the general supply network coming from Llobregat's surface waters[45].

The rising number of customers was reflected in the consumption peak registered the 15th July 1955, with 371,200 cubic meters. A year later, the 5th July 1956 water demand reached 392,000 cubic meters (Voltes Bou 1957).

Figure 4.3. Inauguration of the treatment plant in Cornellà de Llobregat in 1953.

Source: Asociación de Trabajadores de Aguas de Barcelona, www.atab.cat

Two new concessions in 1957 (1.1 m^3/s) and 1960 (2,0 m^3/s), with the subsequent enlargements of the plant (figure 4.4), permitted to treat a maximum of 5.3 m^3/s [46] (although the average water flow was some 4 m^3/s [47]), which meant some 400,000 cubic meters per day (Voltes Bou 1967). Thus, in 1958 the plant achieved the figure of 145.7 hm^3 of water treated in a year (Voltes Bou, 1967). Along these new concessions, a new artery 14 kilometers long was build to connect the water deposits in Esplugues de Llobregat and in Barcelona (Passeig Sant Joan).

[45] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con grave limitaciones", José María Milagro
[46] Aigües de Barcelona. "Planta de tractament del riu Llobregat a Sant Joan Despí". Monografia. Brochure.
[47] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con grave limitaciones", José María Milagro

Figure 4.4. Aerial photo of the Llobregat's treatment plant, 1959

Source: Asociación de Trabajadores de Aguas de Barcelona, www.atab.cat

In 1957 the *Plan de Aguas de Cataluña* [Water Plan for Catalonia] (Muñoz Oms 1957) was enacted. This plan foresaw the regulation of several rivers in the *Pirineo Oriental* [48] basin by means of the construction of dams (figure 4.5). This rationale was perfectly captured in the motto of the plan: "*para la regulación integral de los ríos de la region catalana"* [for the integral regulation of the rivers of the Catalan region].

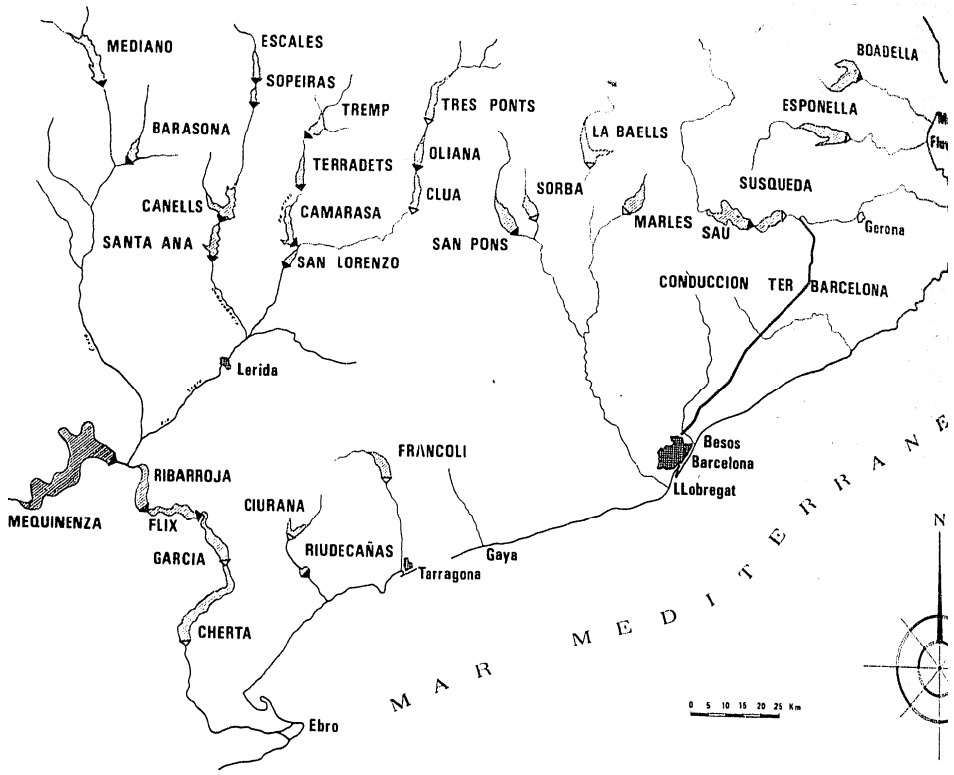
Although 1958 was an extreme dry year, 1959 presented important precipitations, which combined with the improvement of the Besòs catchment permitted to reduce underground water catchments in the Llobregat. A new peak of consumption took place on the 21st July 1959: 434,350 cubic meters (Voltes Bou 1967).

In 1959 an intake plant in Martorell was built[49] (with the concession by the Ministry of Public Works) in order to pump some 50,000 m^3 per day in the case the Llobregat river had not enough water to guarantee supply.

[48] With an extension of 16,500 square kilometers. Currently they are named *Conques Internes de Catalunya* (Catalan Inner Basins)

[49] It was built by the Empresa Concesionaria de Aguas Subterráneas del Río Llobregat S.A., belonging to the SGAB. Another company owned by the SGAB was the Empresa de Aguas del Río Besòs, S.A. (AGBESA), supplying Eastern neighbouring municipalities of Barcelona: Santa Coloma de Gramenet, Sant Adrià del Besòs, Badalona and Montcada. See Voltes Bou (1967).

Figure 4.5. Reservoirs planned in the Water Plan of 1957 for Catalunya



Source: Compte Guinovart (1966:702)

Once quantity problems were to some extent controlled, water quality issues began to be discussed and faced. The Llobregat river was the focus of such problems: first, the industrial spills along the course and its tributaries, and second, salinity. Regarding the former, the SGAB urged the public administrations to enforce the Sanitary and Police Control of flow regulations (Voltes Bou 1967). Salinity, was (and still is) caused by the important mining activity in the middle course of the river (in the Bages *comarca*, concretely Súria and Sallent)[34]. The origin of the problem could be traced back to the inauguration in 1923 of the potassium mines of Balsareny-Sallent, in the Llobregat river, and Cardona-Súria in the Cardener river (Rivas Torras 1997). 1961 was again a dry year. However, thanks to groundwater and the operation of the *Sant Ponç* reservoir, this situation was overcome easily. During the summer of 1961 water supply in Barcelona and the 23 other municipalities exceeded 450,000 m^3 per day during 30 days. According to Voltes Bou (1967) increasing individual living standards and also to the expansion of the supplied area were behind this increase. The treatment plant of Sant Joan Despí was expanded in 1962 (figure 4.6). Together with this, a new water tank with a capacity of 30,000 m^3 was built in Esplugues de

Llobregat, and pipes connected all these facilities. The operation of this plant served to lessen the pressure to the Cornellà wells, and reserve them for drought periods.

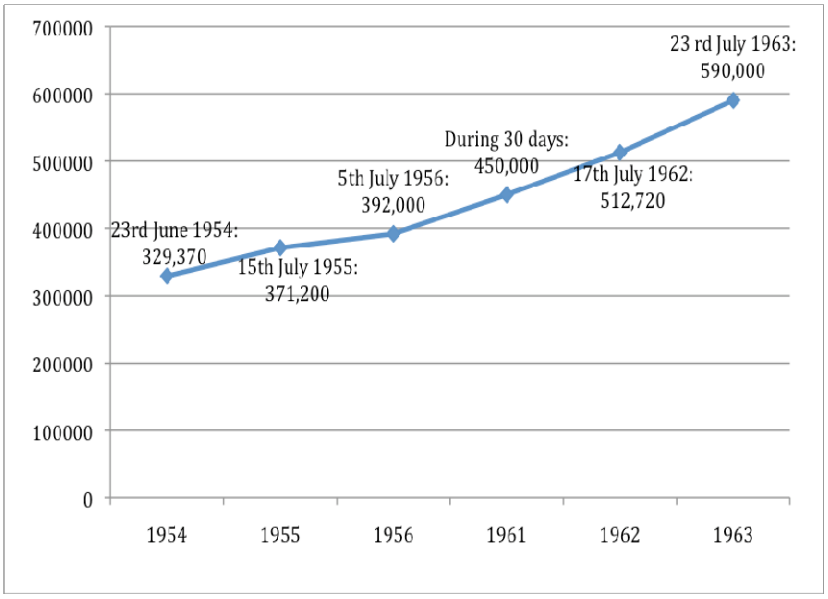
Figure 4.6. Llobregat's treatment plant in 1966, after the extension

Source: Asociación de Trabajadores de Aguas de Barcleona, www.atab.cat

Consumption continued to soar, with a maximum peak of 512,720 cubic meters on the 17th July 1962. During this year a devastating flood[35] occurred in the Barcelona area. Apart from the human and socioeconomic impact, the flood had a direct impact on water infrastructure and electricity facilities. A year later, another maximum was reached: over 590,000 cubic meters the 23rd July 1963[50] (see figure below). While the firm stated that they had capacity to pump over 700,000 cubic meters, water flowing from the Ter was eagerly waited for[51].

[50]La Vanguardia, Domingo, 10 de mayo 1964, p.13, "Sociedad General de Aguas de Barcelona, Sociedad Anónima"
[51] Idem

Figure 4.7. Peak water consumption (cubic meters per day), 1954-1963.



Source: adapted from Voltes Bou (1967) and La Vanguardia

4.3.3 Tapping water from Girona: the Ter transfer

Despite the new water supplies from the Llobregat, the constant growth in water demand (figure 4.7) together with some drought periods encouraged again both public powers and the SGAB to search for additional solutions to the problem of water supply.

One of the most important proposals was the plan to bring water from the Ter river, which was suggested for the first time in the sixteenth century (Voltes Bou 1967). This proposal was included in the Water Plan for Catalonia, formulated in 1957 by civil engineer Victoriano Muñoz Oms and supported by the Barcelona City Council with the idea of achieving an integral use of all the Catalan Rivers (Muñoz Oms 1957). River engineering thus went beyond the regulation of the rivers by means of the construction of dams, and water transfers became a key feature in water planning. Since then until our days, as we will see, water transfers have been a main element in the imaginary of planners, technocrats or even citizens. Thus water transfers have been not only used to overcome the "imbalance" between "Dry" and "Wet" Spain but to make the urban growth of the Spanish metropolitan areas possible.

The technocratic vision stands very clearly in the introduction of this plan, stating for instance that rivers cannot be considered as unities from its source to the sea, but that

they have to be connected and transferred to benefit human populations (Muñoz Oms 1957). This plan also envisaged the transfer of water from the Ebro River for agricultural uses in the Barcelona area when necessary.

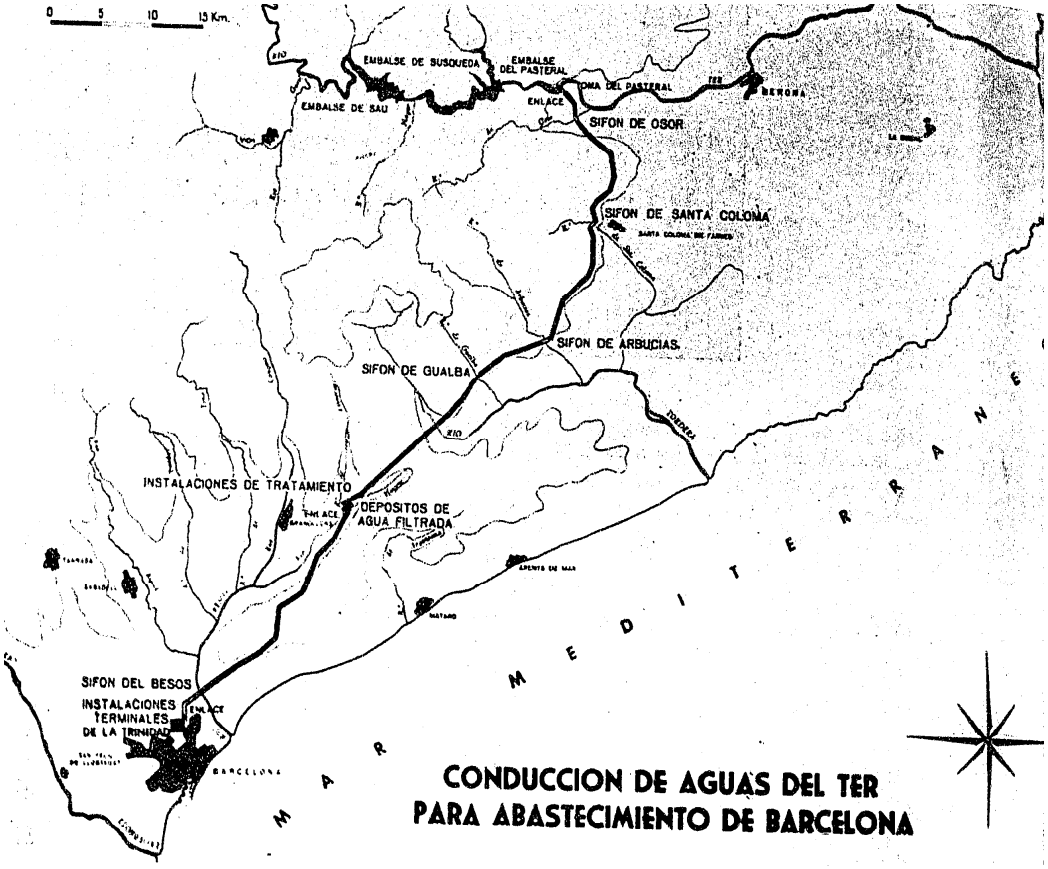
The astonishing urban development of the Barcelona conurbation during the 1960s, with subsequent growth in water demand over 5 percent per year, made possible the town council of Barcelona to obtain a concession of 8 m^3/s form the Ter river (Jové 1995). The project, envisaging treating and transporting some 8 m^3/s to Barcelona and its surrounding area, was led by the Ministry of Public Works. The project (with a budget of 3,500 million pesetas) was financed 50 percent by the State and the remainder 50 percent by the town council of Barcelona provided it would have a concession of 6.5 of the m^3/s transferred. By means of the Decree of 14th November 1958 the State[52] gave permission to the town council of Barcelona to implement new taxes to face the credit payment, granted by the *Banco de Crédito Local* (Compte Guinovart 1966). Several contractors[53] developed the project, among them the *Sociedad General de Aguas de Barcelona*. The SGAB took an active role in planning and offered their services not only to manage local supplies but also to build the infrastructure to provide bulk water supply. We can observe how the private water company developed public interest works. In chapter 5 we will establish parallelisms between this situation and 21st century water management in Barcelona.

The concession of the 6.5 m^3/s to the municipality of Barcelona could have reopened the debate on the municipalization of the water supply. The political situation, however, precluded such debate, and in 1965 the municipality and the SGAB sealed and important agreement by which the latter would distribute across Barcelona the water coming from the Ter river. Thus the municipality had definitely renounced to supply directly its citizens.

[52] *Decreto del Ministerio de Obras Públicas de 14 de noviembre de 1958* and latterly *Ley 15/59, de 11 de mayo*

[53] According Compte Guinovart (1966) the list of contractors was the following one: Marpy Construcciones S.A., Materiales y Tubos Bonna S.A., Obras Subterráneas S.A., S.A.E. de Depuración de Aguas Degremont, Sociedad General de Aguas de Barcelona S.A., Termac S.A., Tierras y Hormigones S.A. and also the Servicio Geológico de Obras Públics [Public Works Geologic Service]

Figure 4.8. Scheme of the water transfer from the Ter to Barcelona.



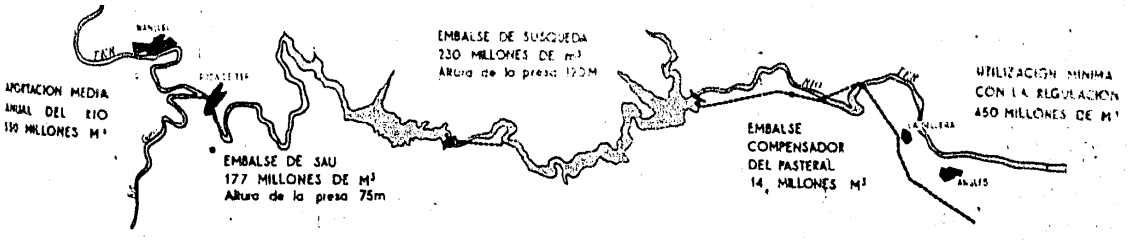
Source: Compte Guinovart (1966:706)

The regulation of the Ter river was made possible thanks to two key reservoirs: *Sau* and *Susqueda*. In 1962 the *Sau* reservoir was inaugurated in the Ter river, with a capacity of some 150 hm^3. Probably this is the most well-know dam in Catalonia because of the Romanesque church of the 11th century buried underneath its waters. On the other hand, in 1968 the *Susqueda* reservoir was finished, just a few hundred meters from the *Sau* reservoir, downstream the Ter River, with a capacity over 230 hm^3. Eventually a third smaller diversion dam, *El Pasteral*, was built to permit the transfer of water to Barcelona.

The Caudillo visited the works the 1st July 1966 and inaugurated the treatment Plant in Cardedeu, some 25 kilometers from Barcelona. From the *Pasteral* diversion dam, water was conducted through 56 kilometers of pipes to the treatment plant of Cardedeu, where was made drinkable, and finally conducted to Barcelona (figure 4.8). Thus, nine years after the approval of the plan, water from the Ter River arrived in the city of Barcelona, with a flow of 561,600 m^3 per day (some 6.5 m^3/s, but with

a real average flow of some 5.4 m^3/s [54]). In the Ter River, opposition to the transfer was heard in local and provincial authorities as well as in agricultural and business circles. However and due to the prevailing political climate, opposition could not and did not succeed (Masjuan et al. 2008).

Figure 4.9. Early scheme of the Sau-Susqueda-El Pasteral system.



Source: Compte Guinovart (1966:703)

Figure 4.10. Sau-Susqueda-El Pasteral reservoir system

Source: Google maps (images from Telemetrics and Teleatlas)

The *Sau-Susqueda-El Pasteral* system (figure 4.9 and 4.10 and table 4.12) was also capable to produce some 300 Kwh of electricity per year. In addition it would also serve to increase the surface of irrigated land in the province of Girona, from 7,000 to 17,000 hectares (Compte Guinovart 1966). Irrigation was one of the key elements to understand the development of the water infrastructure in this part of Catalunya (Pavón Gamero 2007).

[54] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con grave limitaciones", José María Milagro

Table 4.12. Sau-Susqueda-El Pasteral water storage/electricity production system.

Reservoir	Max. storage Capacity (hm^3)	Dam height (meters)	Power installed (Kw)
Sau	170	75	70,000
Susqueda	233	125	90,000
El Pasteral	14	n.a.	8,000

Source: own elaboration from Compte Guinovart (1966)

4.3.4 Population forecasts and the plan to bring water from the south: the first proposal of Ebro transfer

With the Ter transfer, a major solution had been provided to the Barcelona area and a water distribution system was created for the following years. However, once again the booming rates of population and economic growth of the mid and late 1960s reopened the preoccupation about the future water supply in the Barcelona area.

The inquiries carried out by the *Comisión de Recursos Hidráulicos* [Hydraulic Resources Commission] of the *II Plan de Desarrollo de España* [Second plan of development of Spain] in 1968 forecasted a population over 10 million people by the year 2000 in the Pirineo Oriental Basin, most of them located in the Barcelona metropolitan area (Llamas 1969). Thus, drawing on Llamas (1969) the future water needs of the region are presented in table 4.13 (for an approximation, over 50 percent of the figures would be required by Barcelona metropolitan area).

Llamas (1969) argued that with the existing supply system Barcelona's area would run out of water by 1985, even if the Pirineo Oriental basin was totally regulated (including the optimal extraction of groundwater). Assuming these physical limitations, the author proposed to consider other basins, such as the Ebro, or even non-conventional sources such as desalination or wastewater treatment and reuse. Llamas also claimed for a new law regarding groundwater since the existing one dated back to the 19th century and did not regulate correctly the extraction of this resource. This situation hampered a correct planning of aquifer use and recharge and will not change until the *Ley de Aguas de 1985* [Water Law of 1985].

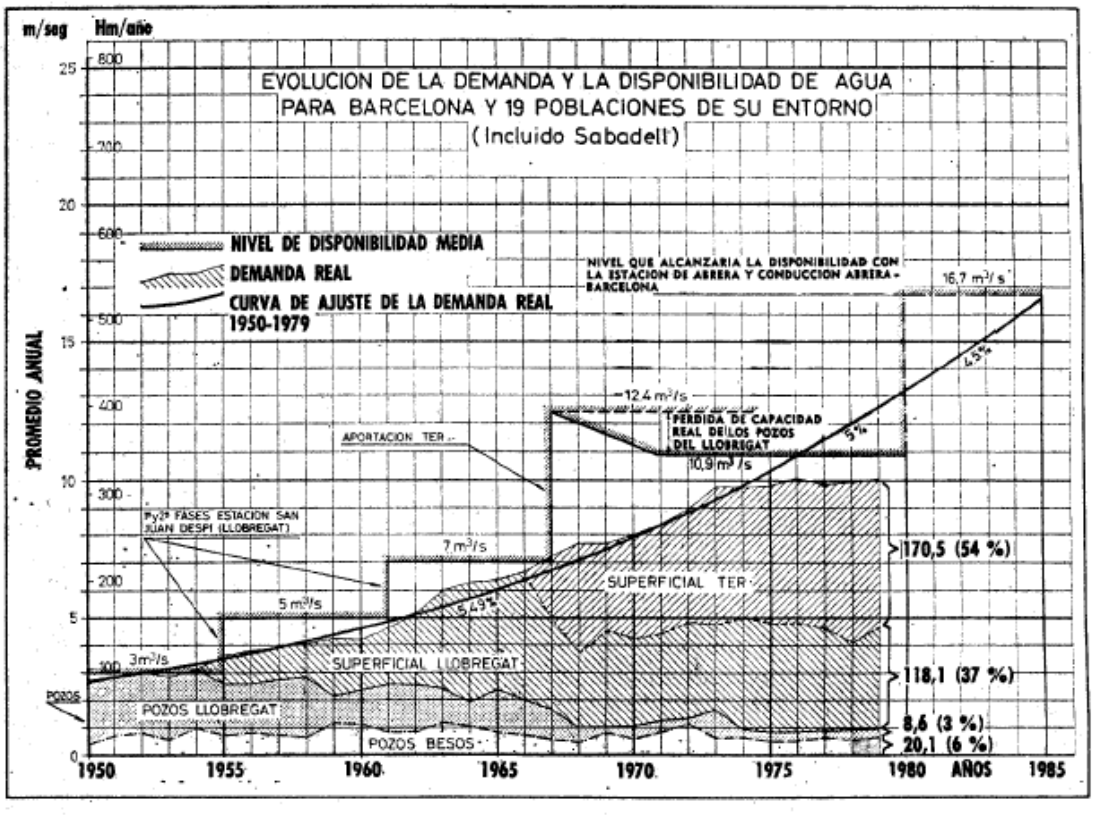
Table 4.13. Forecasted demands of water for the Pirineo Oriental basin, in the horizon of 2000.

Year	Urban and industrial uses (hm^3)	Irrigation (hm^3)	Total (hm^3)
1967	450	480	930
1972	580	650	1,230
2000	2,360	1,250	3,610

Source: own elaboration from Llamas (1969:435)

The book *El Agua. Recurso Natural Escaso* [Water. A Scarce Natural Resource] (Banco Urquijo 1969), which captured the concerns of the financial and industrial Catalan bourgeoisie and the intellectual elites, straightforwardly warned that Barcelona would run out of the water around 1985 and that another transfer (figure 4.11), much larger than that from the Ter, was required. The focus of attention, therefore turned to the Ebro River, located almost 200 kilometers south of Barcelona. After the recommendations of this book and other voices, in 1973 a new water transfer project was raised. This plan implied the transfer of some 1,400 hm^3 per year from the Ebro to Tarragona industrial centre, soon to become the largest petrochemical complex in Spain, and to Barcelona (Diputación Provincial de Tarragona 1978). Some 1,050 yearly cubic hectometers, almost five times the amount transferred from the Ter river, were addressed to cover the urban and industrial demand of Barcelona whereas the rest would go to Tarragona and eventually Castelló and Valencia to feed the iron and steel works of Sagunto (Masjuan et al. 2008). In the summer of 1974, an after the project saw the public light, a massive campaign was organized in Aragon, where most of the Ebro and its tributaries are located, to reject the transfer because it was supposed to enlarge the regional imbalances between the ‘poor’Aragon, , and the ‘rich” Catalonia (Saurí 2004)

Figure 4.11. Chart displaying the evolution of demand and water availability for Metropolitan Barcelona.



Source: La Vanguardia[55]

In 1973 an extreme drought hit the metropolitan area, which was then experiencing a dramatic growth in population. Despite that the flow of water coming from the two rivers and the aquifer (table 4.14) seemed sufficient to cover demand, cut-offs planned for the beginning of 1974 were almost materialized due to persisting drought conditions[56]. Eventually, nonetheless, restrictions never took place because on the 23rd December 1973 rain started to pour in the Ter and Llobregat basins. That same year, a clear inflexion significantly stabilized water demand (Jové 1995). By the second half of the 1975, underground water extracted from the Llobregat delta was halved (from 3 to 1.5 cubic meters per second) due to deteriorating condition of the aquifer[57]. Water availability was estimated then at 10.9 cubic meters per second.

[55] La Vanguardia, Viernes 20 de Junio 1980, p.60, "Barcelona y su entorno, sin garantía en el abastecimiento de agua. Intereses de partido imponen en la Corporación Metropolitana un temerario aplazamiento de la solución", José María Milagro

[56] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con graves limitaciones", José María Milagro

[57] idem

Table 4.14. Average water availability in Barcelona's metropolitan area from 1967 to 1975

Source	Water flow availability (m^3/s)
Llobregat's delta aquifer	3
Llobregat's surface water	4
Ter surface water	5.4
Total	**12.4**

Source: own elaboration from data of La Vanguardia[58]

[58] idem

4.4 Democracy and the reconfiguration of the government of water in Barcelona

The first democratic elections of 1977 and the subsequent enactment of the Constitution of 1978 set the foundations of modern democracy in Spain. By mid 1970s an economic crisis, preceded by the energy crisis of 1973, was hitting the country hard. Inflation was over 40 percent per year, with most of the state-owned industries suffering the effects of the energy crisis. Water consumption during the end of the Franco's rule and the early years of democracy remained fairly stable as a consequence of the economic situation.

In 1979, after the Spanish Constitution was enacted, Catalunya passed its own *Estatut d'Autonomia* [59] [Regional Constitution]. This juridical norm (the articles 9, 13 and 14) established that the *Generalitat* had exclusive jurisdiction over the public waterworks not affecting other regions of Spain and also over the waters flowing integrally through Catalunya. The new *Estatut d'Autonomia*[60] of 2006 maintains such jurisdictions (articles 117 and 118). As a consequence, by means of a Royal Decree[61], the State handed out to the *Generalitat de Catalunya* the water infrastructures, including the reservoirs and the functions over the regulation of the water flows concerning the rivers flowing integrally through Catalunya (*Pirineo Occidental* basin).

4.4.1 Does Barcelona need more water?

The demise of the Francoist state together with public opposition, combined with the economic recession Spain was undergoing in late 1970s and early 1980s propelled the abandonment of the Ebro Transfer (Masjuan et al. 2008). The forecasts presented by Llamas (1969) or the Banco Urquijo (1969) appeared to have grossly overestimated water consumption. We recall that the latter one forecasted a population around 5 million people in 1985 for the Barcelona area with water demand (urban and industrial) over 1,300 hm^3 per year.

[59] *Ley Orgánica 4/1979, de 18 de diciembre, de Estatuto de Autonomía de Cataluña.*
[60] *Ley Orgánica 6/2006, de 19 de julio, de reforma del Estatuto de Autonomía de Cataluña*
[61] *Real Decreto 2646/1985, de 27 de diciembre, de traspaso a la Generalidad de Cataluña de funciones y servicios en materia de obras hidráulicas.*

The excerpt below (figure 4.12), based on an interview to a city councilor in 1980, is a good example of how the Ebro was seen as the solution in the mid-term to the water problem of metropolitan Barcelona. However, we also see how other alternative sources were proposed for the long term, such as desalination or wastewater regeneration. The latter "alternative" projects would become in the 21st century cornerstones of the water supply mix in Barcelona, as we will see later. Another, project that it is currently being developed (in November 2009) is the interconnection of the Llobregat and Ter by means of a network within Barcelona (concretely underneath Collserola). This idea was already exposed in 1981[62].

Figure 4.12. Excerpt from an interview to Albert Serratosa i Palet, city councilors of Barcelona

Interviewer: Water deficit is a serious threat for the municipalities of the *Corporación Metropolitana*. What is the solution?

Albert Serratosa: Even if it may seem a cliché, the first condition includes treating the problem of water in Catalunya as a whole, as it is all the *Pirineo Oriental* Water Basin that has a deficit. The definitive solution would include bringing water from beyond the basin, be it either water treated from the sea or a more rational use of other basin's waters. Regarding seawater treatment, the high costs associated, but especially because of the energy crisis, make it quite unthinkable to be applied in the mid term. Therefore, in the mid term, once we have made the most of our basin's resources, we do not have any solution but to turn to inter-territorial solidarity. In this case this could be done easily as the flows to be extracted from the Ebro are lower than those that Catalunya gives to the river

Interviewer: Mr Serratosa is completely right; for the alleged water transfer purposes, the Ebro is a tributary of the Segre.

Source: La Vanguardia, Jueves 24 de Abril 1980, "El territorio de la Corporación Metropolitana de Barcelona es insuficiente", José María Milagro, our translation

Notwithstanding the clear overestimation of some forecasts, water availability concerns were high by 1981. At the beginning of that year, the town council and SGAB were considering to introduce some proposals to save water against the fear of cutbacks. However, the fears vanished after the important rainfalls[63], as usual. The president of SGAB by then, Ricard Fornesa, insisted on this fact:

[62] La Vanguardia, Domingo 11 de Octubre 1981, p.21, "Barcelona pasará sed si aumenta su demanda de agua potable"
[63] La Vanguardia, Martes 27 de Enero 1987, p.15, "La limitaciones se aplicarían dos veces por semana a partir de finales del mes de abril", José María Milagro

> "Water demand is close to supply. Any reduction in the water flow due to drought or increase in demand as result of economic recovery would cause severe supply problems"[64].

Similarly, *La Vanguardia* raised similar concerns: "Barcelona will be thirsty if water demand increases"[65]. However, the same newspaper argued that the economic recession (with the collateral effects of decrease of immigration, decrease of industrial activity, etc.) had situated water consumption at the levels of 1973.

In 1976, just at the end of the pre-democratic period the *Plan General Metropolitano de Ordenación Urbana de la Entidad Municipal Metropolitana de Barcelona* [Metropolitan General Plan for the Metropolitan Area of Barcelona] was enacted. This Plan considered Barcelona and 26 neighboring municipalities as a whole regarding urban planning. In addition the plan created the *Corporación Metropolitana* substituting the *Comisión de Urbanismo y Servicios Comunes de Barcelona y otros Municipios* [Commission of Urbanism and Common Services of Barcelona and other municipalities].

At the turn of the 1980s, the supply of bulk water ("*agua en alta*")[66] was increasingly envisaged as a public duty, rather than a private activity (regardless whether urban water supply was private or public). In the area of Barcelona this public service was to be of metropolitan nature[67, 68], i.e. managed by the *Corporación Metropolitana* created in 1976.

The imminence of critical situation increased the claims to buy and manage the Abrera treatment plant (upstream the Sant Joan Despí treatment plant in the Llobregat) and to connect it to the metropolitan water network, a duty to be carried of by the *Corporación Metropolitana*. The Abrera Treatment Plant began to be built in 1973, in the middle of an important drought. It was owned by the *Consorcio de Abstecimiento de Agua del Río Llobregat*; in turn, mainly owned by the SGAB. The

[64] La Vanguardia, Domingo 11 de Octubre 1981, p.21, "Barcelona pasará sed si aumenta su demanda de agua potable", our translation
[65] idem
[66] Bulk water represents the flow of water before it is distributed within the urban network. Thus, bulk water supply includes the captation and the treatment of water to turn it drinkable.
[67] La Vanguardia, Viernes 1 de Febrero 1980, p.20, "La Corporación aprovechará al máximo sus recursos legales, técnicos y económicos"
[68] La Vanguardia, Viernes 18 Julio 1980, p.15, "La Corporación asumirá el abastecimiento metropolitano de agua"

cost of the plan was around 5,450 million pesetas[69] and was paid mostly by the SGAB. It had a theoretical capacity of 9 m^3/s per second, although by 1981 supplied 3 m^3/s to Sabadell, Terrassa, Martorell and other municipalities.

The pipeline Abrera-Barcelona was supposed to cost around 4,000 million pesetas, and would have a direct impact on the water price (increase from 3 to 5 pesetas per cubic meter)[70,71]. This project would place water availability 40 percent ahead of water demand. According to city councilor for Municipal Services, Josep Serra Martí, "even in the case economic recovery took place, we would have water until 1995. In the case, water demand remained stabilized, as it happens now, water supply would be guaranteed for decades"[72].

Other visions, such as those of José María Milagro, columnist of *La Vanguardia*, were not as optimistic with the role of the *Corporación Metropolitana*, which was blamed to put off the solution to the water problem in Barcelona. To exemplify the critical situation the metropolitan area was undergoing in terms of water availability, the author argued that:

> "The decrease of available resources to supply this zone has come to a situation that in the case restriction risk was to be registered in machine with an acoustic alarm, this alarm would have been ringing for the past years. But this alarm has been recklessly ignored by the Corporación Metropolitana de Barcelona because two years have gone by since the agreement to assume the responsibility of supply for all the municipalities of the Corporación and they have not been capable of really assuming this responsibility"[73]

In 1982 a controversy emerged again regarding the availability of water to Barcelona; on the one hand, some sources pointed out that SGAB only had a capacity of 10.9 m^3/s[74] (to cope with the near 10 m^3/s of demand of the "Gran Barcelona"). On the other hand, other voices[75] argued that the capacity of supply of the aforementioned company was around 19.6 m^3/s (the surface water from the Ter and

[69] La Vanguardia, Domingo 11 de Octubre 1981, p.21, "Barcelona pasará sed si aumenta su demanda de agua potable"
[70] idem
[71] The SGAB asked to charge at 23.077 ptas each cubic meter in Barcelona (La Vanguardia, Viernes 10 de Abril 1981, p.25, "También el agua va a subir")
[72] La Vanguardia, Domingo 11 de Octubre 1981, p.21, "Barcelona pasará sed si aumenta su demanda de agua potable", our translation
[73] La Vanguardia, Viernes 20 de Junio 1980, p.60, "Barcelona y su entorno, sin garantía en el abastecimiento de agua. Intereses de partido imponen en la Corporación Metropolitana un temerario aplazamiento de la solución", José María Milagro, our translation
[74] La Vanguardia, Domingo 11 de octubre 1981, p.21, "Barcelona pasará sed si aumenta su demanda de agua potable"
[75] idem

the Llobregat at Sant Joan Despí being of 13.3 m^3/s). Some critical voices alerted that the objective of the alarms raised by SGAB were to force the *Corporación Metropolitana*[76] a) to acquire the treatment plant of Abrera (owned by *Consorcio de Abastecimiento de Agua del Rio Llobregat, S.A*[77], a company created by the SGAB); and b) to build a conduction from the plant in Abrera to the plant of Sant Joan Despí. As a response to these allegations, Ricardo Fornesa, the President of SGAB, stated again that the reliability of the water supply of Barcelona and the metropolitan area was very fragile[78], and that a drought or a slight recovery of industrial activity could cause problems. Surprisingly, according to *La Vanguardia* the 1981 drought affecting Spain notwithstanding, the low rainfall did allegedly not affect the 142 municipalities supplied by private water company[79]. According to the CEO of the SGAB in 1982, Josep Bernís[80], if *La Baells* reservoir became operative, in combination with the Abrera plant and Sant Joan Despí (to be connected by a pipe), Barcelona would not have any water problems not even at the beginning of the 21st century. He argued that the interconnection of these facilities would play an important role in alleviating the urban pressure on the dense city of Barcelona. Interestingly, he underscored the role urban planning could have in determining demands, especially from the domestic and industrial sectors.

A year later, in 1981, the *Corporación Metropolitana de Barcelona* (henceforth CMB), finally took an active role in the management of bulk water[81] in order to respond to three main issues:

1) Guarantee of supply, to avoid restrictions
2) Improvement of the reliability of the intake system (by means of the construction of a pipe connecting the Abrera and the Sant Joan Despí treatment plants)

[76] The Corporación Metropolitana had the aim to "metropolitanize" the bulk water supply
[77] This Consortium was created in 1973, against the backdrop of likely water restrictions in Barcelona. Some municipalities (Sabadell, Terrassa, Martorell, and others) plus the Mancomunidad Intermunicipal Sabadell-Terrassa and especially the SGAB made up this consortium.
[78] La Vanguardia, Lunes 24 de Mayo 1982, p.25, "Sociedad General de Aguas de Barcelona, S.A. Junta General de Accioninstas" (press release)
[79] La Vanguardia, Viernes 30 Abril 1982, p.37, "Empresa abierta"
[80] La Vanguardia, Viernes 12 de Febrero 1982, p.27, Interview to Josep Bernís (general director of SGAB), "Josep Bernis: 'Barcelona no debería tener dificultades de abastecimiento de agua'
[81] La Vanguardia, Martes 8 Diciembre 1981, p.27, "Plan coordinado para suministro de agua en el área metropolitana"

3) Improvement of water quality (by means of the acquisition of the Abrera treatment plant)

The process of overtaking the bulk water supply management was ridden, however, with administrative complexity[82]. A concession to be granted by the Ministry of Public Works to the CMB was needed in order to be able to buy the Abrera treatment plant to its owner, the *Consorcio de Aguas del Llobregat S.A.* The treatment plant in Abrera was built with the idea to use the 6.69 m^3/s water flow regulated by the new *La Baells* reservoir[83] in the Llobregat river. However, several administrative problems put off the petition for the legal concession by the *Consorcio de Abastecimientos de Agua del río Llobregat, S.A*[84].

"El agua, bajo control público"[85] [Water, under public control] said a headline in *La Vanguardia* in 1983. By means of an agreement between the SGAB, the Consorcio de Aguas del Llobregat and the CMB, the water facilities of Abrera were finally "metropolitanized". This process would not only imply the change of ownership and management of the facility and the construction of a pipe connecting with Sant Joan Despí[86] but it would also imply the transference of the rights over the water (*concessiones*) from the private to the public arena. To manage the bulk water supply, the CMB constituted in 1983 the *Societat de Gestió Metropolitana d'Abastament d'Aigua* (SOGEMASA) [Society for the metropolitan management of water supply][87]. It was expected that this institutional change would improve reliability and even in the future permit to halt the transfer from the Ter.

Once the Corporación took over the bulk water supply of the Metropolitan these were the main intervening actors in the water cycle of the Metropolitan area:

1. <u>*Generalitat de Catalunya*</u>: deciding how much water could be extracted from the rivers of the rivers flowing exclusively through Catalunya

[82] La Vanguardia, Miércoles 20 Enero 1982, p.23, "El suministro de agua potable tendrá carácter metropolitano", Jordi Bordas
[83] La Baells reservoir was built in 1976 by the Spanish state, with a cost of 3,000 million pesetas
[84] La Vanguardia, Viernes 5 de Junio 1981, p.60, "Diez Ayuntamientos esperan la concesión legal desde hace 33 meses"
[85] La Vanguardia, Martes 19 de Abril 1983, "El agua, bajo control público"
[86] The Budget amounted to some 8,500 million pesetas (5,429 million pesetas for the purchase of the plant, plus 3,100 million for the construction of the pipe). This cost would be recovered through the current and future bills of the citizens of CMB area. Other municipalities not belonging to the CMB that obtain water from Abrera would pay for that water as well (Terrassa, Martorell, Sabadell, Rubí)
[87] La Vanguardia, Domingo 12 de Junio 1988, p.19, "El agua, un bien escaso"

2. *Corporación Metropolitana de Barcelona*: ensuring bulk water supply
3. Municipality/Water companies: ensuring urban water delivery

In 1983, the SGAB was asked to manage the water treatment plant of Abrera for 5 years (extendable to 5 more years), bought to the *Consorcio de Abastecimientos de Aguas del Río Llobregat* and paid by the *Corporación Metropolitana of Barcelona*. The agreements with the *Corporación Metropolitana* were seen by the SGAB as positive "as they guarantee the availability of water in our supply zone, which is precarious nowadays"[88]. In 1984, the CMB obtained a credit of 720 million pesetas to invest in the Abrera plant[89]. Though most of the money was to pay for the plant, some money was to be invested in improving the capacity of the plant and connecting it to the municipalities of the CMB.

Other infrastructures to increase the reliability of the water supply for Barcelona, were the pipeline (24 km long, 3 cubic meters per second) connecting the treatment plant in Abrera and San Joan Despí, carried out by the CMB.

Nevertheless, there were divergent opinions regarding the treatment plant in Abrera. Some voices[90] contested that this project was illegal and should be pulled down, precluding the handing out of the facilities to the public administration.

> "The security margin of water supply will steam from the creation of new flows, not in spending public money in pointless illegal works, whose responsible are the private entities carrying out them and thinking in monopolistic plans"[91]

In 1982, the columnist of *La Vanguardia*, José María Milagro, compared the supply of Madrid with that of Barcelona (table 4.15). The differences on the situation were blamed on the nature of the companies supplying both areas. Referring to Madrid, the columnist suggested that "its state-owned firm nature has facilitated the obtaining of exemptions, advantages and favors that are not at the reach of other water companies of a private nature"[92] [referring to the SGAB]. However, it seems that the columnist only took into account the nature of water supplier, and forgot about the

[88] idem, our translation
[89] La Vanguardia, Jueves 6 de Septiembre 1984, p.15, "Inversión de 720 millones en la planta potabilizadora de Abrera"
[90] La Vanguardia, Viernes 29 de Enero 1982, p.19, "El carácter metropolitano del suministro de agua", Can Pous, S.A.
[91] idem, our translation
[92] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con graves limitaciones", José María Milagro, our translation

bulk supplier (in Madrid it is also the Canal, while in Barcelona, the CMB was overtaking the duty). Nonetheless, this columnist sided himself with the SGAB and blamed the public administration of the faults of Barcelona's water supply:

> "Even though the *Ciudad Condal* [referring to Barcelona] has had enough water, it is not because of the diligence of public authorities, but due to the proper resource management of this Society [referring to the SGAB]. Notwithstanding this, the water availability has not the wide guarantee margins Madrid has. On the other hand, the quality of Llobreagat's water supplied to Barcelona is totally deficient despite the enormous efforts by the SGAB, which reach the limits of the possible"[93]

Table 4.15. Comparison water supply system Barcelona and Madrid, year 1980.

	Barcelona's water system	Madrid's water system
RESERVOIRS		
Total capacity, Hm^3	549	897
TREATMENT PLANTS		
Total capacity of treatment (m^3/s)	13.3	31.8
TOTAL AVAILABLE WATER FLOW		
Average water flow (m^3/s) in a regular year	10,9	27
DEMAND		
Hm^3 per year	298	897
Average water flow (m^3/s) demanded	9.4	14.6
SUPPLIED POPULATION		
Number of people at the end of 1980	3,421,000	4,421,000
ALLOWANCE		
Liters per capita and day	239	286
EVOLUTION OF THE DEMAND		
Annual growth rate, 1950-75 (%)	5.3	5,6
Annual growth rate, 1960-75 (%)	5.8	4,7
Annual growth rate, 1975-80 (%)	-0.7	1,3
QUOTIENT RESOURCES/DEMAND		
in a regular year	1,16	1,85
REGULATORY DEPOSITS		
Total capacity, in thousands of cubic m	223	2,459
QUOTIENT TANKS/CONSUMPTION		
(m^3 tank capacity/m^3 average daily consumption)	0.29	1.94

Source: own elaboration from La Vanguardia[94]

By 1982, the SGAB supplied almost one million customers some 290 hm^3 of water, 60 percent of which came from the Ter, 33 percent from the Llobregat and just 7 percent from groundwater sources. Consumption tended to decrease, the new pricing schemes and the decrease of industrial activity being the main causes according to

[93] idem, our translation
[94] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento del agua con graves limitaciones", José María Milagro

SGAB[95]. In 1985, however, water consumption took up again a positive path (Jové 1995).

Regarding water pricing, SGAB keenly highlighted their sharp social orientation: "prices favor the users with low consumption and permit the existence of cross-subsidies within each consumer group"[96]. The minimum of consumption was removed, so the "user could be more conscious of the importance to save water"[97]: "from 1983 onwards, the company will charge for the water really consumed"[98].

The severe drought affecting Spain in 1982 passed without almost any repercussion at the metropolitan level. However, the persistence of scarce precipitations in 1983 began to raise some alarms, with the Llobregat-Ter system at its lowest level in years (below 50 percent capacity)[99]. The *Comité Asesor y de Estudios del Abastecimiento de Agua a Barcelona* [Advisory Committee for the Water supply in Barcelona] recommended adopting water saving attitudes to avoid a critical situation by the end of the year. Nonetheless, restrictions were not foreseen for the metropolitan area during summer[100]. The situation became harsher in autumn with reservoir levels falling below 30 percent, i.e. 90 days of available resources[101].

The concerns to save water were even explicated in the ads published in the press to explain changing pricing schemes (figure 4.13); however, more than with ecological concerns *per se* these messages were mostly concerned with economic and availability issues: *"El Agua es un bien escaso, ahorre la que pueda en beneficio de todos"* [Water is an scarce resource, save all that you can to the benefit of everybody], adding *"¡Recuerde! Evitando el consumo innecesario de agua no solo se beneficia Ud, económicamente, sino que también contribuye a un menor coste*

[95] La Vanguardia, domingo 26 de Junio de 1983, Announcement "Sociedad General de Aguas de Barcelona, S.A"
[96] La Vanguardia, Domingo 26 de Junio de 1983, Announcement "Sociedad General de Aguas de Barcelona, S.A", our translation
[97] idem
[98] La Vanguardia, Domingo 20 de Febrero 1983, p.14, Commercial SGAB "Modificaciones en el recibo del agua"
[99] La Vanguardia, Jueves 21 de Julio 1983, p. 17, "Se aconseja mayor ahorro en el consumo"
[100] La Vanguardia, Viernes 17 de Junio 1983, p.25, "La mayor parte de Cataluña tiene asegurado el abastecimiento de agua para el próximo verano", José María Milagro
[101] La Vanguardia, Jueves 6 de Octubre 1983, p.3, "Sólo queda agua para tres meses de suministro", José María Milagro

general![102] [Remember! To save water benefits both you in economic terms and contributes to lessen the general cost].

The company raised some concerns about this change: "Therefore, these new pricing schemes will produce a drop in consumption, which has been forecasted, though it is ridden with uncertainty". And added: "This effect [the decrease in consumption] being favorable notwithstanding, goes in the opposite direction to our interests"[103]. The company blamed on the low water prices the fact that revenues were lower than inflation in 1982 and 1983. In 1982, the company already considered the water price agreed with the public authorities to be "clearly insufficient", with increases of 25 percent asked for the next year[104]

The consumption in Barcelona and its Metropolitan Area in 1984 was 262 hm^3, or an annual average consumption per family around 116 cubic meters[105]. SGAB was quite worried about the dwindling consumption patterns, according to them a combination of the effect of the new pricing schemes and the falling industrial activity[106].

A study by SGAB forecasted the demands for the hypothetic concession of the Olympic Games to Barcelona. A 22 percent increase in the water demand was expected (1984 as the baseline) and investments of 2,215 million pesetas would be needed to cope with these new demands (this figures only included the network and water deposit works within the city, and not the costs to bring more water[107]). Thus, with the horizon of the candidature for the Olympic games of 1992, the CMB and SGAB launched a campaign in 1985 to save water (reduction of 15 percent was considered the optimum figure)[108].

[102] La Vanguardia, Domingo 20 de Febrero 1983, p.14, Commercial SGAB "Modificaciones en el recibo del agua"
[103] La Vanguardia, Domingo 26 de Junio de 1983, Announcement "Sociedad General de Aguas de Barcelona, S.A". our translation
[104] La Vanguardia, Lunes 24 de Mayo 1982, p.25, "Sociedad General de Aguas de Barcelona, S.A. Junta General de Accioninstas" (press release)
[105] La Vanguardia, Martes 5 de noviembre 1985, p.25, "El consumo de agua se incrementaría un 22% durante los Juegos Olímpicos"
[106] La Vanguardia, Domingo 1 de Julio 1984, p.56, SGAB Announcement, "Sociedad General de Aguas de Barcelona, S.A. Junta General Ordinaria de Accionistas"
[107] La Vanguardia, Martes 5 de noviembre 1985, p.25, "El consumo de agua se incrementaría un 22% durante los Juegos Olímpicos"
[108] La Vanguardia, Martes 15 de Octubre 1985, p.21, "Campaña para frenar el despilfarro de agua en la Barcelona metropolitana"

Figure 4.13. Commercial to save water, SGAB and Corporación Metropolitana de Barcelona.

Source: La Vanguardia, 10th November 1985, p.24

The water campaigns were aimed specially at creating a civic consciousness among citizens to value the importance of the resource and to promote its rational use[109]. A significant reduction in water consumption combined with the use of all the available water sources, would help to face the likely skyrocketing increase in water consumption of "Olympic" Barcelona (some additional 250,000 people) without new water transfers.

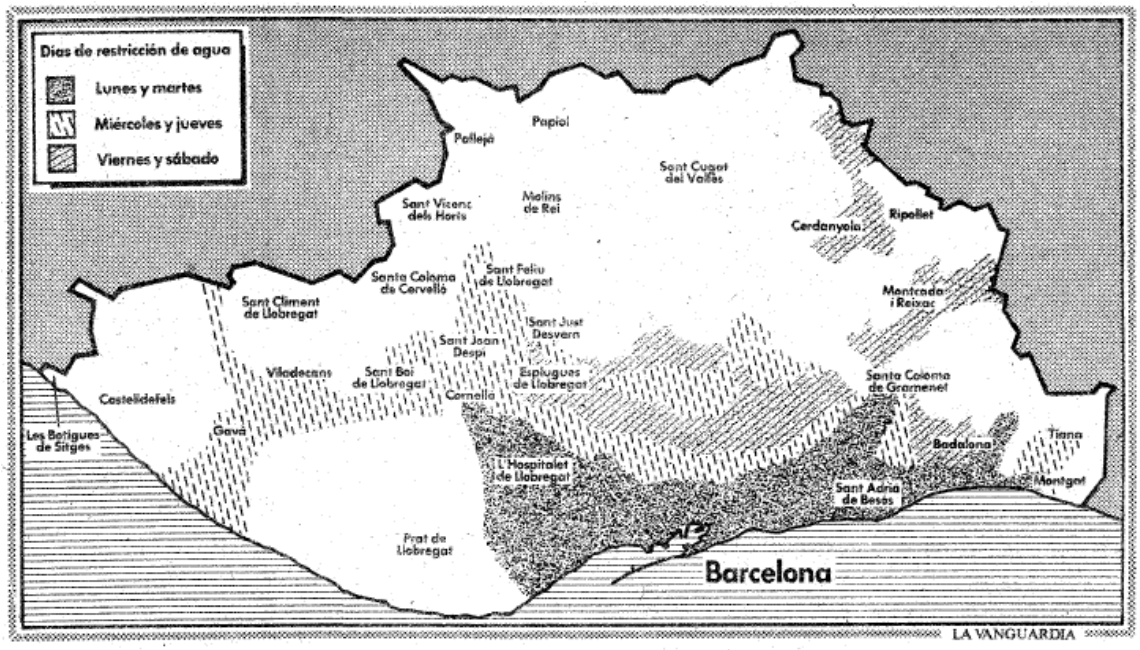
In 1987 claims were raised warning that drinking water from the Llobregat[110] river would run out in three months[111] in the case the drought persisted. According to *La Vanguardia*, in January 1987 a calendar was set to face such event by means of the implementation of water restrictions[112] in stages (figure 4.14). The mayor of

[109] La Vanguardia, Viernes 22 de Marzo 1985, p.21, "Firmado un convenio para proteger las aguas del área metropolitana"
[110] In 1987, Ter and Llobregat's water were not mixed yet. In that sense, the municipalities comprised in the Llobregat's lower basin altogether with the part of Barcelona comprised between Plaza España and Passeig de Sant Joan, drank exclusively water from the Llobregat. On the other hand, the rest of the city of Barcelona closer to the Besòs and the rest of municipalities belonging to the Besòs lower basin were feeded by the Ter.
[111] La Vanguardia Martes 27 de Enero 1987, p.15, "Las reservas del Llobregat para el suministro de aguas a la Barcelona metropolitana sólo llegan a tres meses", José María Milagro
[112] La Vanguardia, Martes 27 de Enero 1987, p.15, "Las limitaciones se aplicarían dos veces por semana a partir de finales del mes de abril", José María Milagro

Barcelona and president of the CMB firmly stated that Barcelona would not run out of water[113], despite the alarms raised by some media groups.

The "Ter-Llobregat" aqueduct[114], to be operative in 1987[115], was expected to improve the reliability and water quality of those areas of the city supplied solely by Llobregat's waters. Thus, with the works, finished by late march 1987[116], water coming from the Ter notably increased its share[117] in the mix of water supplied to metropolitan Barcelona.

Figure 4.14. Restrictions Plan for the year 1987.



Source: La Vanguardia, 27 Enero 1987, p.15

The government, especially the metropolitan government, received important criticisms from some sectors, for instance the media, for the lack of prevision in front of the scarcity episodes of 1987. From *La Vanguardia*:

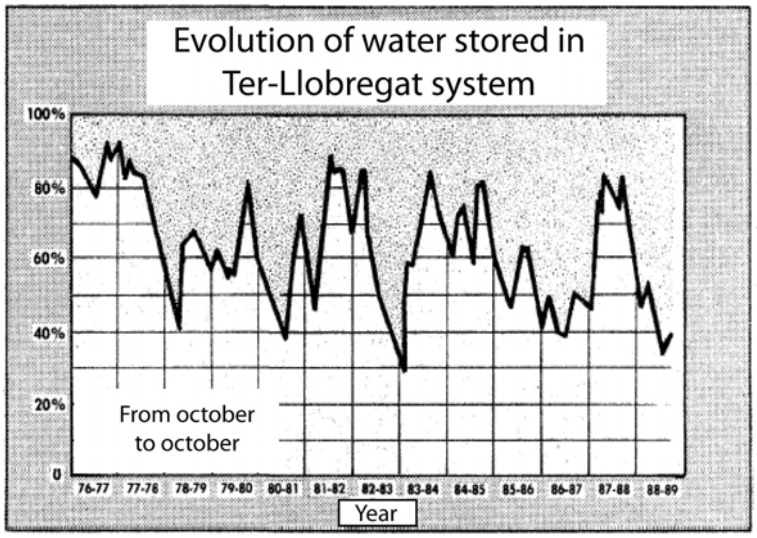
[113] La Vanguardia, Sábado 31 de Enero 1987, p.19, "En Barcelona no serán necesarias las restricciones de agua, según Maragall"
[114] Pipeline connecting the delivery station of La Trinitat (receiving water from the Ter, previously treated in the Cardedeu treatment plant) with the delivery station of El Carmel.
[115] This Project dates back to 1974. The Works were brought to a halt because of economic failure of the firm. In 1977 they were resumed, but new problems paralyzed the Project. Eventually, in 1984 they were taken up again. (see La Vanguardia, 17 de Marzo 1987, p.25 "La conexión del acueducto Ter-Llobregat alterará el suministro de agua a Barcelona este fin de semana"
[116] La Vanguardia, Domingo 22 de Marzo 1987, p.3, "El suministro de agua a Barcelona quedó normalizado durante la tarde de ayer"
[117] idem, p.24, "La conexión del acueducto Ter-Llobregat causó en Barcelona menos restricciones de las esperadas", Lluís Sierra

> "When they ask us to consume less, we are going to ask what are they going to do to guarantee our current consumption and what could be done to guarantee an acceptable level of water consumption in the future in Barcelona and surroundings. The drought that worried us last summer starts to worry us again this year just at the end of January"[118]

Before the 1950s, groundwater from the *Delta del Llobregat* [Llobregat's delta] and Besòs was the main source of Barcelona. In the 1950s surface waters from the Llobregat were added to the supply system. A decade later, water flows from the Ter reached Barcelona. The decrease in consumption brought about by the crises of the 1970s permitted to leave unused the groundwater from the Llobregat and Besòs reserved for emergency situations. However, the high levels of pollution of the Besòs basin turned useless much of its groundwater. By the end of the 1980s the aquifer of the Llobregat delta was in a poor situation, due to the years of overexploitation and the subsequent problems of saline intrusion or pollution from all type of discharges. Then it was just used for emergency when Llobregat waters were too polluted. Thus, at the time of the drought of 1987 Barcelona and its metropolitan area could only in practice rely on Llobregat's (some 5 m^3/s) and Ter's (some 6 m^3/s) surface water flows. With metabolic needs around 10 m^3/s, the equilibrium between supply and demand was very fragile[119]. Drought and water cut-offs concerns continued to lurk by the end of the decade[120], to the point that the SGAB raised again a plan to reduce water consumption by 25 percent; this time, though, without cut-offs in mind but using a drop in pressure organized by zones[121].

[118] La Vanguardia, Martes 27 de Enero 1987, p.4, Editorial "Agua para Barcelona", our translation
[119] idem, p.15, "Las reservas del Llobregat para el suministro de aguas a la Barcelona metropolitana sólo llegan a tres meses", José María Milagro
[120] La Vanguardia, 9 de Febrero 1989, p.19, "La falta de lluvias durante el invierno hace temer un verano con malas cosechas, incendios y restricciones", Antonio Cerrillo
[121] La Vanguardia, Sábado 18 de Noviembre 1989, p.23, "Las lluvias son aún insuficientes para aliviar la sed de Barcelona", Antonio Cerrillo

Figure 4.15. Evolution of stored water, 1976-89.



Source: adapted from La Vanguardia, 6th june 1989, p.31

With the critical drought of 1989 and restrictions looming large, the *Generalitat de Catalunya*, reopened again the idea to transfer water from the Ebro to Barcelona[122], the same year that the so-called "mini-transfer" from the Ebro to Tarragona was inaugurated. The Catalan government asked the Spanish government to include such water transfer in a future National Water Plan[123]. In figure 4.15 we can observe how during the 1980s almost in half of the years the water storage system was below 50 percent of its capacity.

4.4.2 Deconstructing and constructing the new water administration

In 1985 a new Water Law (*Ley de Aguas de 1985*[124]*)* was enacted. It first brought about deep changes in the legal nature of groundwater. From then on, these flows would be considered part of the public domain, and concessions from the public administration would be needed to exploit them.

An important event affecting directly our case study was the transference of the *Confederación Hidrogràfica del Pirineo Oriental* (and also the *Comisaría de Aguas*

[122] La Vanguardia, Viernes 10 de Noviembre de 1989, "La Generalitat reclama el trasvase del Ebro", p.1

[123] idem, "La Generalitat pedirá que el agua del Ebro llegué hasta Barcelona", p.19, Xavier Arjelaguer

[124] *Ley 29/1985, de 2 de agosto, de Aguas*. This law would be modified by the *Ley 46/1999, de 13 de diciembre, de modificación de la Ley 29/1985, de 2 de agosto, de Aguas*; latterly, it would be enacted the *Real Decreto Legislativo 1/2001, de 20 de Julio, por el que se aprueba el texto refundido de la Ley de Aguas. Latterly will be modified by the Real Decreto-Ley 4/2007, de 13 de abril, por el que se modifica el texto refundido de la Ley de Aguas, aprobado por el Real Decreto Legislativo 1/2001, de 20 de julio.*

del Pirineo Oriental) from the State to the *Generalitat de Catalunya* on the 1st January 1986[125,126]. With this change of jurisdiction, the Catalan Government would be in charge of[127]:

a) Planning and developing waterworks in the territory of Catalunya, not subjected to the state's general interest and not affecting other Autonomous Communities

b) The awarding of economic resources to municipalities or particulars to develop such works

c) Granting the concessions and authorizations of water withdrawal in the *Pirineo Oriental* basin

d) Granting the concessions to discharge water or to use the riparian land (*dominio público*) in all the Catalan territory (the State would hold the power to revise the concessions beyond the *Pirineo Oriental* basin).

e) Water policing function in Catalonia (the State would hold the power supervise such duty beyond the *Pirineo* Oriental basin)

f) Elaborating a water plan for the *Pirineo Oriental* basin

The change in the scale of government implied the creation of three new bodies: the *Direcció General de Obres Hidráuliques* [Water works general direction], the *Junta d'Aigües* [Water Committee] and the *Junta de Sanejament*[128] [Sanitation Committee]. The *Junta d'Aigües*, inheriting the jurisdiction of the former *Confederación Hidrográfica del Pirineo Oriental* and the *Comisaría de Aguas del Pirineo Oriental*[129].

[125] *Real Decreto de 27 de diciembre de 1985*
[126] La Vanguardia, Miércoles 18 de Diciembre 1985, p.17, "La Administración central cede a la Generalitat las competencia en materia de obras hidráulicas", José María Brunet
[127] La Vanguardia, Domingo 26 de Enero de 1986, p.25, "En mayo próximo, Cataluña tendrá una ley de organización hidráulica", José María Milagro
[128] This body was created by means of the Ley
[129] La Vanguardia, 10 de Junio 1986, p.34, "La Generalitat propone una nueva administración hidráulica de Cataluña en virtud de sus competencias", José María Milagro

By means of the *Llei 7/1987*[130] the *Corporación Metropolitana de Barcelona*[131] was dissolved because it allegedly invaded municipal jurisdiction (guaranteed by the Spanish Constitution of 1978 and the Catalan Statute of Autonomy of 1979). The process was ridden with polemics[132], uncertainty[133] and some delays[134]. The *Corporación Metropolitana* was split into two metropolitan bodies: one to plan and manage public transportation services (*Entitat del Transport)* and the other one appointed to be in charge of water-related and waste treatment issues[135]. Regarding water resources, the dissolution implied the fragmentation of the ownership and responsibility of water supply services. Thus, while the Generalitat was empowered with jurisdiction for water planning, the metropolitan body was to coordinate municipal water and wastewater services, to forecast future demands and to carry out hydraulic works to ensure these demands[136].

Another major legal change was introduced by the *Ley estatal 7/1985, de 2 de abril, reguladora de las Bases de Régimen Local*, complemented by the Catalan law *Llei 8/1987, de 15 d'abril, Llei Municipal I de Règim Local de Catalunya*. In article 63 of this law, the municipality was endowed with the duty of water supply, sewerage, and wastewater treatment. The article 64 added that the municipality alone or associated must provide these services; the Generalitat could perform these services in extreme cases (art.65). The management of the water supply could be by direct or indirect (concession) management.

[130] *Llei 7/1987, de 4 d'abril, per la qual s'estableixen i regulen actuacions públiques especials en la conurbació de Barcelona i en les comarques compreses dins la seva zona d'influència directa*

[131] We recall that the CMB was born in 1974 as a Urbanism Metropolitan Commission, altogether with the Plan General Metropolitano [Metropolitan General Plan], though progressively acquired the duties of water supply, wastewater treatment, metropolitan transport, waste treatment, etc.

[132] La Vanguardia, Jueves 22 de Enero 1987, p.15, "Los grupos parlamentarios presentan 598 enmiendas a las proposiciones de ley de ordenación del territorio", Josep Gisbert

[133] La Vanguardia, Miércoles 11 de Marzo 1987, p.23, "Los municipios temen que tras la desaparición de la CMB no se garanticen servicios que ahora se prestan", Antonio Cerrillo

[134] La Vanguardia, 11 de Septiembre 1987, p.20, "Pasqual Maragall califica de 'espectáculo poítico' la prórroga concedida al funcionamiento de la CMB", Xavier Arjalaguer y Jaume V. Aroca

[135] The area includes: Badalona, Barberà del Vallès, Barcelona, Begues, Castellbisbal, Castelldefels, Cerdanyola, Cornellà de Llobregat, Esplugues de Llobregat, Gavà, l'Hospitalet de Llobregat, Molins de Rei, Montcada i Reixac, Montgat, Pallejà, El Papiol, El Prat de Llobregat, Ripollet, Sant Adrià del Besòs, Sant Andreu de la Barca, Sant Boi de Llobregat, Sant Climent de Llobregat, Sant Cugat del Vallès, Sant Joan Despí, Sant Just Desvern, Sant Feliu de Llobregat, Sant Vicenç dels Horts, Santa Coloma de Cervelló, Santa Coloma de Gramenet, Tiana, Torrelles de Llobregat and Viladecans.

[136] La Vanguardia, Martes 16 de Diciembre 1986, p.27, "La CMB desaparece y, en su lugar, se crean dos entidades metropolitanas", Josep Gisbert

The *Llei 4/1990*[137] converted the basic network, i.e. the supra-municipal water intake and treatment facilities, into a public service of the *Generalitat de Catalunya*, managed by the Generalitat-owned company *"Aigües Ter-Llobregat"*(henceforth ATLL). However, there was an exception: the water treatment plant of Sant Joan Despí was still owned by the SGAB, thanks to a 99 years concession granted by the Ministry of Public Works in 1953[138]. The SGAB also owned some facilities of the secondary and municipal networks (Perdigó 1999). It is also important to mention the *Llei 5/1990* of Hydraulic Infrastructures in Catalunya, because it created a specific tax devoted to the investment in Catalan public works: the *Canon d'Infrastructura Hidràulica* [Water Tax on Hydraulic Infrastructure]. In the same line, the creation of the *Departament de Medi Ambient* [Catalan Ministry of the Environment] was a key fact in the government of water in Catalunya.

Figure 4.16. Map of the municipalities included in the Corporación Metropolitana de Barcelona.

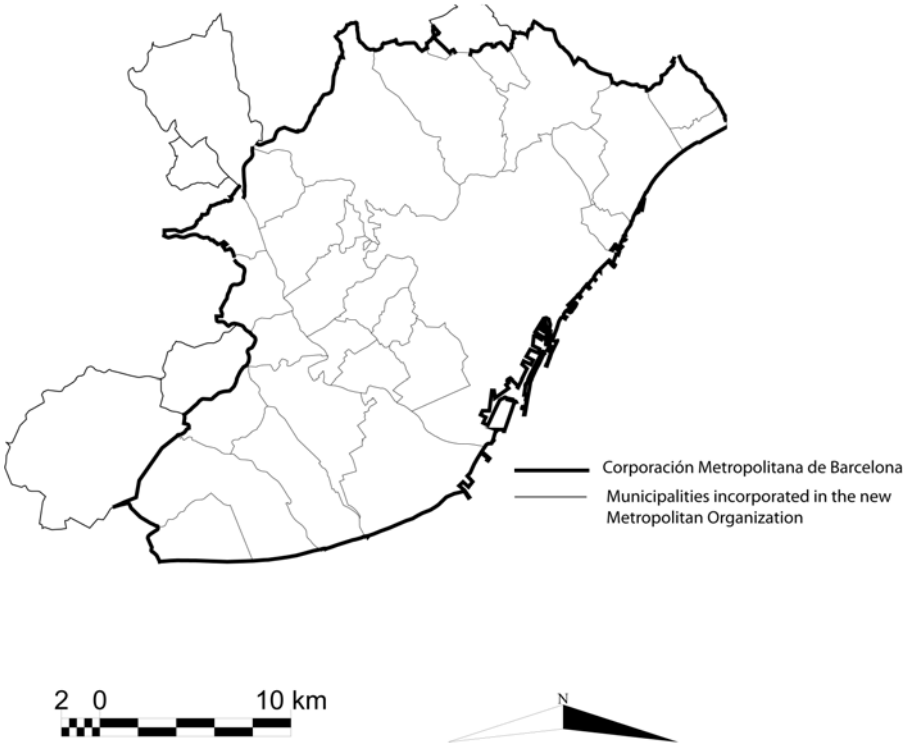
Source: own elaboration

The geographic scope of the metropolitan entities significantly changed from the original map of the CMB (figure 4.16). As we can observe in figure 4.17, the new body in charge of part of water supply issues enlarged its territorial reach (broken line) in comparison with the former CMB area (solid line). Five new municipalities

[137] *Llei 4/1990, de 9 de març, d'ordenació de l'abastament d'aigua a l'àrea de Barcelona. DOGC. Diari Oficial de la Generalitat de Catalunya, 23 Març 1990 (núm. 1271)*
[138] *Orden del Ministerio de Obras Públicas de 1 de junio de 1953*

were included: Torrelles de Llobregat, Barberà del Vallès, Sant Andreu de la Barca, Begues and Castellbisbal.

Figure 4.17. Different metropolitan organizations.



Source: elaborated from La Vanguardia, 16th May 1988, p.13

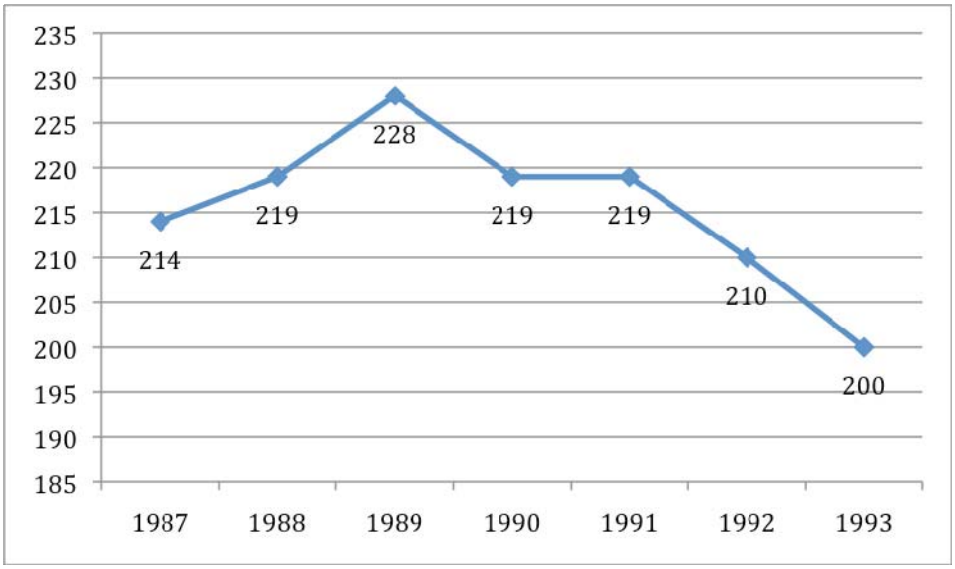
On the other hand, the secondary network, i.e. the pipes connecting the facilities of the basic networks with the municipal networks became a duty of the *Entidad Metropolitana de Servicios Hidráulicos y Tratamiento de Residuos* [Metropolitan Entity for the Hydraulic and Waste treatment services]. This metropolitan organism was in charge of overseeing the changes in the water supply arrangements in the metropolitan municipalities and approving water pricing schemes (to be subsequently authorized by the *Comissió de Preus de Cataluña* [Price Commission of Catalunya].

In 1991 the Metropolitan Area (EMMA) set water-pricing schemes that penalized high consumptions. Thus, consumptions over 48 m^3 per household on a three-month basis would be highly penalized. The weak point of such measure was that household size was not taken into account[139] as the so-called Barcelona water war later demonstrated.

[139] La Vanguardia, Lunes 5 de Noviembre 1990, p.23, "El Área Metropolitana aprueba una tarifa de agua que penaliza los consumos más altos", Antonio Cerrillo

Water demand began to decrease in 1991, until the levels of 1973 (Jové 1995). This could have been partially the outcome of the new pricing scheme change, or could be the result of the recurrent drought and the campaigns of water saving launched by the public administration and the water company at the end of the 1980s (figure 4.18)

Figure 4.18. Evolution of the water delivered by the SGAB to the Metropolitan area, 1987-1993.



Source: elaborated from data of La Vanguardia, 3rd December 1994, p.26

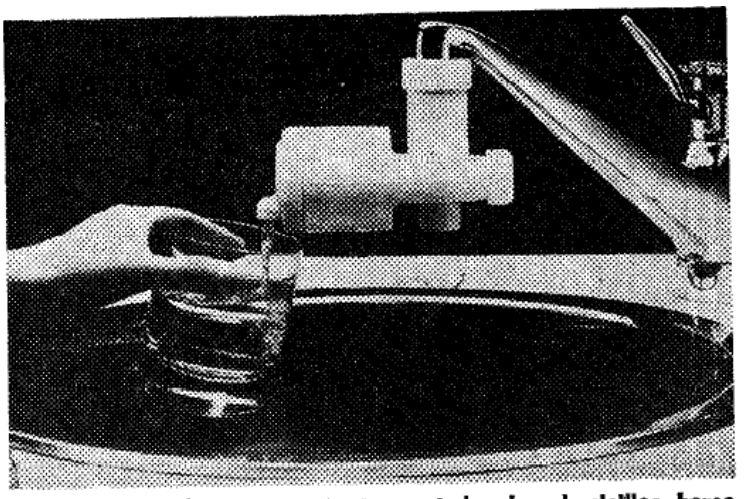
By 1993, consumption continued to drop, a fact attributed by the SGAB to the economic recession[140] affecting especially the manufacturing sector.

4.4.3 Water quality issues in the 1980s and early 1990s

Regarding quality concerns, in 1981 *La Vanguardia* alerted of the increasing bad taste and smell of Barcelona's water: "Tap water is of good quality in health terms, although its smell and taste are getting worse due to chlorine"[141]. The SGAB was afraid that the population ended up rejecting supplied water or as *La Vanguardia* warned (figure 4.19), forcing the installation of in-house treatment equipments: "If the situation does not improve, all households in Barcelona will soon have to install domestic water treatment equipments to make the water taste almost as water"[142]

[140] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré
[141] La Vanguardia, Martes 22 de diciembre 1981, p.22, "El agua que bebemos es sanitariamente buena, aunque cada vez huele más a cloro y sabe peor", our translation
[142] idem

Figure 4.19. Controversy around the quality of tap water in Barcelona.



De no mejorar las cosas, pronto en todos los domicilios barceloneses deberán instalarse aparatos depuradores domésticos para conseguir que el agua sepa, casi, a agua

Source: La Vanguardia[143]

Increasing pollution of Llobregat's surface waters, combined with the permanent situation of drought, were the main issues of water supply at the beginning of the 1980s. Salinity was the most important problem regarding water quality. The increasing salinity of the Llobregat (some 500 milligrams of Chloride per liter from the 1973 onwards, with peaks over 1,200 at the end of the 1970s[144], equivalent to 2 grams of common salt per liter[145]) was an alarming issue. In 1981, the Llobregat transported over 182,500 tons of dissolved salt each day to the sea[146]. To solve this problem, the *Departament de Política Territorial i Obres Públiques* of the *Generalitat de Catalunya* and the SGAB reached an agreement to build a brine drainage system (known as "*Colector de salmueras*"[147]). We recall that this project dated back to the Spanish Republican period. The Catalan public administration would advance the money (some 1,300 million pesetas[148]) while the SGAB would execute the project, which was already approved in 1976 by the Spanish Ministry of Public Works, although without financing. Again we can observe a close collaboration of the SGAB with the administration, developing public projects. In

[143] idem
[144] The existing legislation set a maximum threshold of 350 mg of Chloride per liter
[145] La Vanguardia, Sábado 11 diciembre 1982, p.22, "El colector de salmueras, a punto de ejcución. Reducirá la salinidad del Llobregat" by José María Milagro
[146] idem
[147] See also La Vanguardia 25-11-1970, 19-9-1973, 20-9-1978 or 16-4-1982
[148] idem

1983 the works to build the *Colector de Salmueras del Llobregat* were initiated thanks to the creation of the *Junta de Sanejament* of the Generalitat.

Common chemical pollutants such as organic matter, ammonia, nitrites, chlorides, bacteria, and more sporadic ones such as iron, manganese, chrome, mercury, bromides or cyanide compounds from the industry were the major challenges to water treatment[149]. Despite these problems it was stated that the water coming out from the treatment plant complied with the regulations established by the *Reglamentación Técnica Sanitaria* [Health technical regulations][150]. When the presence of toxic elements was considered too high, either dilution with aquifer water was carried out or else the plant stopped to draw water from the river[151]. By 1983 the water treatment of Sant Joan Despí, owned and managed by the SGAB had seven different processes to treat Llobregat's water: de-gritting, pre-coloration, flocculation, decanting, filtering with active carbon and post-coloration.

In 1984, the problem of poor water quality continued. A report on the Local Environment, published by the town council of Barcelona recognized the poor quality of water, although it pointed out that it was acceptable in health terms[152]. Even the SGAB, by means of the commercial director, José Luís Jové Vintro, recognized the poor quality of the waters captured from the Llobregat:

> "Today and until the brine collector is concluded within two years, water from the Llobregat, before being treated, is water highly polluted, to the point that we could state that is one of the few waters that despite its pollution is used for drinking purposes. It just requires taking a look to water from the river to realize its disgusting aspect; high indexes of smell, color, cloudiness, and the high percentage of solids in suspension and the presence of foams. Even treated water from the Llobregat has today unfortunately a high content of salts and organic matter, close to the threshold of health …"[153]

Some years later, in 1993, the president of the SGAB, Ricard Fornesa, would make such interesting statement regarding the high degree of pollution of Llobregat's water:

[149] La Vanguardia, Domingo 30 de Octubre 1983, p.25, "Los cloruros procedentes de Súria y Cardona y el elvado número de bacterias, lo más grave", F. Llorens Pascual
[150] *Real Dectreto 1423/1982*
[151] La Vanguardia, Domingo 30 de Octubre 1983, p.25, "Los cloruros procedentes de Súria y Cardona y el elvado número de bacterias, lo más grave", F. Llorens Pascual
[152] La Vanguardia, Sábado 29 de Diciembre 1984, p. 14, "El Ayuntamiento reconoce que la ciudad es 'muy ruidosa', pero carece de medios para impedirlo"
[153]La Vanguardia, Domingo 30 de Octubre 1983, p.25, "El agua del Llobregat es una de las pocas que, a pesar de su contaminación inicial, se aprovecha para beber", our translation

> "The first time I saw the water from the Llobregat entering into the treatment plant of Sant Joan Despí and after I saw that the water flowing out was drinkable, I recovered the faith in miracles" [154]

In 1986 Spain entered the Economic European Union, which meant a major adaptation of Spanish legislation to European law. Water was one of the multiple fields Europe could formulate Directives. Regarding water quality, the situation in Barcelona (as well as in other parts of Spain) was so critical that a moratorium to comply with European water quality directives was proposed[155]. Regarding quantity, the metropolitan area, with an allowance of some 250 liters per capita per day, complied with European parameters (in Spain the legislation mandated a minimum of 100 liters)[156].

In 1989, water quality worsened due to the long-standing drought[157] and also to the recurrent contamination[158] especially of the Llobregat river. Many citizens showed its discontent for the poor quality of water, discrediting the official explanations of such decrease and complaining about the price rises of the water company despite this poor quality (see below, in Spanish).

> Desde hace aproximadamente un mes, el agua de Barcelona resulta un producto de color amarillo, olor y sabor nauseabundo. Uno se pregunta si lo que pretende la Sociedad General de Aguas de Barcelona es que haya una intoxicación masiva de personas para empezar a tomar medidas. En cuanto a que las aguas de los pantanos se corrompan y queden inservibles cuando haya sequía, obliga a pensar que por alguna parte hay demasiada incompetencia y falta de previsión. Letters to the Editor, La Vanguardia, Barcelona 12th June 1989, p.4.

> Baje el señor alcalde, aunque sólo sea por una vez, de sus grandes proyectos de hoteles olímpicos, metros olímpicos, "patas" circulatorias olímpicas, etc., etc., y beba, aunque también sea en única ocasión, nuestra "pública" agua (con perdón), y comparta con los ciudadanos esta pequeña miseria que nos deja tan mal sabor de boca en 1989. La miel de los proyectos del 92 no nos endulzan la boca del 89, Letters to the Editor, La Vanguardia 12th June 1989, p.4.

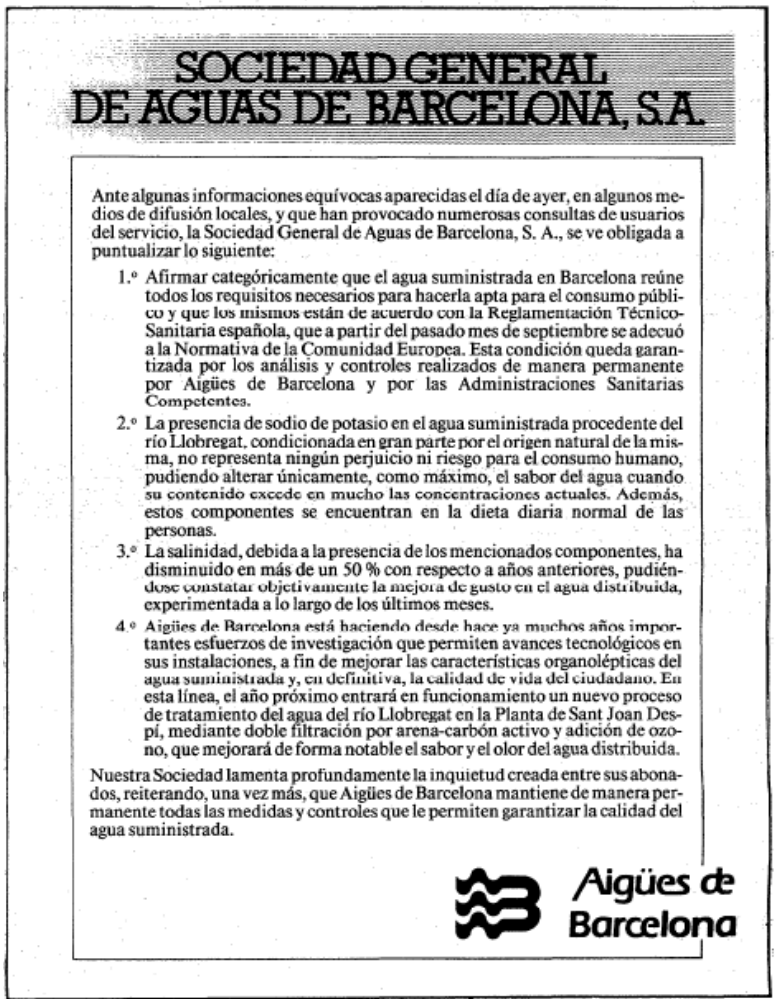
[154] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré, our translation
[155] La Vanguardia, Viernes 26 de Septiembre 1986, p.22, "La CEE estudiará la contaminación de las aguas en el área de Barcelona"
[156] idem
[157] La Vanguardia, 6 de Junio 1989, p.31, "La calidad del agua de Barcelona empeora a causa de la contaminación y del bajo caudal de los ríos", Antonio Cerrillo
[158] La Vanguardia, 22 de Junio 1989, p.29, "El escaso control de los vertidos a los ríos complica el tratamiento del agua potable en el área de Barcelona", Antonio Cerrillo

> Desde hace algún tiempo (aproximadamente dos meses en mi caso), nos suministran un agua, la Sociedad General de Aguas de Barcelona, que me gustaría me dijesen para qué sirve. Mi modesta opinión es que sólo es válida para fregar el suelo. Según opinión general, está pasando en toda Barcelona, y pobre del que la beba, pues además de ser imbebible por su olor y sabor nauseabundo (según comentario de un farmacéutico), está produciendo innumerables trastornos digestivos. Eso sí, las empresas que venden agua están haciendo su agosto. ¿Es que acaso tienen intereses en estas empresas personas relevantes que quieren enriquecerse aún más, a costa de los siempre perjudicados trabajadores?, La Vanguardia, Letters to the editor, "El mal gusto del agua de Barcelona", 4th June 1989.

There were even citizens that linked the poor quality of the water supplied by the SGAB with the bottled water business the company had started (see chapter 6)[159], as bottled water consumption was almost inevitable due to the bad taste of water[160].

[159] La Vanguardia, Letters to de Editor, "El mal sabor del agua de Barcelona" 12th June 1989, p.4
[160] La Vanguardia, Letters to the Editor, "El mal gusto del agua de Barcelona", 4th June 1989.

Figure 4.20. Public announcement of SGAB regarding the quality of water, 1991.



SOCIEDAD GENERAL
DE AGUAS DE BARCELONA, S.A.

Ante algunas informaciones equívocas aparecidas el día de ayer, en algunos medios de difusión locales, y que han provocado numerosas consultas de usuarios del servicio, la Sociedad General de Aguas de Barcelona, S. A., se ve obligada a puntualizar lo siguiente:

1.º Afirmar categóricamente que el agua suministrada en Barcelona reúne todos los requisitos necesarios para hacerla apta para el consumo público y que los mismos están de acuerdo con la Reglamentación Técnico-Sanitaria española, que a partir del pasado mes de septiembre se adecuó a la Normativa de la Comunidad Europea. Esta condición queda garantizada por los análisis y controles realizados de manera permanente por Aigües de Barcelona y por las Administraciones Sanitarias Competentes.

2.º La presencia de sodio de potasio en el agua suministrada procedente del río Llobregat, condicionada en gran parte por el origen natural de la misma, no representa ningún perjuicio ni riesgo para el consumo humano, pudiendo alterar únicamente, como máximo, el sabor del agua cuando su contenido excede en mucho las concentraciones actuales. Además, estos componentes se encuentran en la dieta diaria normal de las personas.

3.º La salinidad, debida a la presencia de los mencionados componentes, ha disminuido en más de un 50 % con respecto a años anteriores, pudiéndose constatar objetivamente la mejora de gusto en el agua distribuida, experimentada a lo largo de los últimos meses.

4.º Aigües de Barcelona está haciendo desde hace ya muchos años importantes esfuerzos de investigación que permiten avances tecnológicos en sus instalaciones, a fin de mejorar las características organolépticas del agua suministrada y, en definitiva, la calidad de vida del ciudadano. En esta línea, el año próximo entrará en funcionamiento un nuevo proceso de tratamiento del agua del río Llobregat en la Planta de Sant Joan Despí, mediante doble filtración por arena-carbón activo y adición de ozono, que mejorará de forma notable el sabor y el olor del agua distribuida.

Nuestra Sociedad lamenta profundamente la inquietud creada entre sus abonados, reiterando, una vez más, que Aigües de Barcelona mantiene de manera permanente todas las medidas y controles que le permiten garantizar la calidad del agua suministrada.

Aigües de Barcelona

Source: La Vanguardia, 28th February 1991, p.43

In 1989 the SGAB received 550 complaints regarding water quality (basically taste and smell). In 1990, according to the chemist in charge of the laboratory of water of SGAB, Lleonard Matia, that number plunged to 55[161]. It was argued that this improvement in water quality was due to the entrance in operation of the brine collector, halving the quantity of salts in drinking water[162, 163]. In the late 1980s SGAB introduced activated carbon as a new process in the Sant Joan Despí Treatment plant[164] in order to remove "new" micro-pollutants such as pesticides, hydrocarbons, chemicals, etc. The issue was so critical that even adds in the

[161] La Vanguardia, Domingo 3 de marzo 1991, p.48, Entrevista a Lleonard Matia Ribot, químico "El agua es el producto de consumo más y mejor controlado de Barclona", Antonio Cerrillo
[162] La Vanguardia, Miércoles 21 de Marzo 1990, p.33, "El agua de consumo humano procedente del Llobregat reduce al 50% su nivel de sal", Carles Sabater
[163] La Vanguardia, 22 de Octubre 1989, p35, "Un colector aliviará la contaminación del río Llobregat", p.35, C.Sabater y A. Cerrillo
[164] La Vanguardia, 20 de Mayo 1987, p.61, "Nuevas tecnologías para mejorar la calidad de las aguas de abastecimiento público", Dr. José I. Cuervo Argudín

newspaper appeared to clarify that the water supplied by the SGAB was drinkable (figure 4.20). Later, in 1992 new water treatments, ozone, complimentary to the existing ones were introduced in the Plant of Sant Joan Despí in order to reduce bad taste and smell of Llobregat's water[165, 166]. Very explicitly *La Vanguardia*, in an article describing the process to turn filthy Llobregat water into something drinkable, talked about "the daily miracle of obtaining drinking water from the Llobregat river"[167].

Despite the increasing treatments, some users continued to complain about the chlorine taste and odor, and the milky aspect of the water. In 1995, it was again promised to reduce chlorine in water[168]. By then, the connection between the two treatment plants (Abrera and Sant Joan Despí) considered as the "definitive solution to the problems of water supply"[169] was planned for 1990[170], but postponed until 1992, increasing the water supplied to Barcelona by 10 percent[171]. The pipe was finally finished in 1994, costing 4 times the initial budget. This cost was translated into the water bill of consumers of metropolitan Barcelona. Initially the plan of the already extinguished CMB was to control all the supply of bulk water by buying the plant of Sant Joan Despí at some point. However, the situation by 1994 was quite fragmented, with the Generalitat owning the Abrera treatment plant (and the Cardedeu treatment plant), the SGAB holding tight the Sant Joan Despí plant and the Metropolitan government owning the pipe networks connecting both[172]. This pipeline was largely underutilized (less than 10 percent of the capacity), partly because of the refusal of the SGAB to buy bulk water from Abrera, despite presenting higher quality than the water treated at Sant Joan Despí. Eventually, in 1999, the pipeline and the Fontsanta urban reservoir (together with the public firm

[165] La Vanguardia, Viernes 15 de Noviembre 1991, p.8, "El agua de Barcelona, depurada con ozono a partir de 1992", Carmen Pérez
[166] La Vanguardia, Domingo 12 de Julio 1992, p.31, "Aguas de Barcelona invierte 3.200 millones para reducir el mal olor y sabor del Llobregat"
[167] La Vanguardia, Jueves 9 de Julio 1992, p.23, "El tratamiento con ozono mejorará la calidad del agua de Barcelona", Antonio Cerrillo, our translation
[168] La Vanguardia, Miércoles 22 de Marzo 1995, p.30, "Barcelona reduce el cloro del agua del Llobregat", Antonio Cerrillo
[169] La Vanguardia, Sábado 31 de Enero 1987, p.19, "En Barcelona no serán necesarias las restricciones de agua, según Maragall"
[170] La Vanguardia, Domingo 22 de Marzo 1987, p.3, "El suministro de agua a Barcelona quedó normalizado durante la tarde de ayer"
[171] La Vanguardia, Viernes 1 de Marzo, p.27, "Barcelona incrementará un 10% el abastecimiento de agua el próximo año", Antonio Cerrillo
[172] La Vanguardia, Domingo 21 de Diciembre 1997, Vivir en Barcelona p.3, "El tubo de Abrera costó cuatro veces más de lo presupuestado"

SOGEMASA) was handed over to the Generalitat altogether with the built up debt[173].

4.4.4 The water wars in the Barcelona Metropolitan Area of the 1990s and the creation of the Catalan Water Agency

During the 1990s there was an important episode of social unrest and turmoil linked to the dramatic increase of water prices in some municipalities of the Metropolitan Area of Barcelona. This episode was known as the *Guerra de l'Aigua* [water wars in Catalan] and has already been studied (Tello 2000). It is important to mention that this event has not only importance *per se* but supposed the reconfiguration of the Catalan water administration and the birth of the *Agència Catalana de l'Aigua* [Catalan Water Agency].

As said, water prices in Barcelona, were highly regulated by the administration. Ricardo Fornesa[174], president de SGAB and *Corporación Financiera AGBAR*, argued that water price negotiations are easier under democracies than under dictatorship, since within the latter populist and dogmatic attitudes are common in issues involving public services[175]. In democratic Barcelona's water price is set according to economic audits, negotiated with the CMB, latterly with the EMMA, and approved by the *Comissió de Preus* [Price Commission] of the Generalitat. Negotiations, though, were and are sometimes important source of dispute between the private company and the price setting body.

For instance in 1995, the increase of "just" 2 percent the price of water, instead of the desired 4.8 percent of the company caused the fury of SGAB[176]. The metropolitan entity in charge of price regulation suspended the contract in force with the SGAB[177] that foresaw increases equal to the inflation. The Catalan price regulator, *Comissió de Preus*, backed the decision of the metropolitan entity, and the water price

[173] La Vanguardia, Miércoles 13 de Octubre 1999, Vivir en Barcelona p.3, "El infrautilizado acueducto de Abrera pasa a la Generalitat", Antonio Cerrillo
[174] Secretary-General of *La Caixa d'Estalvis i Pensions*
[175] La Vanguardia, Sábado 30 de Noviembre 1985, p.36, Interview to Ricardo Fornesa "La fijación de la tarifa del agua presenta menos problemas en la democracia que en la dictadura", Juan Hernández Puértolas
[176] La Vanguardia, Sábado 26 de Noviembre 1994, p.26, "La factura del agua de uso doméstico aumentará poco más del 2% en 1995", Jaume V.Aroca
[177] La Vanguarida, Viernes 25 de Noviembre, p.34, "Los municipios de Barcelona suspenden su contrato con SGAB"

increased only 2.5 percent[178]. The decisions of the administration, according to AGBAR, were becoming excessively politicized[179]. The pulse between the administration and SGAB and the metropolitan administration went on: when the company asked an increase of 7.6 percent for 1996, the EMMA only authorized some 3.4 percent[180, 181]. The increase authorized for the next year was even lower, 2 percent, despite the SGAB asked for an increase of 3.5 percent[182,183].

The "water war" had had not only an effect on the 'content' but also on the 'container', i.e. the structure of the water bill. The SGAB decided to distinguish the amount of money that was related to its services and the part related to taxes[184]. The Generalitat banned this practice[185] in order to avoid new episodes of conflict. Notwithstanding the existence of an increasing three block-rate tariff, the district attorney presented to the High Court of Catalunya a report denouncing that the pricing schemes of the SGAB went against the Spanish *Constitución* as they penalized large household sizes[186]. Blocks were set taking into account an average household size, which was against the article 14 of the *Constitución,* as households were receiving a different treatment in function of their size. Eventually, the Catalan High Court passed judgment on the need of the water company to modify the pricing schemes in order to withdraw the penalization to the families with 4 or more members[187].

Water supply in Barcelona, taxes apart, has historically been one of the most expensive of Spain. In 1993, for instance, for a domestic consumption of 175m^3 per

[178] La Vanguardia, Sábado 24 de Diciembre 1994, p.27, "La tarifa de suministro del agua subirá un 2,5%"
[179] La Vanguardia, Miércoles 31 de Mayo 1995, p.60, "Fornesa advierte de la excesiva politización de las decisiones de la Administración", Fèlix Badia
[180] La Vanguardia, Miércoles 22 de Noviembres, p.36, "El recibo metropolitano del agua subirá un 3,4% en 1996 para la mayoría de las familias", Jaume V. Aroca
[181] La Vanguardia, Viernes 22 de Diciembre 1995, p.34, "El precio del transporte público subirá por encima de la inflación en 1996", Jaume V. Aroca
[182] La Vanguardia, Miércoles 20 de Noviembre 1996, p.33, "El agua sube menos que las tasas incluidas en el recibo", Jaume V. Aroca y Lluís Sierra
[183] La Vanguardia, Jueves 19 de Diciembre 1996, p.35, "La Generalitat bendice las tarifas de bus y metro, pero retoca al alza el precio del agua", Jaume V. Aroca y Lluís Sierra
[184] La Vanguardia, Miércoles 15 de Mayo 1996, p.27, "Los recibos de la luz de los abonados de Enher serán más grandes, simples y claros"
[185] La Vanguardia, Viernes 15 de Mayo 1998, Vivir en Barcelona p.7, "La ley impedirá a las compañías dejar de cobrar el tributo del agua", Antonio Cerrillo
[186] La Vanguardia, Martes 24 de Septiembre, p.34, "La fiscalía critica la tarifa del agua"
[187] La Vanguardia, Miércoles 22 de Enero 1997, p.19, "El TSJC falla que no debe penalizarse el mayor consumo de agua de las familias numerosas", Francesc Peirón

year, the bill rose to 33,000 pesetas, while the average in Spain was 14,000[188]. Still, though water in Barcelona was the most expensive in the State, mainly because of taxes[189] (figure 4.21), it was 28 percent cheaper on average than European cities[190].

Figure 4.21. Taxes included in the water bill

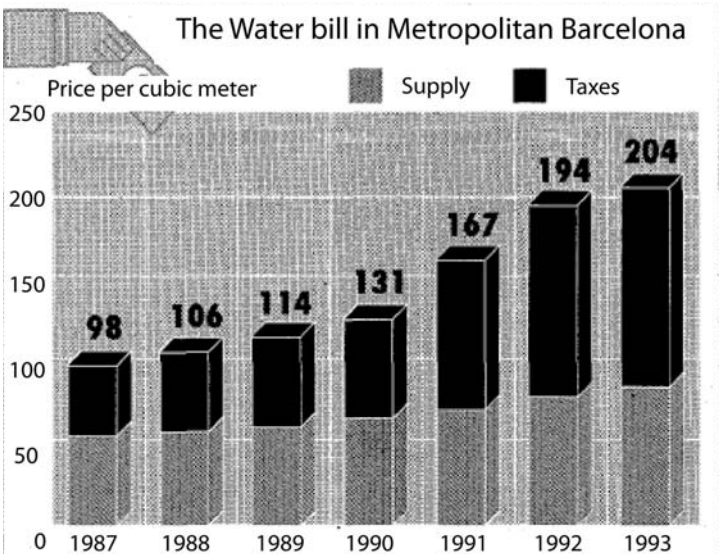
Supply complementary tax (*Tarifa complementària de subministrament*): collected by the Metropolitan body and addressed to fund works in the metropolitan area
Basic network tax (*Canon de la xarxa bàsica*): collected by the Metropolitan body, addressed to fund works related to supply.
Tax on waste management (Tamgrem): collected by the Metropolitan body, and not related to the water cycle.
Sanitation tax (*Taxa de sanejament*): collected by the Generalitat and aimed to finance the construction of wastewater treatment plants
Infrastructures tax (*Canon d'Infrastructures hidràuliques*): collected by the Generalitat, addressed to finance supply water works and flooding prevention. It has two blocks.
Tax on Added Value (IVA): collected by the State, charges 6 percent on the water bill

Source: adapted from La Vanguardia[191]

The sharp increase in taxes (figure 4.22), in the early 1990s set to comply with European wastewater law unleashed rage among the low-income neighborhoods of the Metropolitan area of Barcelona. There were different initiatives. For instance, in 1992, a neighbor's platform asked the company to charge them only the price of water excluding taxes, but the company refused[192]. Demonstrations were performed across the metropolitan area. For instance some 1,500 people in Hospitalet de Llobregat[193], 3,000 people in Badalona[194]. In that city, 7,000 families refused to pay the water bills[195].

[188] La Vanguardia, Miércoles 27 de Octubre 1993, p.31, "El agua corriente de Barelona es de las mejores de España pero también la más cara", Jesús Infiesta
[189] La Vanguardia, Jueves 7 de Septiembre 1998, p.24, "Los barceloneses pagan el precio del agua más caro de España", Antonio Cerrillo
[190] La Vanguardia, Sábado 9 de Mayo 1998, Vivir en Barcelona p.4, "El agua sale en Barcelona un 28% más barata que en Europa", Antonio Cerrillo
[191] La Vanguardia, Miércoles 23 de Febrero 1994, p.31, "La Generalitat exigirá el pago de la deuda para dar una salida al conflicto del agua", Jaume V. Aroca
[192] La Vanguardia, Miércoles 30 de Diciembre 1992, p.28, "Aguas de Barcelona rechaza que se paguen recibos sin tasas"
[193] La Vanguardia, Miércoles 25 de Noviembre 1992, p.28, "Manifestaciones en l'Hospitales y Gavà contra los impuestos", Carles Mestres
[194] La Vanguardia, Jueves 29 de Octubre 1992, p.33, "Tres mil manifestantes en Badalona contra las cargas fiscales del recibo del agua", Jaume V.Aroca
[195] La Vanguardia, Viernes 30 de Octubre 1992, p.30, "Siete mil familias retiran la domiciliación de los recibos del agua en Badalona", Jaume V.Aroca

Figure 4.22. Evolution of the water supply price and the water taxes,1987-1993.



Source: Adapted from La Vanguardia, 3/12/94, p.26

In 1993, over 35,000 families in the metropolitan area refused to pay the water bill[196]. Demonstrations went on, for instance 2,000 people demonstrating in Badalona the same year[197]. Those families were willing to pay for the water but not for the taxes. Hence, decided to pay the charge of the service into a bank account managed by the platform of associations. This amount served as financial support to avoid the cut-off by the company; in fact the SGAB promised not to cut-off the water to those who joined the protest. Some representatives of the neighbors saluted the exemplary behavior of the company during the protests:

> "Aguas de Barcelona has had a gentlemanly attitude. They know that the law does not allow them to partially charge for water, and the guarantee we presented is sufficient to avoid cut-offs. Aguas is not the bad character of the film, it is just the disagreement of the administrations", Alfredo Vela, Platform of neighbors[198], our translation

In 1994, however, the opinion regarding the company had slightly varied, at least in some zones of the city of Barcelona. For instance, the *Federació d'Associacions de Veïns de Barcelona* (FAVB) [Barcelona's Federation of neighborhood associations]

[196] La Vanguardia, Jueves 24 de Junio 1993, p.32, "El Síndic de Greuges fuerza un diálogo para frenar la rebelión contra el recibo del agua", Antonio Cerrillo
[197] La Vanguarida Martes 23 de Noviembre 1993, p.30, " Masiva manifestación contra las tasas del agua en Badalona", Jaume V. Aroca
[198] La Vanguardia, Jueves 24 de Junio 1993, p.32, "El Síndic de Greuges fuerza un diálogo para frenar la rebelión contra el recibo del agua", Antonio Cerrillo

complained about the recurrent cut-offs of water in the popular districts of Nou Barris and Sant Andreu[199], where participation in the "*Guerra de l'Aigua*" was large.

In 1994, the *"Guerra de l'Aigua"* had engaged some 5 percent of the 1.1 million clients of the SGAB, i.e. over 60,000 households[200], especially those living in the periphery of Barcelona. By then, 32 months after the protest exploded, a debt of 570 million pesetas with the SGAB has been contracted[201]. The Generalitat recognized a lack of pedagogy in explaining the costs implicated in the water cycle[202]. In that sense, a response to the conflict the administration offered to modify the tax on infrastructure in order to favor people with low incomes[203]. With this movement, it seemed that the conflict was reaching its end[204]. In September 1994 an agreement between the government, the political parties and other stakeholders was reached. However, the most active platforms refused the agreement and called for continuing the 'rebellion'[205].

In the draft of the law *Ordenació i Gestió de Recursos Hidràulics* of the Generalitat in 1997, it was proposed to internalize in the price the tax on waterworks, so those directly charged would be the water companies instead of the users[206]. The tax would shift from supplied water to bulk water, even though the user would finally pay the cost. In 1998 the Generalitat decided to unify the jurisdiction over the water cycle in a single agency, the *Agència Catalana de l'Aigua* [Catalan Water Agency, ACA]. Until then, the interventions in the water cycle were split into the regional Ministry of the Environment (with the *Junta de Sanejament*) and Ministry of *Política Territorial* (*Junta d'Aigües* and *Aigües Ter-Llobregat*). The greens (ICV), then in the

[199] La Vanguardia, Domingo 30 de Enero 1994, p.43, "Protesta ante la Sociedad de Aguas de Barcelona"
[200] La Vanguardia, Sábado 3 de Diciembre 1994, p.26, La Vanguardia, "La compañía Aguas de Barcelona ya abstece a la mitad de la población de Cataluña", Jaume V. Aroca
[201] La Vanguardia, Jueves 24 de Febrero 1994, p.28, "Los vecinos pagarán todo lo que deben por el recibo del agu si se logra un acuerdo"
[202] La Vanguardia, Domingo 27 de Febrero 1994, p.38, Entrevista a Josep Maria Culell, conseller de Política Territorial "Habrá facilidades, pero los recibos atrasados del agua deben pagarse"
[203] idem
[204] La Vanguardia, Martes 22 de Febrero 1994, p.31, "La Generalitat y los vecinos aproximan sus posiciones en "la guerra del agua""
[205] La Vanguardia, Viernes 30 de Septiembre 1994, p.31, "Las entidades que más han animado la "guerra del agua" se resisten al pacto"
[206] La Vanguardia, Sábado 31 de Mayo 1997, Economía y Negocios p.7, "Agua: bajo precio, mucho valor y excesivo lío", Jordi Goula

opposition, asked even to take over the supply system owned by Aguas de Barcelona[207].

The so-called "water wars" of Barcelona could lead to different interpretations, as Masjuan et al. (2008) pointed out. Thus, while for some it may be an example of a popular view stating that water must be a universal basic service accessible to everybody, other stances could stress the irresponsible nature of the protest since wastewater treatment was fundamental for the improvement of the much deteriorated river network of the Barcelona area, one of the most polluted in Europe. Eventually, for authors such as Tello (2000) the water wars reflect a kind of socio-ecological conflict that showed the difficult access to water at affordable prices by some urban groups.

4.4.5 Drought alarms in the 1990s: pushing transfers forward

Drought alarms were raised again in 1990, with water restrictions for summer lurking large[208]. The headline of *La Vanguardia* was very explicit: *"Barcelona tiene reservas de agua para solo un trimestre"* [Barcelona has water stored for just three months][209].

The drought periods of the 1990s not only in Barcelona but also in the whole Spanish territory brought back the proposal to transfer water from the Ebro river. As a result in 1993 the Socialist government elaborated a new National Water Plan. Water planning in Spain has been always a contested issue, being the last national water plan enacted in 1933. The National Water Plan of 1993 considered both the saving and reutilization and the production of new resources, but especially the 'correction of hydrologic imbalances" within Spain (Baltanas 1995). We could draw some parallelisms with the Water Plan of Catalonia of 1957 in the sense that both saw rivers in the same way: "a system of interconnected networks with water flowing according to existing 'deficits' and 'surpluses' in the different basins" (Masjuan et al. 2008:434). According to this plan "the Spanish territory was unbalanced in hydraulic terms" with "basins with the surplus water that other basins need, which is wasted

[207] La Vanguardia, Jueves 5 de Marzo 1998, Vivir en Girona p.6, "El Govern agrupa en una agencia las competencias sobre el agua", Antonio Cerrillo
[208] La Vanguardia, Jueves 22 de marzo 1990, p.1 "Restricciones en junio si no llueve antes"
[209] La Vanguardia, 10th January 1990, p.19

away to the see without any use"[210]. Briefly, this plan estimated that some 5,000 hm^3 per year could be transferred to other basins in deficit.

Despite the plan was approved by the Spanish government, the *Consejo Nacional del Agua*[211] [National Water Council] demanded a *Plan Nacional de Regadíos* [National Plan on Irrigation], the *Libro Blanco del Agua* [Government White Paper on Water] and the basin water plans, before finally approving the National Water Plan. This plan also faced the opposition of the conservative party in the opposition, preferring by then desalination, as it was a less costly and less traumatic option[212]

> "Water transfers [...] transfer not only water but also development, economic power, and therefore, political power, which is going to generate a new model of territorial organization more unequal and less balanced and solidary than the current one", Clemente Sanz Blanco, senator for Segovia of the Partido Popular, *El Norte de Castilla*, 27th December 1993, quoted by Del Moral Ituarte (2004)

Eventually, according to the socialists running the government this plan was never developed because of the tensions of four years of drought and the political situation[213]. In 1996 the conservatives won the elections and this plan was eventually shelved, although the idea to transfer water from the Ebro would be reopened in 2001 with another National Water Plan.

In parallel to the Spanish water debate around water planning, the conservative Catalan government had been negotiating since 1995 the transfer of water from the Rhone river in France with the company *Societé Mixte d'Aménagement du Bas-Rhône et du Languedoc.* Some 350 hm^3 per year were to be transferred to Barcelona through an aqueduct 330 kilometers long. Nonetheless, the reluctance of the Spanish government to approve this project combined with its high costs left the Rhone project standing.

The drought alarms were raised again in 1998[214]. In 1999, the drought continued, and allusions to the drought of 1989-1990 were made, even posing the possibility of cut-

[210] *Anteproyecto de Ley de Plan Hidrològico Nacional de 1993*, our translation
[211] The *Consejo Nacional del Agua* is the maximum advisory board regarding water planning in Spain. It has to deliver prescriptive reports on the projects of National Water plans, basin water plans or other project of water planning of general interest.
[212] Abc, Domingo 2 de Marzo 2008, p.22, "Cuando los socialistas querían el trasvase", Ángel Puerta
[213] idem
[214] La Vanguardia, Viernes 18 de Diciembre 1998, Vivir en Girona p.5, "Los pantanos del Llobregat y la Muga bajan a niveles alarmantes", Daniel Ramírez

offs. Interestingly, when talking of the most wasteful uses, the public administration mentioned toilet baths, not even mentioning outdoor uses, already widespread[215].

The controversial modification[216] of the water law of 1985 in 1999 opened water concessions to market exchanges, inspired in the California water market experience (though liberalization was partial and the State oversaw the process).

4.4.6 Demand side management in the SGAB?

Although we can argue that the interest by SGAB to participate in water saving campaigns responds to the need to ensure the very nature of their business, we should also admit the existence of certain environmental discourse by the mid 1980s. Thus, the SGAB in a business report of 1985[217] mentions its "spontaneous aim" to "make compatible economy with ecology". They do so by "trying to give back to nature the elements, previously withdrawn, in the closer state to their original conditions"[218].

In the 1990s, the president of SGAB, Ricard Fornesa, already showed (at least in public declarations) an incipient demand side management discourse. For instance in the context of an international seminar on water economy in Barcelona in 1993 he emphasized[219]:

- The need to create a proper land use planning and policy linking water and urbanization
- Reutilization of water and leakage repair
- Pollution prevention in order to obtain new sources
- Application of strict criteria for the new agricultural water concessions
- Establishing proper financial mechanisms to regulate demand

In addition, he positioned himself against water transfers: "In principle I am against water transfers and the interruption of river streams", he answered when we was

[215] La Vanguardia, Lunes 22 de Marzo 1999, Vivir en Barcelona p.5, "Cataluña tiene reservas de agua hasta otoño, según el conseller de Medi Ambient", our translation
[216] La Vanguardia, Sábado 8 de Mayo 1999, p.27, "El Gobierno liberaliza la compra y venta de agua en una controvertida reforma de la ley", Carlos Novo y Antonio Cerrillo
[217] La Vanguardia, Domingo 7 de Julio 1985, p.53, Business brief report, "Sociedad General de Aguas de Barcelona, S.A. Juntas Generales ordinaria y extraordinaria de accionistas"
[218] Our translation
[219] La Vanguardia, Sábado 29 de Mayo 1993, p.31, "Los expertos piden que se acabe el derroche de agua agrícola para combatir la sequía", Antonio Cerrillo

asked his opinion about the need to transfer water from the Ebro river. He added: "the final needs requiring the transfer of water from the Ebro depend, in principle, of the land development policies of the future and the prioritization of the different uses of water. We squander a lot of water"[220]. Some years later, in 2003 his opinion was slightly different when asked for the Rhone transfer: "we have to be very cautious regarding water transfers, because they constitute an aggression to nature", however, the transfer of water from the Rhone "is not a bad option; we should study this project in depth, which could free water from the Ebro"[221].

The role of price in curbing demand is increasingly presented as an effective tool both to rationalize water consumption and to cover infrastructure costs more quickly[222]. The president of the group reflected on the lack of awareness the citizens had regarding the economic value of water:

> "An essential product such as water could not be cheap… The consumer is not aware of the economic value of water. The water that comes out of the tap has to be stored, conducted, treated, transported and delivered to every consumer's home. The infrastructures required to do so are very costly in financial terms. The consumer has not become aware of the economic value of water", Ricard Fornesa, president of Aguas de Barcelona[223]

However, this was in apparent contradiction to the interests of the company to sell increasing quantities of water. The decrease of aggregate demand in Barcelona (some 4 percent), and especially of industrial consumption (over 15 percent), was bad news for the shareholders[224].

> "The drought could not be avoided investing in infrastructures. But [it could be avoided] its effects. Financial resources and water resources management has to be optimized to guarantee the supply", Josep Lluís Jove, Director General de Aguas de Barcelona[225], our translation

[220] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré, our translation
[221] Words by Ricard Fornesa, La Vanguardia, Miércoles 26 de Febrero 2003, p.63, "En línea. AGBAR. Fornesa no ve mal el trasvase del Ródano", our translation
[222] La Vanguardia, Sábado 30 de Enero, p.5 (Economía y Negocios), "Que hacer para evitar los despilfarros"
[223] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré, our translation
[224] La Vanguardia, Domingo 30 de Mayo 1993, p.79, Sismograma, Feliciano Baratech
[225] La Vanguardia, Martes 19 de Enero 1993, p.22, Encuesta "¿Se ha invertido suficientemente para evitar las sequías en España?"

This answer was given to *La Vanguardia*, when asking different mayors, private managers or engineers whether enough had been done in Spain to prevent drought episodes. All the remainder answers were totally different: more infrastructures had to be built in order to fight this problem. Such "environmental concerns" granted the SGAB an award from the important Spanish business magazine "Dinero" in 1993[226].

In 1997 several private firms, among them Aguas de Barcelona, constituted with the Generalitat and the municipality of Barcelona the foundation *Foro Ambiental* in order to make compatible industrial development and environmental protection and to promote industrial ecology[227].

In the context of the restoration and protection of local aquifers[228], SGAB developed a project to decontaminate, recover and treat groundwater flows from the most polluted basin in Catalunya: the Besòs. This third "tap" would provide some extra cubic hectometers (15 hm^3 per year) for Barcelona's supply[229].

4.4.7 The Ebro again in the debate: the *Plan Hidrológico Nacional* (PHN) of 2001

The National Water Plan of 1993 of the Socialist government was finally defeated and abandoned after the Conservative victory of 1996. However, this demise did not end the imaginary of wet and dry Spain. What is more, the Ebro became the banner again of new National Water Plan[230], this time proposed by the conservatives. The core of the plan included the transfer of some 1,050 hm^3 to Eastern and Southern Spain, with blossoming tourist developments and water-demanding agriculture, as well as to urban Barcelona. The former zones would receive up to 80 percent of the water while Barcelona would obtain the remainder. The Spanish minister of the Environment responsible for the National Water Plan of 2001 warned that within two

[226] La Vanguardia, Jueves 24 de Junio 1993, p. 59, "Codorniu, Freixenet y Aguas de Barcelona premiados por "Dinero""
[227] La Vanguardia, Jueves 5 de Junio 1997, p.32, "Empresas y entidades crean la Fundación Foro Ambiental"
[228] La Vanguardia, Jueves 2 de Marzo 1995, p.22,"¿Qué medidas adoptaría para afrontar los efectos de una sequía prolongada?", answered by Josep M. Miralles, Director de explotaicon de AGBAR
[229] La Vanguardia, Martes 16 de Mayo 2000, Vivir en Barcelona p.1, "Del Besòs al grifo", Antonio Cerrillo
[230] *Ley 10/2001, de 5 de julio, del Plan Hidrológico Nacional*

years (that is, in 2003-04) Barcelona would lack water if the water transfer from the Ebro was not carried out [231].

As it happened in 1975 when the first proposal to transfer water from the Ebro was proposed, the PHN of 2001 generated much social opposition. This time, however, the capacity of social mobilization was much higher and the structure of Spain, organized in *Comunidades Autònomas* [Spanish regions], was quite different. Not only conflict between political parties at the national level occurred but also confrontation between water donor and water receiving regions exploded. The participation of civil society was astonishing. For instance, the *Plataforma per la Defensa de l'Ebre* [Platform for the Defense of the Ebro], a coalition of civic groups of the lower Ebro valley and Ebro delta, were able to gather some 400,000 citizens in the streets of Barcelona in a demonstration in 2002 against the water plan. Similar protests took place in Madrid or Zaragoza and also a 'Blue march' towards Brussels from Aragon, spreading the claim in France, Germany, the Netherlands and Belgium, was organized between 2001 and 2002.

In addition, the opposition to the plan was backed by most of the academic and scientific community. From the continuous dialogue between the social movements and the scientific community the movement known as the *Nueva Cultura del Agua* [The New Water Culture] was born. This movement was institutionalized with the creation of a foundation with a large presence of water experts and opened to citizens in order to serve as a forum for deabting water issues.

As Masjuan et al. (2008) argue, the opposition towards the transfer put together three different rationales:

a) The access to water as a fundamental right for both humans and non-humans

b) The local and regional identity forged historically around water

c) The eco-social characteristics of water, not reducible to simple economics

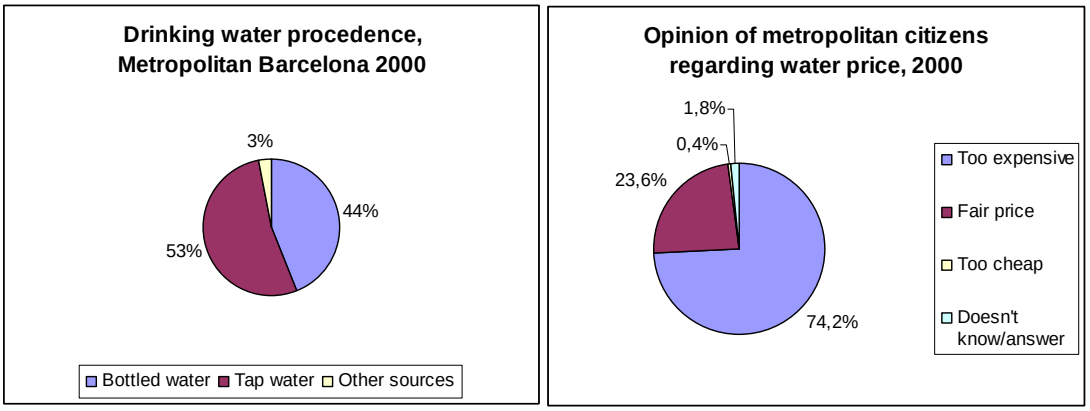
Eventually, the lack of economic support from the European Union, the European Water Framework Directive and especially the socialist takeover in the Spanish elections of March 2004 brought about a major shift in water politics.

[231] La Vanguardia, Martes 12 de Junio 2001, p.1, "Matas vaticina que en 2 años faltará agua en Barcelona si no hay trasvase"

4.4.8 Poor water quality and drought in the 21st century: a never-ending story

Bad taste continued to be a major issue of Barcelona's water supply, until the point that by 2000, almost half of the population did not drink tap water (figure 4.23). Even though most citizens, according to a survey carried out by Aguas de Barcelona, recognized an outstanding service, also most of them found water too expensive (figure 4.24). In part because of increasing fears from risks related to food supply (foot and mouth disease, mad cow disease, carcinogenic compounds in olive-pomace oil, etc.) the high concentrations of trihalometanes, THM (carcinogenic compound) in Barcelona's water supply had an impact on local media[232,233] and population (despite that the presence of such compounds in water supply is know since 1974[234]). SGAB began to partially apply a new water treatment with chlorine dioxide that did not produce THM in the treatment plant of Sant Joan Despí[235].

Figure 4.23. Drinking water origin, Metropolitan Barcelona, year 2000/Opìnion of metropolitan citizens regarding water price, 2000.[236]



Source: own elaboration from Aguas de Barcelona (2000). Encuesta de Aguas de Barcelona. Barcelona; La Vanguardia[237] and Barcelona Metropolis Mediterrània

One of the arguments developed by the Spanish government in 2004 (before the elections) in favor of the Ebro transfer was the poor quality of Barcelona water and

[232] La Vanguardia, Domingo 28 de Octubre 2001, p.32, "El año que vivimos peligrosamente"
[233] La Vanguardia, Jueves 6 de Septiembre 2001, p.23, "La cloración causa 600 muertes al año", Josep Corbella
[234] idem, p.24, "Efectos colaterales de la cloración", Antonio Cerrillo y Josep Corbella
[235] La Vanguardia, "Viernes 7 de Septiembre 2001, p.1, "Aguas de Barcelona prueba un sistema sin residuos cancerígenos"/p.21 "AGBAR reducirá el cloro al tratar el agua", Josep Corbella
[236] Cerrillo, Antonio (2001). "Els barcelonins tanquen l'aixeta". *Barcelona Metròpolis Mediterrània*, 55. Available at http://www.bcn.es/publicacions/bmm/55/ct_reportatge.htm. Last accessed 22nd september 2009.
[237] La Vanguardia, Viernes 27 de Abril 2001, Vivir en Tarragona p.5, "La mitad de la población no bebe agua del grifo por su mal sabor", Antonio Cerrillo

high cost of buying bottled water. Thus, according to the Spanish minister of the Environment:

> "Situations like that of Barcelona, where over 75 percent of the population does not use tap water neither to drink nor to cook, are not tolerable", Elvira Rodríguez, Spanish minister for the Environment in 2004 (before the elections of March 2004)[238], our translation

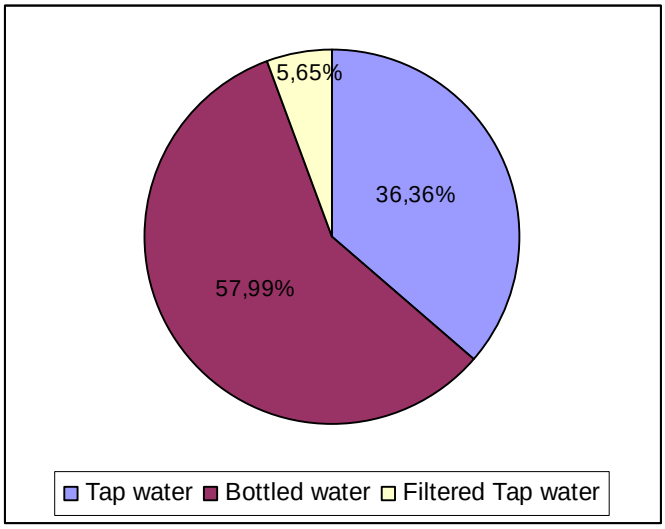
According to minister, good drinking water quality would suppose a saving of 600 Euros per year per family. AGBAR, challenged these figures, and lowered to some 50 percent people buying bottled water, and just 16 percent those not using tap water to cook. In addition, the company remarked that water directly consumed for human metabolism represented just 1.5-2 percent of the 129 liters per capita and day (lpcd) of average consumption. Elsewhere, *La Vanguardia* heralded the dramatic increase of bottled water consumption in Spain (some 40 percent increase in 5 years; and 80 percent for the period 1996-2006). Concretely, according to the Catalan Water Agency, over half of the population of the metropolitan area of Barcelona did not drink tap water due to its poor quality and also to changing lifestyles. The phenomenon of bottled water commodification and fetishization has been traced by several scholars especially from consumer culture studies and anthropology (Opel 1999, Wilk 2006, De Wolff 2007, Kaplan 2008). However, despite the critiques to the quality of tap water in Barcelona, nutrition and health experts, insisted that tap water in the metropolitan area was one of the most controlled and monitored products[239]. In parallel to the ascendancy of bottle water a new phenomenon took hold of some households: in-home reverse osmosis systems and filtering pitchers. In the Metropolitan Area of Barcelona, in 2006, over 5 percent of drinking water for human intake came from such systems[240] (figure 4.24).

[238] La Vanguardia, Miércoles 4 de Febrero de 2004, p`. 33, "Aguas de Barcelona replica los argumentos del Gobierno a favor del trasvase", Antonio Cerrillo

[239] According to Abel Mariné, professor of Nutrition and Bromathologie of the Universitat de Barcelona, quoted in La Vanguardia, Miércoles 17 de Octubre 2007, p.28-29, "Más botella que grifo", Antonio Cerrillo

[240] La Vanguardia, Jueves 18 de Octubre 2007, p.36, "El 5% del agua que se bebe ya es filtrada", Antonio Cerrillo

Figure 4.24. Water consumption for drinking, Metropolitan Area of Barcelona, 2006**.**



Source: Own elaboration from data from the Agència Catalana de l'Aigua quoted in La Vanguardia 18/10/2007

Agreement between the EMMA and AGBAR to "do the most with available resources" once the transfer from the Ebro was politically and socially rejected[241] meant recovering the Besòs and Llobregat wells. A pack of projects, including the desalination plant of El Prat de Llobregat, to improve water quality in Barcelona followed. Stress was put on the decrease of toxic substances in the water, among them trihalometans[242].

"Agua con sabor a agua" [Water with taste of water]; with this headline *La Vanguardia* referred to the improvements in the Abrera treatment plant and the arrival of desalted water by 2009 to "solve once for all " the problem of quality of metropolitan water supply[243]. In 2006, the levels of trihalomethans in the supply network were around 105 micrograms per liter, below the legal threshold (150 micrograms); however, stricter legislation by 2009 would set this limit in 100 micrograms. This is why the installation of new filters was necessary[244]. The extension of the Abrera water plant not only would bring about quality improvements through the new filtering systems, but also an increase of the water

[241] La Vanguardia, Jueves 4 de Noviembre 2004, Vivir en Barcelona p.6, "El recibo del agua subirá un 5% en el área metropolitana", Antònia Justicia
[242] La Vanguardia, Jueves 24 de Febrero 2005, p.34, "Una desaladora en El Prat y otros 13 proyectos mejorarán la calidad del agua en Barcelona", Antonio Cerrillo
[243] La Vanguardia, Martes 10 de Octubre 2006, Vivir en Barcelona p.1, "Agua con sabor a agua", Antonio Cerrillo
[244] La Vanguardia, Martes 10 de Octubre 2006, Vivir en Barcelona p.2, "La mejora definitiva de la calidad del agua llegará con la desalinizadora, en el 2009"", Antonio Cerrillo

treated: from 90 to 120 hm^3 per year (some 20 percent of the consumption of the metropolitan region). The increase of the water captured theoretically was not to decrease ecological flow because farmers of the Llobregat delta agreed to use reclaimed water from the wastewater treatment plant. AGBAR installed filters to combat triaholomethans in the Sant Joan Despí Treatment Plant[245].

The debate around the thrialomethane content in domestic water was far from being shelved. A headline of *La Vanguardia* read "Agua bajo sospecha"[246] [Water under suspicion] to refer to problematic of thrialomethans presence in water supply over the legal limits in some parts of the city (affecting some 130,000 people of Les Corts, Pedralbes, Poble Sec and Ciutat Vella). The problematic water was that coming exclusively from the Llobregat river. Both the water company and the *Agència de Salut Pública* [Public Health Agency of Barcelona] assured that health risk did not exist. Eventually in 2009 new filters[247] were installed in the treatment plant of Sant Joan Despí (reverse osmosis) and Abrera treatment plant (*electrodialisis*) to improve the quality of waters and especially fight trihalomethanes (especially to cope with the European legislation to reduce these pollutants by 2009).

Spain was undergoing in 2005 the worst period of drought of the last 60 years[248]; in Catalonia rains had fallen by 44 percent (in comparison with 2004)[249]. Water restrictions loomed large for urban uses again in 2005 despite domestic consumption plunging 11% in summer[250]. For uses such as agriculture, golf courses or electricity production restrictions already took place in June[251]. The *Decret de Sequera 2005 (Decret 93/2002 de 17 de maig*) forced to increase groundwater extraction, especially

[245] La Vanguardia, Sábado 26 de Febrero 2005, p.33, "Guerra a los compuestos químicos en el agua", Antonio Cerrillo

[246] La Vanguardia, Martes 20 de Noviembre 2007, Vivir p.1-2, "Agua bajo sospecha", Antònia Justícia

[247] La Vanguardia, Martes 11 de Marzo 2008, Vivir en Barcelona p.6, "Cura de shock para tratar los caudales del Llobregat", Antonio Cerrillo

[248] La Vanguardia, Sábado 30 de Abril 2005, p.1, "España padece el periodo de sequía más grave en 60 años"/La Vanguardia, 16 de Mayo 2005, p.29, "España cierra el grifo del agua", Antonio Cerrillo/La Vanguardia, Miércoles 8 de Junio 2005, p.1, "Los ríos españoles pierden más del 40% de su caudal"

[249] La Vanguardia, 3 de Junio 2005, p.36, "Las lluvias de los últimos nueve meses se han reducido un 44% respecto al 2004"

[250] La Vanguardia, Miércoles 18 de Mayo 2005, p.31, "Las últimas lluvias no bastan", Antonio Cerrillo/ La Vanguardia, Miércoles, 8 de Junio 2005, p.31, "Menos presión para ahorrar agua", Antonio Cerrillo /La Vanguardia, Martes 6 de Septiembre 2005, p.27, "El área metropolitana sufrirá restricciones de agua un día a la semana si no llueve", Antonio Cerrillo

[251] La Vanguardia, 3 de Junio 2005, p.1. Primeras medidas de choque ante la sequía en Catalunya/p.35, "La sequía llama a las puertas de Barcelona", Antonio Cerrillo

from the Llobregat, AGBAR saw this as a threat to the sustainability of the aquifer (salinity problems). The Generalitat however, attributed the reluctance of AGBAR to overuse groundwater in emergency moments to its business interests and the company's poor infrastructure to treat groundwater[252]. AGBAR even asked their users to use less water in order to postpone/avoid domestic water restrictions[253].

The relations between AGBAR and the Catalan water regulator (the Catalan Water Agency, ACA) worsened due to disagreements in how to manage the drought (both coincided in the idea to bring water by ships but the Catalan administration rejected the proposal to bring it from the Ebro concession that Tarragona enjoyed); AGBAR offered to bring this water[254]. The Catalan government proposed to bring water from southwestern Spanish desalination plants[255]. Eventually AGBAR tried to calm down the debate[256]. On its part, the *Cercle d'Economia* reopened the debate around the need to transfer water from the Rhone River to "definitely solve the water problem"[257]. The proposal of considering the Rhone River, included in the study *El problema del abastecimiento del agua en Barcelona y su entorno*[258], was rejected by the Catalan government and instead the latter proposed to do the most with the resources of the basin. The *Cercle* saw desalination as an acceptable alternative that had to be smoothly implemented due to the high energy and economic costs.

The next chapter will take up again the issue of drought, focusing on the later episode suffered by Barcelona and presenting also an empirical case of how urbanization patterns may produce water scarcity. It will also deal with the "definitive" solutions to the "water problem" proposed for Barcelona: desalination.

[252] La Vanguardia, Miércoles 11 de Mayo 2005, p.27, "El Govern dice que AGBAR rechaza el plan antisequía por intereses", Antonio Cerrillo
[253] La Vanguardia, Miércoles 14 de Septiembre 2005, p.29, "AGBAR pide que se gaste menos agua para retrasar o evitar las restricciones domésticas", Antonio Cerrillo
[254] La Vanguardia, Sábado 8 de Octubre 2005, p.27, "AGBAR se ofrece para llevar agua del Ebro en barco a Barcelona y el Govern lo rechaza", Antonio Cerrillo/ La Vanguardia, Martes 10 de Mayo 2005, p.33, "AGBAR alerta que el plan del Govern contra la sequía empeorará la calidad del agua", Antonio Cerrillo/ La Vanguardia, Martes 11 de Octubre 2005, p.30, "Una flota en la guerra del agua", Antonio Cerrillo
[255] La Vanguardia, Viernes 9 de Septiembre 2005, p.28, "El Govern estudia transportar agua de desaladoras en barcos hasta Barcelona", Antonio Cerrillo
[256] La Vanguardia, Miércoles 12 de Octubre 2005, p.30, "Fornesa afirma que AGBAR no decidirá la procedencia del agua transportada en barco", Esteve Giralt
[257] La Vanguardia, Martes 22 de Noviembre 2005, p.32, "El Cercle d'Economia resucita el trasvase del Ródano a Barcelona y Milà lo rechaza", Antonio Cerrillo
[258] Dolz, Josep; Armengol, Joan. 2005. El problema del abastecimiento del agua en Barcelona y su entorno. Barcelona: Cercle d'Economia

5 Drought, desalination and suburbanization in Barcelona

In chapter 4 we presented the story of the urbanization of the water supply in Barcelona. We discussed the political debates and struggles over the nature of the water flow and its social control. We also focused on the reorganization of the water supply in Barcelona and its metropolitan area since the arrival of democracy. The remarkable feature in this case was how more layers in the government of the water flow appeared, reordering the existing choreographies of social power over the cycle.

As we have seen, Barcelona's water supply history has been ridden with conflicts regarding the ownership and control of the flow of water. Nonetheless, other more material problems, directly linked to the quality and the quantity of water punctuate this history and have shaped Barcelona water politics profoundly. Both the water quality problems, for instance those of the 1980s and 1990s reported in chapter 4, and the scarcity issues, have exerted a deep impact on the trajectory of the urbanization of the water supply. In turn, the uneven urbanization processes of the metropolitan area, presenting signs of suburbanization, has fed new water problems. We would argue that without this consideration of the suburban process, it is not possible to understand why current Barcelona's technologies of water management and water production are they way they are and why discourses over water availability are constructed in a given way and not another.

In this chapter we will analyze in depth the last, and probably the most critical, episode of water scarcity in Metropolitan Barcelona through a particular prism: the use of the daily press (concretely *La Vanguardia*) and the policy documents related to the episode of drought of 2007-2008. Once we have analyzed these discourses on the drought problem, we will bring to the fore the hegemony of desalination as the technology that will solve the "water problem of Barcelona" once and forever.

5.1 Introduction: Water and Urbanism

In the first chapter we saw how the urbanization process is critical to understand how the environment is mobilized and transformed to feed the urban metabolism. At the beginning of the 20th century Barcelona's region had its neuralgic centre in the city of Barcelona then having absorbed the neighboring towns. In the 1960s and 1970s an important migratory wave in the context of Franco's industrialization propelled a dense urbanization along the main axis of communication and the Llobregat and Besòs rivers.

The extreme densification of the Metropolitan Area of Barcelona reached in the 1960s and 1970s, combined with the democratization of the private car, are probably the most important factors that explain the massive proliferation of 'illegal' second homes throughout the Metropolitan Region of Barcelona. Thus it is estimated that from 1970 to 1986 some 20,000 hectares were urbanized (Rueda 2002).

In 1974, at the end of the Francoist regime the *Plan General Metropolitano* (PGM) [Metropolitan General Plan] was presented. It was definitely approved in 1976 and since then has served as a framework for all the urban transformation in Barcelona in the last 30 years (Capel 2007). This plan, together with the former *Plan Comarcal*[259] of 1953 (or even the *Plan Director del Área Metropolitana de Barcelona*, of 1956) implied the change of scale in urban planning, as it included 27 municipalities.

Horacio Capel (2007) argues that the garden-city neighborhoods built in the outskirts of Barcelona are to some extent the antecedents of what is now suburban Barcelona:

> "The garden-city neighborhoods of the adjoining outskirts were affected in many cases by an insufficient demand and due to the crises of the thirties, the civil war and the long and tough postwar. Many of them ended up being self-building neighborhoods for immigrants. Today we can find the legacy of those neighborhoods in the developments of secondary homes of a periphery 100 to 200 km around the city, in the single-family houses and flats with garden in the neighboring municipalities; and also the *semi-detached* houses (and *lumbered* by means of marketing to middle class groups with

[259] *Plan de Ordenación Urbana de Barcelona y su zona de influencia*

> confused minds[260]) built everywhere, that made us yearn for the principles of rational urbanism" (Capel 2007, online version), our translation

In table 5.1, we provide the evolution of the population for the Metropolitan Region of Barcelona, and for the different zones of the region. Since the 1980s, patterns of urban sprawl can be detected in the Barcelona Metropolitan Area and Region (Muñoz 2003, Catalán et al. 2008). The division between the urban and the rural became blurred both in physical and socioeconomic terms, and the urban field (Friedman and Miller 1965) was materialized. Rueda synthesizes this change towards a suburbanized urban-industrial society:

> "The city was no longer conceived as a physical artifact with a delimited shape […] but as a complex system of specific locations and interconnected flows of people, information, commodities and money" (Rueda 2002:79-80, our translation)

On the other hand the municipalities of the so-called second periphery have been absorbing important contingents of people leaving Barcelona. In fact, between 1981 and 2001 this second ring registered a positive net migratory balance that almost equaled the population loss of Barcelona and the rest of the MAB (Sánchez 2003). The arrival of the 21st century signified a turning point in the demographic evolution of the Barcelona and its periphery. Immigration is a key variable explaining population growth in MAB from the 2000 onwards. At the beginning of 2009, people born outside Spain amounted to 18 percent of the population of the Metropolitan area of Barcelona. This figure is larger than the Catalan average (15%) and the Spanish average (12%)[261]

[260] In the original text in Spanish the author plays with the words *adosado* (semi-detached) and *endosado* (lumbered)
[261] Instituto Nacional de Estadística, www.ine.es

Table 5.1. Population in the Metropolitan Region of Barcelona, 1981-2008.

	1975	1981	1986	1991	1996	2001	2005	2008
Barcelona	1,751,136	1,752,627	1,701,812	1,643,542	1,508,805	1,505,325	1,593,075	1,615,908
1st periphery (MAB)[262]	3,008,770	3,145,013	3,083,353	3,037,763	2,904,941	2,862,708	3,135,758	3.186.461
2nd periphery	1,010,943	1,093,863	1,146,174	1,226,659	1,323,107	1,525,016	1,634,422	1,742,391
Total MRB	4,019,713	4,238,876	4,224,527	4,264,422	4,228,048	4,387,724	4,770,180	4,928,852

Source: Own elaboration from IDESCAT, Area Metropolitana de Barcelona and INE.

It is interesting to introduce briefly the genesis of the suburbanization of the MRB. Barba and Mercadé (2006) succinctly summarize how the process of suburbanization has taken place. The origins of such process are found in the dictatorial period (although some can be traced back to the early 20th century as well). Thus, most of new urban land dates back to Franco's years (some 85% of urban plots). This was the result not of urban planning but of private initiatives. Most of the suburban developments were a result of speculative interests, did not comply with urban legislation, and lacked even services such as wastewater networks or paved streets.. In 1986 some suburban developments with precarious water supply systems could eventually solve their situation[263]. At the beginning, most of the suburban developments were used a secondary homes by the compact city urban dwellers. With time, many of these suburban developments have turned into as permanent homes, despite the car-dependence they create.

At the beginning of the 21st century, most of these plots (75%) are considered to lie on urban land, although many still lack compulsory services and suffer important deficits. For instance in 35 percent of them water supply system are in poor conditions (Barba and Mercadé 2006). We argue that increasing service standards, with increasing costs for the local administration, has accelerated the privatization process of water services in many municipalities of the region. Suburban developments and especially single-house residences are widely accepted and desired by the population as survey reflect.

[262] In 2008 there were 36 municipalities; see http://www.amb.es/web/guest/Territori_pob , last accessed 4th september 2009

[263] La Vanguardia, Sábado 4 de Octubre 1986, p.21, "Un total de 27 urbanizaciones del área metropolitana han resuelto los problemas de abastecimiento de agua", Marina Guarro

The social and territorial outcomes of the suburban model (Barba and Mercadé 2006:104) could be summarized in this way: lack of relations with local social environments and networks; lack of internal structure; lack of services; lack of multiplicity of uses; lack of coherence with the administrative map; impacts on the environment and natural resources; destruction of singular landscapes; individual/household isolation from society; lost of the feeling of belonging to a place; weakening of the social sustainability ties (solidarity, equality and freedom); weakening of democratic values, and increase of fear and insecurity (see Parés-Franzi 2006).

5.1.1 The suburbanization of water scarcity in the Barcelona Metropolitan Region

> "Badia del Vallès, the municipality that spends less" ["Badia del Vallès, el municipio que menos gasta"][264]

The citizens of this dense dormitory town of metropolitan Barcelona consumed around 107 lpcd[265] during 2008, with minimums of 90 lpcd[266]. Some 8.9 kilometers southwards (according to Google maps), the municipality of Sant Cugat del Vallès presented an average consumption of 182 lpcd[267] for the same period of time. Others had even higher consumptions: 273 lpcd in average of Sant Andreu de Llavaneres (north-east of Barcelona) or Matadepera with 230 lpcd[268] in 2008. During that year we recall that a decree banning outdoor uses was raised, having a clear effect on the consumption for instance of the last two municipalities: from 13 to 25 percent reductions. Without the ban, the normal domestic (ex. of 2006) water metabolism of them would had been 350 lpcd in Matadepera or 331 lpcd[269] in Sant Andreu de Llavaneres.

During the last decades, the Metropolitan Region of Barcelona has experienced a process of change in the location of the population and economic activities in which the denser cores have tended to lose population to the outer peripheries. Population

[264] La Vangaurdia, Miércoles 30 de Julio 2008, Vivir en Verano p.4, "Badia del Vallès, el municipio que menos gasta", R. Montilla
[265] Agència Catalana de l'Aigua
[266] La Vangaurdia, Miércoles 30 de Julio 2008, Vivir en Verano p.4, "Badia del Vallès, el municipio que menos gasta", R. Montilla
[267] idem
[268] idem
[269] idem

change is accompanied by changes in the predominant urban form because urbanization in the new peripheries of the MRB usually embraced a low-density pattern or "urban sprawl". Against this context of population and urbanization change, the MRB has been facing increasingly severe water supply problems as we will see next. During recent years, shortages have multiplied, forcing the government to enact several drought emergency acts to restrict first agricultural and public ornamental uses and, depending on the intensity of the drought, also some outdoor domestic water uses. These policies reflect the uneven geography of domestic consumption in the MRB. The predominant urban vertical apartment blocks are a common feature of the metropolitan core, whereas the periphery is more associated with single houses and condominiums, which often have gardens planted with non-local and water-demanding species and swimming pools.

To complete our picture of the environmental history of the urbanization of water supply in the Metropolitan Region of Barcelona is critical to understand the highly uneven geography of resource use in the case study area.

In another paper (March and Saurí 2010) we wanted to establish the likely influence of demographic, socioeconomic, and climatic factors on domestic water consumption, taking as an example the Metropolitan Region of Barcelona. Our main hypothesis was that factors influencing this consumption depended in important ways on the urban form and therefore could vary according to the dominant urban patterns (compact, disperse) existing in urban areas. In many southern European cities, for instance, the traditionally compact urban model is increasingly giving way to more disperse suburban settlements (European Environment Agency (EEA) 2006). This is also happening in Madrid, as we will see in chapter 7.

The impact of suburbanization is not only social but especially environmental in character (Kahn 2000, Johnson 2001, Hasse and Lathrop 2003, European Environment Agency (EEA) 2006, Travisi et al. 2006). Among the environmental impacts of suburbanization in Barcelona, we can mention an increase of energy per capita, soil sealing or landscape fragmentation (Rueda 2002). A number of American and Australian studies have also noted the effects on water consumption of this model, especially due to the massive presence of high-water demanding gardens and swimming pools. In the Metropolitan Region of Barcelona some incipient studies started also to confirm such trends (Domene et al. 2005, Domene and Saurí 2006,

Parés-Franzi et al. 2006, Domene and Saurí 2007), especially at the household level. To complement such views we wanted to single out the effect of the urban model at a regional scale. To do so we chose to work with a multiple regression model where domestic water consumption per capita was the dependent variable. Our statistical analysis, involving most of the municipalities of the MRB (160 out of 163) incorporated an important number of variables (socio-demographic, economic, territorial and climatic) for the year 2003. The municipalities where split into two groups according to a threshold of 3,500 people per square kilometer of urban land: compact city and suburban municipalities.

The results obtained from the two models confirm the importance of urbanization patterns in shaping the difference of domestic water consumption per capita in the MRB. The models also singled out the importance of other socio-economic variables such as income, population ageing, or household size. The investigation emphasized the implication of ongoing urban change in the MRB on the production of water scarcity. Changes within the home (built environment), intertwined with changes within the households (socio-demographic and economic characteristics) appear to have significant impacts on the demand of domestic water and need to be taken into account both when new water plans are drafted and when strategies toward a sustainable use of water are proposed. Because of the relevance of urban form, we argue that the suburbanization of Barcelona is leading to a significant increase in its urban water metabolism[270], which in turn jeopardizes the fragile hydrologic equilibrium between water supply and water demand in the region. Water scarcity in the MRB is not only physically driven but also socially constructed and produced.

Next we trace the evolution of the construction and mediatization of the recent droughts, with special emphasis on the episode of 2008. Water crisis have paved the way to the hegemony of some technologies, but have also revived old projects of water transfers and interconnections.

[270] By water metabolism we mean the flow of water required to sustain the producion and reproduction of urban life.

5.2 The construction and mediatization of a drought

Droughts are common in the Mediterranean, and Barcelona and its metropolitan area are not an exception. Despite the lack of agreement with the terminology, we use the term "drought" not as an exclusively physically driven phenomenon but as a socially constructed (and produced) situation (Kallis 2008). The suburbanization of Barcelona has changed unevenly the patterns of resource use, increasing the pressures to the system. We have seen in our narrative of the urbanization of water supply in Barcelona since the creation of a centralized water supplier, that droughts have shaped both the discourses on water and the development of water works. In figure 5.1 we present periods of droughts during the 20th and early 21st century in Barcelona.

The chronic scarcity, despite decreasing per capita consumption and increase of efficiency in the supply, during the outset of the 21st century (2000,2002, 2005, 2007- 2008) was seen by the association of water companies of Catalunya (ASAC) as an alarming sign of insufficient water supply infrastructure (ASAC 2008).

Figure 5.1. Droughts in Barcelona during the 20th and 21st century, before the 2007-2008 drought

1910-1915: low patterns of rainfall, but not many data on the socioeconomic impacts of the drought.

1922-1923: short but exceptionally intense drought period

1944-1950: low rainfall period. The country was recovering from the Civil War and the drought had a modest impact. However, the continuity of the drought ended up in night water cut-offs during the summer of 1950 when the water resources of Barcelona (the Llobregat and Besòs underground resources) almost run out and a heat wave hit the city.

1953: low (though not extremely low) rainfall (some 50-60 percent of the normal patterns) unleashed a critical situation in the urban fabric. Barcelona suffered water cut-offs during more than seven hours per day, and that made the public authorities to realize the structural water deficits of the supply system of Barcelona. The migratory wave had incipiently started, and by then Barcelona had over 1,3 million people. It was the last time Barcelona suffered real cut-offs. This drought accelerated the construction of the treatment plant of Sant Joan Despí as well as works to improve the whole system.

1973: 20 years later an extreme drought hit an area that was undergoing a dramatic growth in population. The situation could be resolved without any cut-offs taking place because of the arrival on time of rains.

1985-1986: the arrival of rains saved Barcelona of water cut-offs (they were just 3 months ahead).

1988-1989: this two-year drought period almost obliged Barcelona to apply restrictions. Some initiatives carried out that increased the reliability of the system.

1999-2003: this drought period forced the government to enact up to three Drought decrees (1999, 2000, 2002), but any real cut-offs for the urban population did not take place.

2005: the drought of 2005 leaded the government to enact two Drought decrees to prevent Barcelona from running out of water.

Source: adapted from Departament de Medi Ambient i Habitatge (2007), La Vanguardia (11/1/2008)[271] and other secondary sources

5.2.1 2007 and the arrival of the first wave of drought

Once the drought of 2005 was overcome with a rainy 2006, in January 2007 the water stored in the Ter-Llobregat began to decrease again and the idea of restrictions loomed on the horizon[272] In March 2007 the reserves were plummeting[273] and the

[271] La Vanguardia, Viernes 11 de Enero 2008, Vivir en Barcelona p.3, "La pertinaz sequía", Ramon Suñé / Departament de Medi Ambient i Habitatge. 2007. *La situación actual de excepcionalidad en el contexto històrico*. Barcelona: Generalitat de Catalunya.
[272] La Vanguardia, Miércoles 17 de Enero 2007, p.28, "Las reservas de agua caen en picado y hacen temer restricciones", Antonio Cerrillo
[273] La Vanguardia, Jueves 15 de Marzo 2007, p.32, "Las reservas catalanas de agua se desploman"

Catalan government announced a decree to reduce water allowances for non-domestic uses (agriculture, hydroelectric production, golf and garden watering) in the case situation did not improve significantly. At the end of March 2007 the Government passed a Decree of drought[274], activating the level 1 with restrictions for some uses. Fears of domestic cut-offs by September in the case rains lacked were raised[275], remembering the rejection of the PHN of 2001 that forecasted important investments in Barcelona. *La Vanguardia* played with words and talked about "drought of millions"[276], referring in this case to the denial by the EU of various projects included in the PHN for Catalunya that could have helped to avoid such situation.

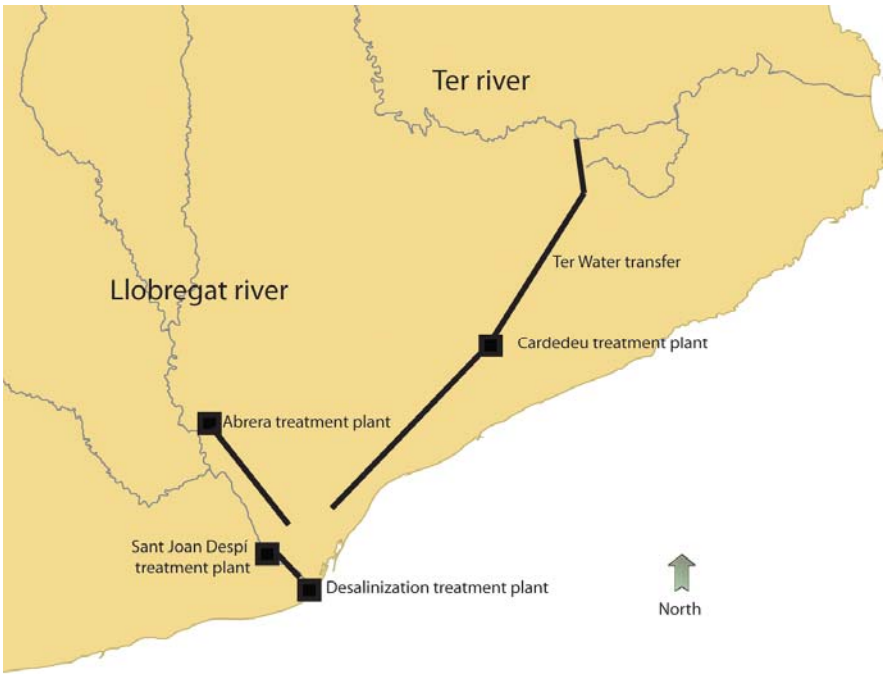
In May 2007 an important episode of rainfall aided to increase the level of the Ter-Llobregat system over 56 percent[277] of capacity. However, the level 1 of exceptionality of the Decree of drought was still activated. Eventually, the summer went on and no restrictions at the domestic level were applied in autumn.

The dynamics of stored water were negative in the following months and the situation of drought persisted, to the point that the Generalitat of Catalunya enacted a new decree as a follow up to that of April 2007[278]. The economic elites of Barcelona warned about the critical effects future cut-offs could cause on economic activities and asked for immediate solutions, such as interconnections of networks or transfers from other rivers[279]. The tourist sector complained about the lack of forecasting and of the disastrous effects of water restrictions on their business[280]. The water supply system feeding Barcelona (figure 5.2) seemed to be insufficient to cope with the metabolism of the metropolitan region against a situation of increasing droughts.

[274] *Decret 84/2007 de mesures excepcionals i d'emergència per a la gestió dels recursos hídric, de 13 d'abril de 2007*
[275] La Vanguardia, Viernes 23 de Marzo 2007, p.31, "La sequía amenaza los hogares", Antonio Cerrillo, Antonio Cerrillo
[276] La Vanguardia, Viernes 30 de Marzo 2007, p.32, "Sequía de millones", Antonion Cerrillo
[277] La Vanguardia, Miércoles 16 de Mayo 2007, p.33, "Los embalses del Ter y del Llobregat superan el 56%, pero continúa la sequía", Javier Ricou
[278] *Decret 257/2007, de 27 de novembre, pel qual es prorroga la vigència del Decret 84/2007, de 3 d'abril, d'adopció de mesures excepcionals i d'emergència en relació amb la utilització del recursos hídrics*
[279] La Vanguardia, Martes 18 de Diciembre 2007, Vivir p.1, "La sequía desespera", Eduardo Magallón/p.2., "La Cambra exige al Govern que asegure agua 'como sea'"
[280] La Vanguardia, Miércoles 19 de Diciembre 2007, Vivir en Barcelona p.3, "El sector turístico carga contra la falta de previsión", Anònia Justícia

Some experts[281] stressed the serious deficit of water in the area of Barcelona and complained about the continuous calls for reductions of domestic water consumption instead of facing structural changes (water from the agriculture to the city, reutilization, and transfer from the Rhone river). With Catalunya experiencing the driest December (in 2007) in 10 years, unleashing the phases of exceptionality 1 (an even 2 in some basins) and with restrictions looming large for March 2008, *La Vanguardia* started an important campaign challenging the water politics and policies of the Catalan government. In an op-ed of titled *"Catalunya ante la sequía"* [282] [Catalunya in front of the drought] structural measures were urged to cope with the dreadful effects of the drought: "the time has come to start to fight the drought not only with conjunctural measures but also with structural solutions".

Figure 5.2. Water supply system of the Metropolitan Region of Barcelona.



Source: own elaboration from Agència Catalana de l'Aigua and La Vanguardia

Despite a positive opinion about the demand side management strategies developed by the Government and the Catalan Water Agency, such as the improvements of the networks, water saving campaigns, water reutilization programs, or promoting a new water culture for agriculture, the editors of *La Vanguardia* argued that these were not enough. The plans for desalinization laid out by the Catalan (and Spanish)

[281] La Vanguardia, Jueves 6 de Diciembre 2007, Vivir en Barcelona p.7, "Los apagones, cercanías…, y ahora el agua", Antonio Cerrillo
[282] La Vanguardia, Viernes 7 de Diciembre 2007, p.22, Op-ed "Catalunya ante la sequía", our translation

government revealed that demand-side management strategies did not suffice to cope with the increasing water problems Catalunya, and especially the Catalan Inner basins, were facing. This technology, according to the newspaper, had major flaws such as the important energy consumption and especially CO_2 emissions. In contrast, the op-ed pointed out that there was enough water to supply Catalunya in the Ebro and Pyrenees basins as well as in the Rhone river. "It is urgent, therefore, to reopen the water debate in Catalunya, and appraise again all the alternatives" [283] the editors stated. Among the alternatives these were listed:

- To buy surplus water from irrigation, both from the Ter and the Llobregat basins as well as from the Pyrenees basins stored in the Canal Segarra-Garrigues
- To use the entire concession from the transfer of the Ebro to Tarragona and extend such transfer to Barcelona
- To analyze the feasibility of the Rhone transfer, one of the preferred options by the newspaper[284].

A week later, another op-ed pointed out "The lack of water in Catalunya" (title of the op-ed[285], *"La falta de agua en Catalunya"*) and backed the Catalan Business Organization that had raised alarms about the serious consequences of water cut-offs for the Catalan economy. According to the newspaper, the drought of 2005 was a clear warning, but since rainfall arrived on time, the measures to solve the problem were postponed: "The scarcity of rainfall has become a structural problem in Catalunya and requires measures beyond those merely circumstantial/conjuncture ones". The op-ed was very critical also with the lack of emergency proposals to face the immediate consequences of the drought on the economy and society, and also with the mid/long-term projects the administration had to cope with future droughts. The desalinization plant not only was to be operative too late (summer 2009) but "would be insufficient" to solve the problem. The critique to desalinization was a recurrent issue in different opinion pieces appearing in this newspaper.

> "To quench the thirst of the agriculture lands and of people, in exchange of consuming energy that is not renewable currently, is like 'to put out the fire with

[283] La Vanguardia, Viernes 7 de Diciembre 2007, p.22, Op-ed "Catalunya ante la sequía", our translation
[284] La Vanguardia, Viernes 14 de Diciembre 2007, p.34, opinion piece "Aguas alpinas", Carlos Sentís
[285] La Vanguardia, Martes 18 de Diciembre 2007, p.22, op-ed "La falta de agua en Catalunya"

> embers'. The governments have the duty, therefore, to avoid freshwater[286] concealing a bitter taste"[287]

Demand side management measures implemented by the Catalan water Agency were insufficient to cope with the critical situation, as they represented a:

> "minimum effort in front of the seriousness of the problem posed by the current drought. Recurrently stressing the need of water savings by the citizens equals to make them feel guilty when the real problem lies in the inefficacy of the public administration to forecast such situation and seek alternatives of supply" [288]

Again, there were references to the existent alternatives to guarantee the water supply in Barcelona and metropolitan area. Thus, from *La Vanguardia* it was argued that despite "water scarcity is serious in the Ter and Llobregat basins, there is water in enough quantity in the Ebro basin, in the reservoirs for agricultural uses, subject to a great waste; beyond the border, there is the Rhone basin".

Nonetheless, and notwithstanding the immense pressure by some media and the economic elites to carry out infrastructural works, the Catalan government went on emphasizing the importance of individual behavior to reduce water consumption[289] and ruled out the possibility of transferring water from the Segre river to Barcelona in the near future[290]. However, it predicted the need to apply drastic and exceptional measures, even water restriction, in spring 2008[291].

La Vanguardia continued with shocking headlines such as "*Prepararse para lo peor"* [Prepare for the worse] [292]. Political tension was also present in the Catalan Parliament, where the conservative nationalist party, CiU, accused the government and especially the Catalan Minister on the Environment to spend too little money in waterworks and water planning[293]. By the end of 2007, when reservoirs were below 30 percent of their capacity, the Generalitat presented the project of the third

[286] The author plays with Spanish words. In Spanish, freshwater is *agua dulce* (sweet water).
[287] La Vanguardia, Viernes 21 de Diciembre 2007, p.23, opinion piece "Desalación", E. Solé, our translation
[288] La Vanguardia, Martes 18 de Diciembre 2007, p.22, op-ed "La falta de agua en Catalunya", our translation
[289] idem, Vivir p.3, "La Generalitat pide coraje al ciudadano"
[290] La Vanguardia, Sábado 15 de Diciembre 2007, Vivir en Barcelona p.7, "Montilla pide ahorro de agua por la sequía 'sin precedentes'"
[291] La Vanguardia, Miércoles 19 de Diciembre 2007, Vivir en Barcelona p.1, "Medidas drásticas", F.Bracero and E.Magalllón
[292] La Vanguardia, Jueves 20 de Diciembre 2007, Vivir en Barcelona p.1, "Prepararse para lo peor", Francesc Bracero and Óscar Muñoz/p.2, "Montilla llama a la calma"
[293] La Vanguardia, Viernes 21 de Diciembre 2007, Vivir en Barcelona p.6, "CiU acusa a Baltasar de gastar poco en agua", Francesc Bracero

desalination in Catalunya. The particularity of this plant, to be located in the province of Tarragona, lied in the fact that it would interconnect the Ebro network of Tarragona with the Ter and Llobregat system. The alleged rationality behind this was to pump water to Barcelona in winter and to Tarragona during summer[294].

5.2.2 Shipping water from far away: an emergency solution to the drought of 2008

In 2008, pressure from the opposition, economic elites and some hegemonic media seemed to have an effect and the Catalan government presented some structural measures of emergency. The first emergency measure to be implemented was the shipping of water from Marseilles area and from a desalinization plant in Almería (Carboneras) [295] to the Metropolitan Area of Barcelona. The AGBAR group entered into scene as it was designated to build a pipe connecting the port of Barcelona (where the ships would unload the water) with the water supply network. This measure, as we have reported, was already thought to solve the drought of 2005. Thus, the first ship carrying water was planned to arrive in March 2008[296]. The Catalan Water Agency would also search for new wells, and even gave thought to the connection of the Tarragona water network with the Ter-Llobregat.

The option to ship water from Almería seemed the cheapest one; however, from the Spanish Conservatives (*Partido Popular*) of Almería, this solution was seen as surrealist:

> "It is mind-blowing that they resort to a province such as ours, the one with the highest water deficit in Spain, to solve the problems that the socialists have created in Barcelona after rejecting the transfer from the Ebro", Rafael Hernando, deputy for the PP[297].

Not only the conservative party but also some environmental associations criticized the solution[298] because of its environmental irrationality. On the contrary, the Spanish government strongly endorsed the alternative to bring water from

[294] La Vanguardia, Sábado 22 de Diciembre 2007, Vivir en Barcelona p.7, "Una desalinizadora unirá la red del Ebro con la del Ter y el Llobregat", Esteve Giralt
[295] La Vanguardia, Jueves 10 de Enero, Vivir en Barcelona p.1-2, "Barcos a punto"/"Agua de Andalucía y Francia", Jordi Bordas y Óscar Muñoz
[296] La Vanguardia, Viernes 11 de Enero 2008, Vivir en Barcelona p.1-2, "Cisternas en marzo"/"Agua a buen precio", Lluís Sierra y José Bejarano
[297] idem, our translation
[298] La Vanguardia, Domingo 13 de Enero, Vivir en Barcelona p.6, "Los ecologistas critican el proyecto de trasladar agua"

Carboneras and granted money to urgently adapt the port of Almería to ship desalted water "not only to Catalunya but also to other zones of Spain or Africa in need of water", according to the Ministry of the Environment[299,300]. Part of the population of Almería, especially the agricultural sector was proud of selling water to Barcelona (though with some criticisms also) as it was an outcome of the culture of saving due to the structural scarcity they suffered[301]. The action to bring water from Almería, from wells of Tarragona[302] or raw water from the Rhone, was, according to the Catalan Ministry of the Environment, an extreme one. The rule of thumb was to search for local sources, be it new wells or the recover of those not in use, or new desalination plants[303].

The Catalan conservatives (CiU) stressed again the need to promote the transfer of water from the Rhone river. This was not only a solution to the water crisis of Barcelona and Catalunya, but also a possible solution to Valencia or Murcia. One of the leaders of the conservative coalition, Antoni Duran Lleida, defended that instead of "looking to the sky and wait for rains, we should look northwards, to the Rhone"[304]. According to him, that would free the water coming from the Ter to Barcelona, and would also liberate the Ebro from a possible transfer. The proposal of transferring water from the Rhone was also endorsed by the *Col·legi d'Enginyers Industrials de Catalunya* [Engineer Association of Catalunya]. From the Spanish Ministry of the Environment, this option was totally rejected on the grounds of ecological impacts, while firmly supporting desalination as the solution to the water problem[305]. We will see however, that the Spanish Ministry would change to some extent its position as the drought episode became more critical.

The town council of Barcelona, despite its limited range of possible actions, also implemented some measures to save water. A clear example was the decision to

[299] La Vanguardia, Miércoles 16 de Enero, Vivir en Barcelona p.3, "Carboneras se adecua a golpe de talonario", Antonio Cerrillo, our translation
[300] La Vanguardia, Jueves 7 de Febrero 2008, Vivir en Barcelona p.4, "Todo está listo para transportar agua en barco", Interview to Cristina Narbona, Ministry of the Environment of Spain, by Antonio Cerrillo
[301] La Vanguardia, Sábado 19 de Enero 2008, Vivir en Barcelona p.7, "Oro líquido", José Bejarano
[302] La Vanguardia, Martes 26 de Febrero 2008, Vivir en Barcelona p.6, "Tarragona enviará agua de sus pozos a Barcelona",Sara Sans
[303] La Vanguardia, Viernes 18 de Enero 2008, Vivir en Barcelona p.3, "El agua en barcos llegará en mayo si antes no llueve", Antonio Cerrillo
[304] La Vanguardia, Lunes 14 de Enero 2008, p.17, "Ciu defiende un trasvase del Ródano para combatir la sequía", our translation
[305] La Vanguardia, Miércoles 16 de Enero, Vivir en Barcelona p.3, "Carboneras se adecua a golpe de talonario", Antonio Cerrillo

irrigate the Montjuic urban park (some 1,000 m^3 per day, representing a fifth of the water used for urban cleansing and watering of public spaces in Barcelona) with reclaimed water from El Prat de Llobregat wastewater treatment plant[306] and groundwater from wells[307]. The impossibility to water public parks with drinking water obliged the municipality of Barcelona, as well as the other municipalities, to find alternative sources. Other municipalities, for instance those of the Vallès zone, used reclaimed water (Sabadell) or recovered some industrial wells (Terrassa)[308]. Some sectors argued that the ban on the irrigation of gardens and swimming pools could create an illegal business[309], with some private firms holding groundwater concessions, and offering water to urban dwellers with pools and gardens.

The Catalan Water Agency (ACA) also undertook other emergency actions aimed to recover local wells in the Metropolitan Area. In the long term, the ACA initiated the works to of interconnection between the waters coming from the Ter and the Llobregat at Barcelona (the Trinitat and the Fonsanta water tanks) through a pipe underneath the Collserola urban park[310], to be finished by 2010. The government also planned a fourth desalination plant in Catalonia, to be finished by 2015, the third in the Metropolitan Region. With that decision the possibility to bring water from the Rhone was shelved[311] by the Catalan government, appealing to different reasons[312]:

- Operational concerns: the project would take 8 to 10 years to finish
- Environmental concerns: the environmental impact of the project would be very serious, contradicting European environmental legislation, concretely the European Water Framework Directive.

[306] La Vanguardia, Martes 15 de Enero 2008, Vivir en Barcelona p.4,"Montjuïc se regará con agua de El Prat", Lluís Sierra
[307] La Vanguardia, Viernes 8 de Febrero 2008, Vivir en Barcelona p.7, "Camiones cisterna para regar Montjuïc", Lluís Sierra
[308] La Vanguardia, Domingo 24 de Febrero 2008, Vivir en Barcelona p.6, "El Vallès recurre al agua regenerada y de pozos", Paloma Arenós
[309] La Vanguardia, Lunes 31 de Marzo 2008, Vivir en Barcelona p.2, "Negocio con la sequía", Raül Montilla and Antonio Cerrillo
[310] La Vanguardia, Miércoles 16 de Enero 2008, Vivir en Barcelona p.1-2, "Ciudad de tuneladoras"/ "Interconexión en el 2010", Óscar Muñoz
[311] La Vanguardia, Sábado 26 de Enero 2008, Vivir en Barcelona p.4, "Agua de mar, adiós Ródano", Antonio Cerrillo
[312] La Vanguardia, Viernes 22 de Febrero 2008, Vivir en Barcelona p.2, "Los recortes se alejan hasta finales de verano"

- Geopolitical concerns: France would hold the control of the water flow. Incidentally, in chapter 6, we will see that France or at least French capital have endend controlling the water flow of Barcelona.

The president of the Generalitat emphasized the need to combine short-term measures with the more structural (such as desalinization) to combat a situation of drought that would be more recurrent in the near future[313].

5.2.3 Pushing forward restrictions

In February 2008, as the level of water stored in the Ter-Llobregat fell below 25 percent, the Government issued the second level of warning in the Metropolitan Region of Barcelona and part of the province of Girona. This meant the introduction of restrictions for 350 municipalities concerning agriculture, urban cleansing and public gardens and sport facilities watering. The measure also banned the use of drinking water for private garden watering or swimming pools[314]. However, this measure presented some inconveniences as the administration lacked instruments to control the use of water in the private sphere[315] and some municipalities did not know how to act in some situations[316]. In order to achieve full legal actions, the *Entitat Metropolitana de Medi Ambient* [EMMA] (regulating the supply of 32 municipalities of the metropolitan area) modified the water supply regulation to include the possibility to fine the non-fulfilment of the Decree of drought (with fines up to 3,000 Euros depending on the seriousness of the offense)[317]. Despite being widely accepted as necessary, the restriction measures of the level of exceptionality II were criticized by some economic sectors. The gardening sector for instance, complained about the millionaire loses they would suffer as a result of the implementation of the drought decree[318,319].

[313] La Vanguardia, Sábado 28 de Enero de 2008, Vivir en Barcelona p.4, "Montilla prevé una larga batalla contra la sequía", Raúl Montilla
[314] La Vangaurdia, Martes 5 de Febrero 2008, Vivir en Barcelona, p.5, "Prohibido usar agua potable para el jardín y la piscina", Antonio Cerrillo
[315] La Vanguardia, Miércoles 6 de Febrero 2008, Vivir en Barcelona p.4, "La prohibición de usar agua potable carece de controles", Antonio Cerrillo
[316] La Vangaurdia, Sábado 23 de Febrero 2008, Vivir en Barcelona p.5, "A salto de mata", Antonia de la Fuente
[317] La Vanguardia, Viernes 8 de Febrero 2008, Vivir en Barcelona p.7, "Multas de hasta 3.000 euros por derrochar agua", Antonio Cerrillo
[318] La Vanguardia, Sábado 15 de Marzo 2008, Vivir en Barcelona p.5, "El decreto de sequía castiga a los jardineros", Luís Benvenuty

It is also very interesting to note the impact that the drought had on the individual level. Here we could argue that Focauldian governmentality had reached water politics. By governmentality we can understand government at distance, a defining characteristic of neoliberal governance. Therefore and beyond the sovereign action of the state, forbidding certain uses of water could be interpreted as a more subtle form of governing the individuals' actions. In what concerns water use, citizens adopted very specific rationalities of resource use and even of policing. Thus, every citizen could act a surveyor of the actions of the neighbor and report unlawful uses such as garden watering or swimming pool filling. The newspapers and the television described many cases of infractions reported by anonymous citizens. *La Vanguardia* put it that way:

> "Every neighbor, pedestrian, bus driver could become a servant of the law. They are the public eye that guarantees the compliance with the current decree against improper use of water"[320]

The "tragedy" went on and the water reservoirs reached the lowest level of their recent history, especially caused by the low levels of the Muga basin (north-east Catalunya) system[321]. According to the Catalan Water Agency (ACA), Barcelona was facing the hardest drought since 1944[322]. If rains did not arrive, Barcelona would have to apply domestic cuts after the summer[323].

Apart from the projects presented by the government and the opposition, other proposals were also advanced. For instance, a business association of Girona, proposed to lend Barcelona use of Ter (Girona), Segre (Lleida) and Ebro (Tarragona) waters under the condition that Barcelona returned the same flow of reclaimed water to these rivers once used[324]. The Catalan government nonetheless ruled out the use of Segre or Ebro's water[325]. Some well-known environmental experts, such as Ramon

[319] La Vanguardia, Miércoles 9 de Abril 2008, Vivir en Barcelona p.2, "El temor a las multas por regar hace caer las ventas"
[320] La Vanguardia, Sábado 19 de Abril 2008, p.1-2, "El ojo público", Enrique Figueredo and Paloma Arenós, our translation
[321] La Vanguardia, Sábado 9 de Febrero 2008, Vivir en Barcelona p.4, "Los embalses alcanzan el nivel más bajo de su historia", Antonio Cerrillo
[322] La Vanguardia, Lunes 25 de Febrero 2008, Vivir en Barcelona p.6, "El decálogo de la sequía", Antonio Cerrillo
[323] La Vanguardia, Viernes 22 de Febrero 2008, Vivir en Barcelona p.2, "Los recortes se alejan hasta finales de verano"
[324] La Vanguardia, Sábado 9 de Febrero 2008, Vivir en Barcelona p.5, "Una patronal de Girona propone 'prestar' agua a Barcelona", Antoni F. Sandoval
[325] La Vanguardia, Viernes 22 de Febrero 2008, Vivir en Barcelona p.2, "Los recortes se alejan hasta finales de verano"

Folch, argued that the best solution to solve the water problem of Catalunya would be the general use of reclaimed water[326].

As time passed, and despite emergency measures, *La Vanguardia* showed increasing disapproval for the water policies of the Catalan government, but also criticized the entire political class. In an op-ed[327], *La Vanguardia* reacted bitterly to the lack of commitment of the political class in Catalunya and Spain to continually postpone the debate around the hydraulic model for the last 30 years. The editorial complained that since 1976 (when *la Baells* reservoir was inaugurated) the water supply of Barcelona had not been enlarged. The Rhone transfer was never materialized at the time of CiU rule of the Catalan government because of the opposition of the PP (then in the Spanish government). Later CiU and the PP proposed the transfer from the Ebro, but the PSOE modified the PHN, prohibiting the transfer from this river. Eventually, desalination would not arrive on time, said La Vanguardia.

Criticisms against the Catalan government continued. *La Vanguardia*[328] reported that restrictions of water for water cleansing or garden watering together with the efforts of the citizens to reduce water consumption were useless as water was being wasted in other points of the networks due to leakages in some pipes. For instance, the media denounced that ATLL was losing 4 percent of the water, the equivalent to the consumption of some 155,000 people[329]. According to this media, the administration did not take action to preclude such situation.

The Catalan minister of the environment compared the serious situation was facing due to the drought to a 'war economy'[330]. By mid March Barcelona had 200 days of water supply without restrictions. The minister prioritized domestic supply of water over all other uses, and found inacceptable a 'water war' between territories. The implementation of the emergency measures had an estimated impact of 70 hm^3 in reduction (or 70 days of consumption in the Metropolitan Region of Barcelona).

[326] La Vanguardia, Viernes 29 de Febrero 2009, contraportada edición Girona, Interview to Ramón Folch by Joaquim Roglan "Hay que rebajar la extracción del Ter, pero no es el momento"
[327] La Vanguardia, Sábado 9 de Febrero 2008, p.20, op-ed "Grave imprevisión política ante la sequía"
[328] La Vanguardia, Jueves 28 de Febrero 2008, Vivir en Barcelona p.1, "Ahorro en saco roto", Jordi Bordas
[329] La Vanguardia, Viernes 29 de Febrero 2008, Vivir en Barcelona p.1-2, "Tubería coladero", Antonio Cerrillo
[330] La Vanguardia, Miércoles 12 de Marzo 2008, Vivir en Barcelona p.7, "Baltasar: 'Estamos en economía de guerra'", Antonio Cerrillo

Consumption in the Metropolitan area had been steadily dropping since the 1990s (chapter 4). Year by year the city of Barcelona was consuming less water per capita with an average around 110 lpcd in 2007 [331]. In 2008, Barcelona continued to save water, and domestic water consumption by the time the drought hit the hardest was around 104 lpcd, very close to the 100 lpcd level recommended by the World Health Organization (WHO) in developed countries to guarantee adequate sanitary conditions (Howard and Bartram 2003). To exemplify such situation *La Vanguardia* stated that Barcelona citizens were 4 liters ahead of insalubrity[332]. With such low consumption in the compact city, water saving measures at the individual level seemed to have reached a limit.

5.2.4 Temporal water transfers, another step to face the drought

The drought unleashed new territorial conflicts for the control of water in Catalunya[333], both in the north (Girona, Ter river), the south (Tarragona, Ebro river), and the West (Segtre river). In Girona, a Francoist law permitted to divert 60 percent of the water flow of the Ter to the Barcelona conurbation since the mid 1960s[334]. In the case of Tarragona, part of the population, especially the people in the Delta de l'Ebre, saw in the water shipping to Barcelona a disguised transfer from the Ebro[335] (however, water shipped was to be drawn from wells). Contrarily, some agricultural sectors of Lleida were willing to discuss the possibility to transfer water from the Segre basin to Barcelona according to *La Vanguardia*[336]. Other sectors such as certain environmental NGOs, were extremely hostile to any transfer to Barcelona.

Territorial conflicts, however, had just started. In March 2008, other measures to face the drought were proposed: water transfers. We will see how the terminology to name such projects varies widely depending on the arithmetic in the Catalan Parliament. Thus, while the Catalan (and also the Spanish) government would not mention not even once the idea of transfer but of one-time and reversible works, the

[331] La Vanguardia, Lunes 17 de Marzo 2008, Vivir en Barcelona p.3, "Barcelona gasta cada vez menos"
[332] La Vanguardia, Domingo 6 de Abril 2008, Vivir en Barcelona p.1-3, "Ciudadano agua", Francesc Peirón"
[333] La Vanguardia, Sábado 1 de Marzo 2008, Vivir en Barcelon p.1-2, "El agua es mía" / "La cultura del 'no' llega al agua", Antonio Cerrillo
[334] idem, p.2-3, "Al límite de solidaridad", Antoni F. Sandoval
[335] idem, p.3, "Trasvases envenenados", Esteve Giralt
[336] idem, p.3 "Dispuestos a compartir", Pau Echauz

Catalan opposition (as well as the Spanish conservatives) spoke openly about transfers.

Once the option to transfer from the Rhone river was rejected by the Catalan Parliament, the Catalan political opposition, led by CiU, raised the question whether a concealed transfer form the Segre was being planned[337]. The plan to bring water from the Segre caused important political turmoil, and the farmers from Lleida totally opposed the alleged transfer of water promoted by the Catalan Ministry of the Environment from the Segre river to the Llobregat[338].

In parallel to this process, CiU increased the pressure on the government and asked the Generalitat to establish a deadline to stop extracting water from the Ter river to Barcelona:

> "We do not want the Ter to be the water's 'milk cow' of Barcelona. Enough of squeezing the river", Convergència i Unió[339].

On the other hand, the Catalan Water Agency (ACA) contested to this allegation and argued that it was not feasible to stop bringing water from the Ter, but it was possible to decrease such flow with contributions from other basins[340].

By late March, seven vessels were ready to ship water from Marseilles. Tarragona was also ready to ship water to Barcelona (max. 4.4 hm^3 per year), while the opposition from the agricultural sector increased[341]. The government was also considering the option to rent a desalination vessel to locate it in front of the coast of Barcelona[342]. Water from ships would cost 44 million Euros every 2 months[343]. Even the possibility to bring water by train[344] was mentioned. Despite snowfalls in March

[337] La Vanguardia, Jueves 13 de Marzo 2008, Vivir en Barcelonap.7, "El Govern traerá 'agua de donde haga falta'", Jordi Bordas
[338] La Vanguardia, Sábado 15 de Marzo 2008, Vivir en Barcelona p.5, "Amplio rechazo al plan para llevar agua del Segre al Llobregat", P. Echauz y A. Cerrillo
[339] Eudal Casadesús, president of CiU in Girona, quoted in La Vanguardia, Sábado 15 de Marzo 2008, Vivir en Barcelona p.5, "CiU pide fecha para el fin del trasvase", S. Oller, our translation
[340] La Vanguardia, Miércoles 19 de Marzo 2008, Vivir en Barcelona p.6, "La ACA cree que el Ter no puede dejar de dar agua a Barcelona", A.F. Sandoval
[341] La Vanguardia, Sábado 29 de Marzo 2008, Vivir en Barcelona p.3, "Tarragona asegura el agua de puerto a puerto", Esteve Giralt
[342] La Vanguardia, Lunes 17 de Marzo 2008, Vivir en Barcelona p.1-2, "Barcos a la vista", Alberto Gimeno and Antonio Cerrillo
[343] La Vanguardia, Viernes 4 de Abril 2008, Vivir en Barcelona p.2, "Chorro de dinero", Óscar Muñoz
[344] La Vanguardia, Jueves 3 de Abril 2008, Vivir en Barcelona p.3, "Medi Ambient y Renfe piensan en trenes cisterna", Óscar Muñoz

the level of the reservoirs continued to shrink[345] until 4 hm^3 of entering the "emergency level" scenario[346] (water level below 20 percent of the capacity of the system). *La Vanguardia* even talked about "National Emergency" [347]. AGBAR had a plan of restrictions for the 23 municipalities served by this company, with water restrictions two days per week in the worst of the cases[348], as we can see in table 5.2.

Table 5.2. Levels of emergency and measures

Situation	Level of water stored in the Ter-Llobregat system (%)	Allowance per capita (lpcd)	Measures to be carried out
A	20	230	-
B	15	210	Reduction of pressure
C	10	180	Reduction of pressure and cut-offs, one day per week
D	5	160	Reduction of pressure and cut-offs, two days per week

Source: own elaboration from "Plan de Contingencia de la Sequia (AGBAR)", La Vanguardia 27/3/2008

The tourist sector warned that cut-offs would seriously damage the image of Barcelona[349]. Solutions urged. *La Vanguardia* in an op-ed encouraged to "find water wherever" and took up again the importance of long term planning[350]. Even the Catalan church asked the population to pray for the arrival of rains[351].

Next we will examine case by case how different rivers were proposed as possible sources to increase the supply of urban Barcelona.

[345] La Vanguardia, Martes 18 de Marzo 2008, Vivir en Barcelona p.6, "Las nevada no ayudan y los embalses siguen bajando", Antonio Cerrillo
[346] La Vanguardia, Miércoles 26 de Marzo 2008, Vivir en Barcelona p.3, "A un mes de la alerta roja", Antonio Cerrillo
[347] La Vangaurdia, Sábado 29 de Marzo 2008, Vivir en Barcelona p.1, "Emergencia nacional", Ramon Suñé
[348] La Vanguardia, Jueves 27 de Marzo 2008, Vivir en Barcelona p.1-2, "El peor escenario", Antonio Cerrillo
[349] La Vanguardia, Jueves 3 de Abril 2008, Vivir en Barcelona p.5, "Si hay cortes, adiós turismo", Antónia Justicia
[350] La Vanguardia, Sábado 29 de Marzo 2008, p.22, op-ed "Conseguir agua de donde sea"
[351] La Vanguardia, Viernes 4 de Abril 2008, Vivir en Barcelona p. 4, "Sistach pide que se rece para que llueva", Oriol Domingo

The Segre river

The option the Catalan executive seemed to prefer was the Segre, in the Pyrenees (North West of Barcelona) even admitting the existence of plans for a "temporal extraction" to Barcelona[352]. It is interesting to reflect upon terminology briefly. The Catalan government used "temporal and reversible water withdrawal" to avoid transmitting the idea that what was planned was a transfer. The province of Lleida, where the Segre flows, criticized the lack of transparency of the Catalan government while the farmers directly talked about theft[353]. Moreover, the *Institut d'Estudis Catalans*, the maximum authority on the Catalan language, stated that the connection between the Segre and the Llobregat was in fact a water transfer[354]. Hence, semantics were close to the absurd.

The "temporal extraction" from the Segre could take place in autumn 2008 and last until the drought vanished or, at most until the spring 2009, when the desalinization plant was expected to start operating. However, the final decision had to be taken by the Spanish government and the *Congreso de los Diputados* [Spanish Parliament], as it affected an inter-communitarian basin (Ebro)[355]. The Spanish minister of the environment, Cristina Narbona, avoided endorsing the transfer from the Segre but at the same time did not completely reject the idea: "Water transfers are the last solution, but the Government is not fundamentalist"[356]. Eventually, however, the Spanish government vetoed the transfer from the Segre[357], partly due to the fears of likely protests from Valencia and Murcia to receive the same deal and ,very especially because of the Spanish National elections to be celebrated in the spring of 2008.

[352] La Vanguardia, Miércoles 19 de Marzo 2008, Vivir en Barcelona p.6, "El Govern admite que se plantea trasvasar agua del Segre a Barcelona", Francesc Bracero
[353] La Vanguardia, Jueves 27 de Marzo 2008, Vivir en Barcelona p.3, "Lleida critica la falta de transparencia del Govern y los regantes hablan de robo", Pau Echauz
[354] La Vanguardia, Sábado 29 de Marzo 2008, Vivir en Barcelona p.2, "El Institut d'Estudis Catalans dice que el enlace Segre-Llobregat es un trasvase", Óscar Muñoz
[355] La Vanguardia, Miércoles 26 de Marzo 2008, Vivir en Barcelona p.1-3, "Trasvase de emergencia", Pau Echauz and Antonio Cerrillo
[356] La Vanguardia, Jueves 27 de Marzo 2008, Vivir en Barcelona p.3, "Narbona elude apoyar el trasvase del Segre", Antonio Cerrillo, our translation
[357] La Vanguardia, Sábado 29 de Marzo 2008, p.13, "Zapatero se impone al tripartito y veta el trasvase de agua del Segre, Enric Juliana

The transfer of the Segre did not only generate tension between the Catalan and the Spanish government[358], with accusations of treachery from the former to the latter. It also caused turmoil within the Catalan government, with some components of the government considering the transfer from the Segre a bad idea[359], and even within the political parties of the government[360, 361]. That was especially obvious in the case of *Iniciativa per Catalunya-Els Verds* [Catalan eco-communists], in charge of the Catalan Ministry of the Environment that had converted its opposition to transfers in one of its most important political banners.

The *Colegio Oficial de Ingenieros de Caminos, Canales y Puertos* [Spanish Engineering Association] stated that the option to transfer water from the Segre was feasible but it was politically-driven and not very efficient. According to them, connecting Barcelona with the mini-transfer would be also feasible, cheaper and faster to be implemented[362].

Table 5.3. Arguments in favour and against the transfer from the Segre river.

In favor	Against
- Essential to fight the drought	- Would bring about delays in the desalination plant
- Enough water in the Segre	- Spanish and not Catalan jurisdiction
- Circumstantial	- The central government preferred the connection with the mini-transfer of the Ebro
- The pipes, pumps, etc., would be reused by ATLL	- Could increase the turmoil with Valencia and Murcia

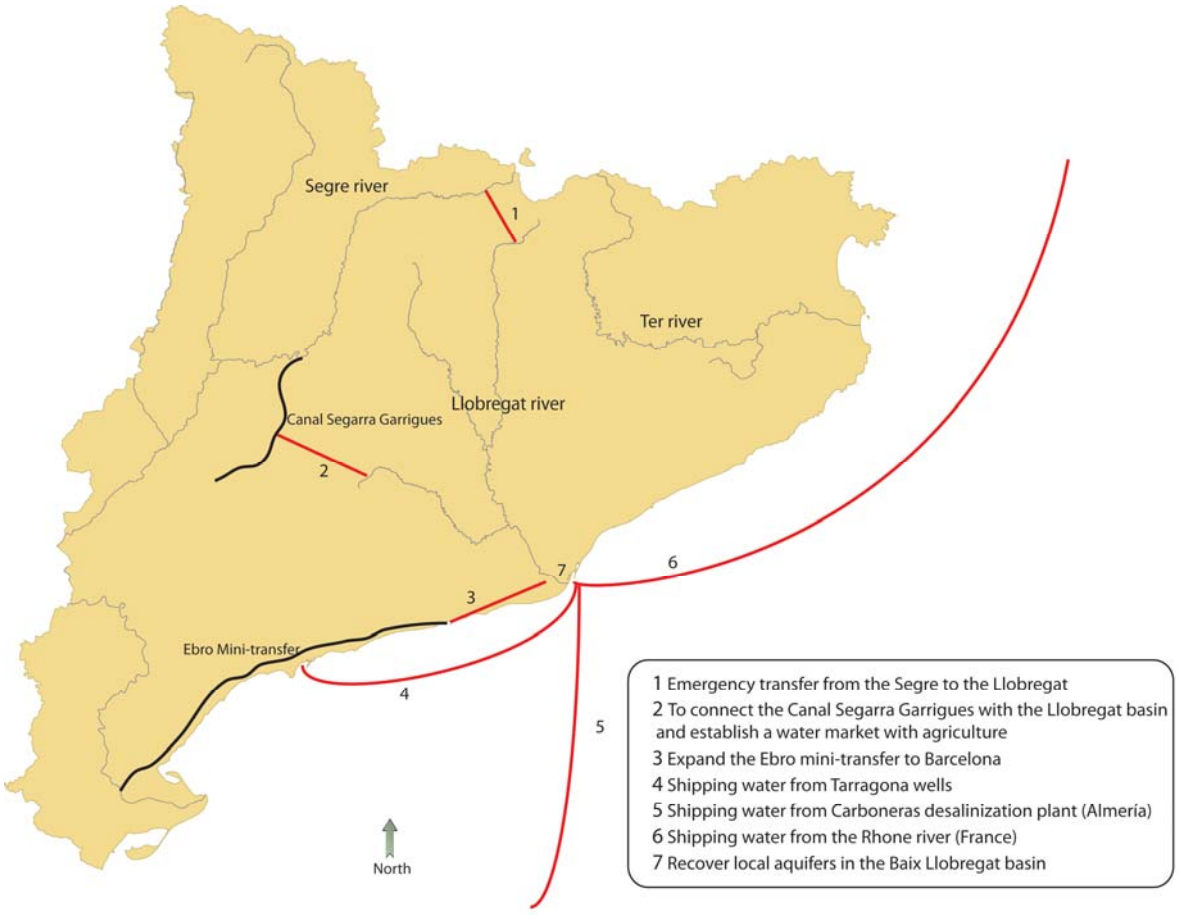
Source: own elaboration from La Vanguardia[363]

In table 5.3 we present the main arguments for and against the 'reversible withdrawal' or water transfer from the Segre river to overcome the critical situation of the drought in the Metropolitan Region of Barcelona.

[358] La Vanguardia, Domingo 30 de Marzo 2008, p.15, "Saura acusa al Gobierno de traición por negarse al trasvase del Segre", Iñaki Ellakuría
[359] La Vanguardia, Lunes 31 de Marzo 2008, Vivir en Barcelona p.1-2, "El agua divide al Govern", Pau Echauz and Iñaki Ellakuría
[360] La Vanguardia, Sábado 29 de Marzo 2008, p.14, "El trasvase del Segre al Llobregat abre una vía de agua en Iniciativa", Silvia Hinojosa
[361] La Vanguardia, Viernes 4 de Abril 2008, Vivir en Barcelona p.1-2, "Montilla no se fía de Baltasar", F. Magallón and M. Díaz Varela
[362] La Vanguardia, Martes 1 de Abril 2008, Vivir en Barcelona p.3, "Los ingenieros creen que el trasvase del Segre se plantea por política"
[363] La Vanguardia, Lunes 31 de Marzo 2008, Vivir en Barcelona p.3, "Inevitable para evitar restricciones"/ "Miedo a extender las guerras del agua", Antonio Cerrillo

Eventually, the Spanish Minister of the Environment vetoed the transfer from the Segre and encouraged the Catalan government to obtain water from farmers in the Canal d'Urgell[364] (see figure 5.3 for the options to bring water from the Segre and also from the Ebro).

Figure 5.3. What are the solutions to avoid domestic restrictions?



Source: own elaboration from La Vanguardia, Miércoles 2 de Abril 2008, Vivir en Barcelona p.3

The Ebro river

As we have learned through the history of the urbanization of the water supply of Barcelona and its Metropolitan Area, the Ebro has been the candidate to provide water for the urban conurbation through the 20th century multiple times. In addition,

[364] La Vanguardia, Martes 1 de Abril 2008, Vivir en Barcelona p.1-2, "Ni gota de acuerdo", Antonio Cerrillo and Silvia Hinojosa

it is also important to mention that some 1.5 million people outside the Ebro basin already drink and use its waters[365] through different transfers (table 5.4).

Table 5.4. Transfers along the Ebro river and its tributaries

	Typology	To supply	Water transferred	Since
Ebro-Besaya	Reversible transfer for urban and industrial supply	Cantabria	22 hm^3 per year	1982
Alto de Tornos	Small transfer to municipalities of Cantabria	Cantabria	Small quantity, no official data	1982
Cerneja-Ordunte	Transfer to the urban conurbation Gran Bilbao	Basque Country	12 hm^3 per year	1961
Zadorra-Arratia	Transfer of water to the North basins, water used in the urban area of Gran Bilbao	Basque Country	130 hm^3 per year	1967
Alzania-Oria	Transfer to the North basins for hydroelectricity generation, urban supply and industrial uses	Basque country	1 hm^3 per year	1967
Carol-Ariège	Reversible transfer, for hydroelectric uses	France	Max. 5 m^3/second; minimum contribution from France 20 hm^3 per year	1982
Siurana-Riudecanyes	Transfer to the Catalan Inner Basins	Tarragona	5-7 hm^3 per year	1947
Ebro-Camp de Tarragona	Supply of Tarragona and south of the province of Barcelona	Tarragona (and part of south Barcelona)	Max. 121 hm^3 per year. Average flow 70-75 hm^3 per year	1989

Source: own elaboration from La Vanguardia and Spanish Ministry of the Environment

One of these transfers arrived in the Catalan Inner Basins in 1989, in order to supply the thirsty chemical industry of Tarragona and improving the quality of tap water for Tarragona citizens and the important tourist activity of the area. This was called the *mini-transvasament de l'Ebre* [mini-transfer of the Ebro] with a concession of 121 hm^3 per yearfrom the river, and an average flow of between 70 and 80 hm^3.

Once the Segre transfer had been vetoed and rejected by the Spanish government and the Spanish president (despite the Catalan minister of the environment holding tight

[365] La Vangaurdia, Jueves 10 de Abril 2008, Vivir en Barcelona, p.1-2, "Los trasvases del Ebro", Antonio Cerrillo

to the plan)[366], the attention turned to the Ebro river. By mid March, and despite prioritizing the Segre transfer, the Catalan government had already opened the possibility of extending the mini-transfer from the Ebro to Barcelona by means of a pipe 14 kilometers long[367] from Cunit (Tarragona) to Cubelles (Barcelona).

The rationale behind the transfer of 40-45 hm^3 was legally grounded in the concession (120 hm^3) granted in 1981[368] to the *Consorci d'Aigües de Tarragona* (CAT) [Water consortium for raw water supply to Tarragona] and materialized in 1989. As only 70-80 hm3 out of the 120 hm^3 were used on average, some 40 hm^3 remained for use. It is important to mention that the proposal to connect Tarragona and Barcelona regional water networks was not a new issue but could be traced back to the beginning of the 21st century as we report below (figure 5.4).

Figure 5.4. The project of interconnection of the Ebro between Tarragona and Barcelona: a brief history

The interconnection of the transfer of the Ebro to Tarragona with the Barcelona regional water network was not a product of the drought of 2008. The embryo of such project dated back to 2000 when the Catalan Parliament (with the votes of CiU, PSC and PP, and the opposition of ICV and ERC) approved an agreement to ask the Spanish government to include in the National Water Plan a transfer to the Catalan Inner Basins (from the Ebro or the Rhone)[369].

In 2002 the Catalan government (then controlled by CiU) made the project public envisaging a connection between the supply network of Tarragona and that of the Metropolitan Area of Barcelona. The contestation by the groups against the National Water Plan shaped the position of the PSC, with contrasting discourses in Tarragona (contrary to the transfer) and another in metropolitan Barcelona (need of more water); this tension was resolved by backing the interconnection of the networks but ruling out the project presented by the Catalan government as it "could represent a starting point of the transfer of water from the Ebro river included in the National Water Plan"[370]. Even the Town Council of Barcelona rejected the project of the Generalitat to bring water from the transfer[371] on the grounds that it was a disguised initiative of the National Water Plan.

[366] La Vanguardia, Viernes 4 de Abril 2008, p.1 (headline), "Zapatero desautoriza al Govern por el trasvase" /"Misil de Zapatero sobre el trasvase del Segre y las argucias del tripartito, p.15, Enric Juliana

[367] La Vanguardia, Lunes 17 de Marzo 2008, Vivir en Barcelona p.2-3, "El Govern también baraja usar agua del minitrasvase del Ebro", Antonio Cerrillo

[368] See *Ley 18/1981, de 1 de julio, sobre actuaciones en materia de aguas en Tarragona*

[369] La Vanguardia, Viernes 30 de Junio 2000, p.44, "Pacto político para pedir a Matas un trasvase de agua para Cataluña", Antonio Cerrillo

[370] La Vanguardia, Miércoles 2 de Octubre 2002, p.35, "El Ebro abre una brecha en el PSC", Antonio Cerrillo

[371] La Vanguardia, Sábado 26 de Octubre 2002, p.36, "El Ayuntamiento de Barcelona rechaza el proyecto de minitrasvase de la Generalitat", L. Sierra and S. Angulo

In 2003, PSC, ERC and ICV signed the document *Compromís per l'Ebre* [Pact for the Ebro] where these political parties committed to promote a new water culture, to oppose to a transfer from the Ebro and to ask for the derogation of the National Water Plan in the case they arrived to the Generalitat (Alfama i Guillén et al. 2007).

In late 2003, a coalition between PSC, ERC and ICV won a majority to run the Generalitat. The translation of this change in water planning was the rejection in 2004 of the National Water Plan including the interconnection between Tarragona and Barcelona[372]. In March 2004 the Spanish Socialists won the elections and cancelled part of the National Water Plan (that dealing with the transfers from the Ebro). The Spanish Parliament ratified the derogation in June 2004 with the unique opposition of the conservative party (PP)[373]. Instead, the Spanish government launched an array of alternatives measures, articulated by desalinization and considering also other works[374]. The Metropolitan Region of Barcelona would have a desalinization plant, according to the government in operation in 2007 or 2008[375]. Then, the debate around the interconnection between Tarragona and Barcelona was eventually shelved.

Source: own elaboration from news published in La Vanguardia

The connection from Cunit to Cubelles however could only yield some 12 hm^3 per year due to the limited diameter of the pipe. In order to provide the 45 hm^3 of surplus water from the farmers of the Ebro, a pipe 20 km long would be needed (figures 5.5 and 5.6). Instead of using the remainder water from the concession, there was the possibility to buy water directly to farmers, as some irrigation associations along the Ebro river seemed to be willing to sell surplus water. This would add to some 45 hm^3 per year instead of the 32 hm^3 that would be obtained through the Segre transfer[376].

The two irrigation communities of the Ebro Delta showed their will to reach an agreement to sell surplus water to Barcelona[377]. However, they would not give the water for free; instead they asked for bidirectional solidarity[378] meaning economic compensations in the form of investments to modernize the irrigation network of the

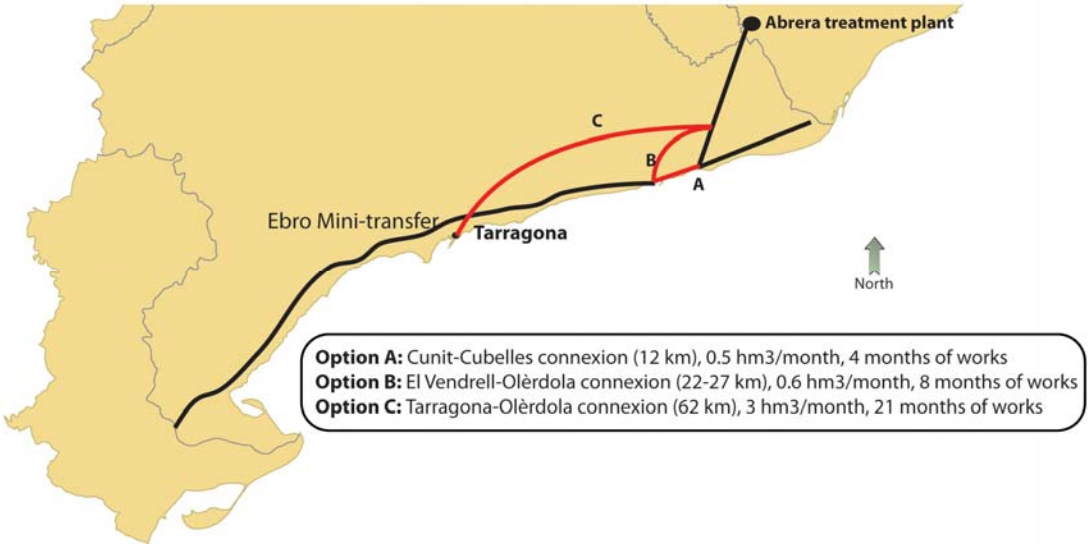
[372] La Vanguardia, Sábado 21 de Febrero 2004, p.32, "Maragall pide a la UE que no financie el trasvase y dedique los fondos al Delta", Jordi Barbeta/ La Vanguardia, Viernes 30 de Abril 2004, "El Govern pide a Madrid que renuncie a los fondos para llevar agua del Ebro a Barcelona", Jordi Marsal
[373] La Vanguardia, Miércoles 30 de Junio 2004, p.26, "El Pp llena de pancarta el Congreso en defensa del trasvase del Ebro", José María Brunet
[374] La Vanguardia, Miércoles 14 de Julio 2004, p.30, "Narbona pide ayuda de la UE para 160 obras alternativas al trasvase"
[375] La Vanguardia, Lunes 19 de Julio 2004, p.35, Entrevista a Antonio Serrano, secretario general de Territorio y Biodiversidad, by Antonio Cerrillo
[376] La Vanguardia, Miércoles 2 de Abril 2008, Vivir en Barcelona p.1-2, "El Ebro vende agua", Esteve Giralt
[377] La Vanguardia, Jueves 3 de Abril 2008, Vivir en Barcelona p.4, "Los regantes sellan su unidad para negociar", Esteve Giralt
[378] La Vanguardia, Martes 8 de Abril 2008, Vivir en Barcelona p.2, "Los regantes del Ebro exigen fuertes incentivos"

Delta[379]. The *Col·legi d'Enginyers de Catalunya* [Catalan Engineering association] as well as some hydrologists also backed the transfer from the Ebro rather than from the Segre[380].

Figure 5.5. Options of transferring water from the Ebro

Source: own elaboration from La Vanguardia, Jueves 3 de Abril, Vivir en Barcelona, p.2

Figure 5.6. Options to connect the Ebro mini-transfer to Barcelona



Source: own elaboration from La Vanguardia, 8/3/08 p.12

Some Catalan engineers and ecologists (Ramon Folch, Josep Alabern or Josep Dolz[381]) emphasized the need to interconnect the networks to increase the reliability of supply in front of drought episodes.

[379] La Vaguardia, Miércoles 9 de Abril 2008, Vivir en Barcelona p.3, "Regantes y Govern se acercan con lentitud", Esteve Giralt
[380] La Vanguardia, Jueves 3 de Abril 2008, Vivir en Barcelona p.1-2, "El Ebro gana adeptos", Antonio Cerrillo

> "Without an interconnected network, water could not be governed. Without a network, management is not possible", Ramon Folch, interviewed in *La Vanguardia*[382]

From CiU the idea to interconnect the basins was meaningless without the input of extra water:

> "The proposal to interconnect the regional supply networks only helps to interconnect the misery", Ramon Espadaler, quoted in *La Vanguardia*[383]

The mayor of Barcelona Jordi Hereu argued that "the right to water is actually a principle of equity that has to include all Catalans and all territories and municipalities of the country, wherever they are located"[384]. In that sense, the mayor and president of the Metropolitan Body asked for territorial and social cohesion in order to carry out the necessary measures to ensure water to all the citizens. The EMMA, the Metropolitan body for the environment, also asked the Generalitat and the Spanish state to guarantee the supply of water in the metropolitan area and avoid restrictions[385].

In parallel, the Catalan government accepted to study the feasibility of the transfer from the Rhone river as an option to be considered for the future[386], despite having ruled it out some time. Although the Catalan president and the opposition agreed to meet in order to search for a common position against the drought[387], the Catalan government however, did not want the Parliament to decide about water transfers[388].

It is important to mention that Spanish elections took place in March 2008 and that the Socialist Party (PSOE) won although far from absolute majority. In the search for allies for the vote of confidence session, water was a key element. For instance, CiU put again the transfer of the Rhone on the table as one of the conditions to refrain

[381] See interview in La Vanguardia, Domingo 6 de Abril 2008, Vivir en Barcelona, p.4-5, Antonio Cerrillo
[382] idem, our translation
[383] La Vanguardia, Lunes 7 de abril 2008, "El Ródano renace", Vivir en Barcelona p. 2, Antonio Cerrillo, our translation
[384] La Vanguardia, Domingo 6 de Abril 2008, Vivir en Barcelona p.6, "Agua: diálogo y responsabilidad", Jordi Hereu, Mayor of Barcelona and President of the Metropolitan Area
[385] La Vanguardia, Viernes 11 de Abril 2008, Vivir en Barcelona p.5,"El área metropolitana se une contra las restricciones", Raúl Montilla
[386] La Vanguardia, Miércoles 2 de Abril 2008, Vivir en Barcelona p.1-2, "El Ebro vende agua", Esteve Giralt
[387] La Vanguardia, Jueves 3 de Abril 2008, p.11, "Montilla se acerca a Mas por el agua", Josep Gisbert
[388] idem, p.12, "El tripartito rechaza que el Parlament decida sobre los trasvases", Silvia Hinojosa and Francesc Bracero

from voting against the government[389]. This party retook the idea to bring water from France as a solution to solve "once and forever"[390] the structural shortages of water of the Catalan basins, while improving the quality of the water and freeing the Ter. The transfer could vary from 6 to 20 m^3/s (from 189 to 621 hm^3 per year) and could arrive to Barcelona (Cardedeu), to Tarragona, or even to Tortosa (Delta de l'Ebre), crossing Catalunya North to South. According to *Fundació Catalunya Oberta*, a free market Catalan think tank, the participation of private capital in such venture would be feasible and the costs would be below those of desalinization. However, desalinization, according to CiU, would also have a role in the mid-term to solve the water problem of Barcelona, although never as a "solution" to solve the problem forever[391]. At the level of imminent actions, they totally rejected the possibility to transfer from the Segre and instead CiU backed the connection with the Ebro mini-transfer, the buying of water rights to the farmers in the Ebro basin, water shipped from other places and water from the mines of Fígols (north Barcelona). The latter option was dismissed due to low-level water flows and the high mineralization[392].

The Spanish government accepted to study the proposal of the Rhone presented by CiU and consequently to inform the French government[393]. For the president of the Generalitat the plan to bring water from the Rhone was a "joke" as the proposal required an agreement between the Spanish and the French governments and would take over 15 years to complete[394]. The president of the Generalitat eventually accepted the idea to interconnect the regional networks[395] (opening the pace for the Ebro mini-transfer). However, and due to discrepancies regarding the Rhone, a Catalan water pact for the water problem could not be reached[396].

Interestingly, from some political and economic sectors water scarcity in the Metropolitan Region of Barcelona was seen not as physical consequence of climate

[389] La Vangaurdia, Domingo 6 de Abril 2008, p.14, "Duran condiciona su voto a Zapatero al trasvase del Ródano", Francesc Bracero
[390] La Vanguardia, Lunes 7 de Abril 2008, "El Ródano renace", Vivir en Barcelona p.1-2, Antonio Cerrillo, our translation
[391] La Vanguardia, Lunes 7 de Abril 2008, p.15, "Mas ofrece a Montilla un pacto global para afrontar la sequía", Isabel Garcia Pagan
[392] La Vanguardia, Miércoles 9 de Abril, Vivir en Barcelona p.2, "No al agua de las Minas de Fígols"
[393] La Vanguardia, Jueves 10 de Abril 2008, p.11, "Madrid hablará con París del Ródano", Enric Juliana
[394] La Vanguardia, Jueves 10 de Abril 2008, p.12, "Montilla ve en el plan del Ródano "una broma de mal gusto", Carla Fibla and Josep Gisbert
[395] La Vanguardia, Martes 8 de Abril 2008, p.12, "El tripartito rectifica y estudia ahora la conexión con la red del Ebro", Josep Gisbert
[396] idem, p.11, "Montilla no logra un pacto catalán del agua y pasa la pelota a Zapatero", Jordi Barbeta

change but as a politically driven issue[397]. The problem of water scarcity was defined mainly as a consequence of the incapacity of the different political parties to plan and implement structural solutions to the cyclical droughts on the Llobregat and Ter basins. An op-ed of *La Vanguardia* stated this position and also claimed that water could not be so politically contested[398].

Another alternative source of water gained momentum due to the drought period: groundwater from the Barcelona subway network. Though not drinkable, since 2005 it had been used for public purposes such as watering public gardens or street cleansing. The metro network draws 7 to 11 hm^3 per year of which some 1,3 hm^3 are used. In 2009 it was planned to increase the quantity to 2,2 hm^3 as a result of the extension of the network. The remainder water was diverted to the sewer system and to the Besòs to increase the environmental flow of this river[399], as an example of how a river could be 'artificially' improved to restore its 'natural' characteristics. In the same line of utilization of local resources, the town council of Barcelona announced that the municipality would double groundwater use for public uses by 2009[400].

Despite the prominence of supply side measures, such as transfers, dominating the political debate, other demand-side measures were carried out. A very important one was the construction of a pipe from the wastewater treatment plant of El Prat 8 kilometers upstream[401]. The reclaimed flow, some 2,5 hm^3, would be used to recharge the aquifers or for agricultural purposes; however, an important part would be discharged on the river and latterly the same flow would be captured in the treatment plant and became drinkable water. This is a clear example of indirect reutilization for domestic water consumption.

Once the option to bring water from the Segre was ruled out, the central government and the Generalitat agreed to bring water from the Ebro, with the construction of a pipeline connecting Tarragona with Olèrdola.

The Catalan minister of the environment however still defended the transfer of water from the Segre as it was the only project to be "temporal, reversible and

[397] La Vanguardia, Domingo 6 de Abril 2008, p.14, piece of opinion "La Vaterpolítica", Jordi Barbeta
[398] La Vanguardia, Domingo 6 de Abril 2008, p.22, "Hay que actuar ya"
[399] La Vanguardia, Jueves 10 de Abril 2008, Vivir en Barcelona p.2, "El metro da agua", Óscar Muñoz
[400] La Vanguardia, Martes 8 de Abril 2008, "Barcelona duplicará el uso de agua freática", Lluís Sierra
[401] La Vanguardia, Viernes 11 de Abril 2008, Vvir en Barcelona p.5,"Agua depurada para alimentar el Llobregat"; Antonio Cerrillo

provisional"[402]. However, the transfer from the Segre was definitely buried when the Generalitat and the Spanish government decided to rely on the Ebro[403]. The pipe finally would have 60 kilometers and would bring 3.1 hm^3 per month of the water not used by Tarragona from the Ebro; the irrigation communities of the Ebro would not receive money but the commitment of investments to improve irrigation systems (bringing about savings around 50 hm^3 per year, roughly the same amount transferred to Barcelona)[404]. After this, the irrigations communities of the Ebro changed their opinion and positioned against the interconnection, as compensations were not bearable[405].

As we have mentioned before, semantics was a relevant issue and the promoters of the project went on denying it was a water transfer: "It is not a transfer: we are going to buy water to the farmers to supply Barcelona while the drought lasts"[406].

The Catalan opposition, CiU, went on to reclaim a pact to fight the drought that included the transfer from the Rhone[407]. On the other hand, the Spanish conservatives (PP) were in favor of the interconnection with the condition that the other territories of the Mediterranean coast had also access to Ebro's waters[408]. Such was the case of Valencia and Murcia (figure 5.7), who totally backed a permanent transfer to Catalunya while asking for an equal treatment, i.e. receiving water from the Ebro as well[409], and even appealing to the Constitutional Court[410].

ICV insisted on the temporality of the project and threatened to leave the government in the case the interconnection became permanent[411]. To exemplify the temporality of the transfer the Catalan government passed a motion against the permanent water

[402] idem, p.13, "Las administraciones ultiman el plan para llevar el minitrasvase a Barcelona", Antonio Cerrillo, our translation
[403] La Vanguardia, Domingo 13 de Abril 2008, p.25, "Montilla asume el plan del Ebro y renuncia al trasvase del Segre", Josep Gisber and Raúl Montilla
[404] La Vanguardia, Miércoles 16 de Abril 2008, p.10, "El coste del pacto del Ebro irá a cargo de los fondos del Estatut", Antonio Cerrillo
[405] La Vanguardia, Jueves 17 de Abril 2008, p.18, "Los regantes buscan negociar compensaciones", Esteve Giralt
[406] Words by María Teresa Fernández de la Vega, vice-predisent of the Spanish Government. La Vanguardia, Martes 15 de Abril 2008, "El Gobierno pagará buena parte de lo que cuesata mover el agua del Ebro", Jaume V. Aroca and Josep Gisbert, our translation
[407] La Vanguardia, Miércoles 16 de Abril 2008, p.13, "Mas evita apoyar el plan del Ebro y persiste en el Ródano", Josep Gisbert
[408] idem, p.13, "El PP, a favor, y para todos", C. del Riego
[409] La Vanguardia, Jueves 17 de Abril 2008, p.18, "Valencia pide agua, pero evita un choque con Catalunya", Salvador Enguix
[410] idem, "Valencia y Murcia reclamarán agua del Ebro en el Constitucional", Salvador Enguix
[411] idem, p.19, "ICV amenaza con dejar el Govern si la opción del Ebro no es temporal", Josep Gisbert

transfer between basins[412]. The contestation to the plan even received the support of one of the parties of the government, ERC[413], which maintained a different and curious stance according to geography: in favor in Barcelona, against in southern Catalunya, and neither for nor against in Madrid[414].

Figure 5.7. Cartoon satirizing the request of Ebro's water by Murcia and Valencia**.**

Source: *Ninots* by Toni Batllori (*La Vanguardia*, 18/4/08, p. 15)

The proposal of the Spanish government to "win" some 50 hm^3 with the modernization of the irrigation system of the Delta was defined as not realistic by some experts and media. As a result, the Catalan government studied to acquire the water rights of the farmers in the whole Ebro basin (again, the compensations could be under the form of investments)[415]. This proposal could create *de facto* a water rights bank as it would open the process to all farmers and not only to the irrigation communities of the Delta.

The Spanish government, against the requests from Valencia and Murcia, insisted that the Decree by which the interconnection will be implemented did not imply a new concession to draw water from the Ebro but the "reappointment" of the destiny of the water assigned for the mini-transfer to Tarragona.[416] The decree also specified that the infrastructure would be paid by the central government as investments included in the new Catalan Autonomy Law[417].

[412] La Vanguardia, Viernes 18 de Abril 2008, p.16, "El tripartito se justifica por el Ebro con una moción contra los trasvases permanentes", Josep Gisber and Francesc Bracero
[413] La Vanguardia, Domingo 27 de Abril 2008, p.16, "ERC actuará contra el plan Ebro que defiende el Govern", Francesc Bracero
[414] La Vanguardia, Martes 29 de Abril 2008, "El minitrasvase de agua del Ebro divide al tripartito en el Congreso", F. Bracero and J.V. Aroca
[415] La Vanguardia, Viernes 18 de Abril 2008, Vivir en Barcelona p.2, "El Govern intenta ahora negociar con más regantes", Antonio Cerrillo
[416] La Vanguardia, Sábado 19 de Abril 2008, p.15, "El Gobierno se pertrecha ante la 'guerra del agua' y pide no humillar a Barcelona", Cristina Sen
[417] idem, p.16, "El decreto ratifica que el plan Ebro se pague con fondos del Estatus", Antonio Cerrillo

The Decree of the Spanish government[418] enabled the Generalitat to buy water rights from the farmers of the Ebro basin in order to avoid the reduction of water flows in the mouth of the river. We recall that the creation of water markets already appeared in the modification of the water legislation in 2001[419]. However, the *Federación de Regantes del Ebro* (Ebro irrigators' federation) and the Aragon region ruled out the possibility of selling water rights to be used 'outside the basin'[420]. As we see the processes of marketisation and commodification of water are ridden with conflict and struggle, and some mobilizations impede the neoliberalization of this resource. The expert on water resources Pedro Arrojo, from Zaragoza, insisted on the fragility of the idea to save water in the irrigation systems to offset the effects of the transfer to Barcelona. Additionally, he criticized the plans to increase in 300,000 hectares the irrigated land in the Ebro valley, equivalent in water consumption to twice the transfer proposed by the PP in the National Water Plan[421]. The plan raised contestation from the anti-transfer movement (*Plataforma en Defensa de l'Ebre)* in the *Delta de l'Ebre*[422] despite the efforts of the Catalan government to implement a water rights market to trade off the temporal effects of water withdrawals. However, as we have mentioned, this plan faced the frontal opposition of the farmers of the Ebro basin and of the Aragon region; furthermore, it lacked the support of the State. Instead, the opponents to the selling of rights situated water savings as the way to offset the impacts of the transfer of water to Barcelona[423]. The government of Aragon feared that with the institution of a water rights market other regions such as Murcia or Valencia could make offers to the farmers and promote emergency transfers[424]. The Secretary of State on Water, Josep Puxeu[425], also moved away from the "mercantilization of water" in a basin such the Ebro as water could end being

418 *Real Decreto-Ley 3/2008, de 21 de abril, de medidas excepcionales y urgentes para garantizar el abastecimiento de poblaciones afectadas por la sequía en la provincia de Barcelona.*

419 *See article 67.1 of Real Decreto Legislativo 1/2001, de 20 de julio, texto refundido de la Ley de Aguas*

420 La Vanguardia, Viernes 25 de Abril 2008, "La pugna Gobierno-Generalitat deja en el aire el inicio de obras del plan Ebro", Antonio Cerrillo

421 La Vanguardia, Lunes 5 de Mayo 2008, Vivir en Barcelona p.3, Interview to Pedro Arrojo by Antonio Cerrillo

422 La Vanguardia, Miércoles 23 de Abril 2008, p.20, "Baltasar no logra vencer la reticencia de los antitrasvasistas al plan Ebro", Esteve Giralt

423 La Vanguardia, Sábado 26 de Abril 2008, p.15, "El Govern se queda solo en su plan para compensar el trasvase", Antonio Cerrillo and Mario Sasot

424 La Vanguardia, Miércoles 30 de Abril 2008, p.14, Anlysis "No atosiguen a los regantes", Antonio Cerrillo

425 La Vanguardia, Vivir en Barcelona p.4, Entrevista a Josep Puxeu, Secretario de Estado de Medio Rural y Agua, Antonio Cerrillo

controlled by those with more ability to pay: the city and the services sector as it has been happening in California since the late 1980s when water markets were established due to the long-standing and recurrent droughts (Anderson and Snyder 1997).

On the 28th of April 2008 the Generalitat constituted the *Taula Nacional de la Sequera* [Drought National Board][426] with politicians, scientific experts, environmental groups, and other stakeholders. Their aim was to become an arena of discussion of the different proposals to face the drought and with the unique condition to avoid talking about permanent transfers.

It was finally agreed that the extension of the transfer to Barcelona by means of a water pipe would not be permanent but only operate during episodes of extreme urgency[427]. Furthermore, the connection would be reversible, i.e. Tarragona would receive water from Barcelona if needed in the future[428].

The Spanish government proposed a UTE (Temporary Consortium) between 5 or 6 firms to develop the project. AGBAR asked to have a key role in the works[429] and presented a proposal to carry out the project in 6 months. Eventually, the project, to be finished by mid October, was granted for 164 million Euros to a UTE of 6 firms, leaded by AGBAR with 20 percent of the stakes. The other firms were Sacyr, Copisa, Dragados, Comsa and Acciona Infrastructuras[430]. The water crisis had provided the water company with an opportunity to expand their business reach, first with the construction of facilities to connect the port of Barcelona with the water network, and after with the construction of the pipe connecting Tarragona with Barcelona.

[426] See http://aca-web.gencat.cat/aca/sequera/ca/taula-nacional-presentacio.jsp, last accessed 8th October 2009.
[427] La Vanguardia, Jueves 1 de Mayo 2008, p.11, "El trasvase Tarragona-Barcelona funcionará en los dos sentidos", Antonio Cerrillo and Iñaki Ellakuría
[428] La Vanguardia, Martes 6 de Mayo 2008, p.16, "Barcelona dará a Tarragona agua si se contamina el Ebro", Antonio Cerrillo
[429] La Vanguardia, Jueves 1 de Mayo 2008, p.11, "El trasvase Tarragona-Barcelona funcionará en los dos sentidos", Antonio Cerrillo and Iñaki Ellakuría
[430] La Vanguardia, Viernes 9 de Mayo 2008, Vivir en Barcelona p.5, "AGBAR llevará la batuta en la obra del trasvase", Antonio Cerrillo

Finally heavy rains fell on Metropolitan Barcelona. *La Vanguardia* wrote that the "isobars lined up, at last, against the curse"[431] [of lack of rains]. These rains put off the activation of the emergency level to late May[432].

5.2.5 "Al maig cada dia un raig"! Or how the Ebro's transfer was shelved again

May became the key month to understand how the drought situation would evolve in the near future. May 2008 was the rainiest month in 30 years in many parts of Catalunya. This totally changed the pre-established schemes of emergency measures.

At the beginning of May, rains increased the water level of the system to over 25 percent[433] and delayed emergency until June. It continued to rain during part of the month[434]. Thus, while at the end of March the system only had 126 hm^3 (just 6 hm^3 above the emergency level), by mid May the water stored had rocketed up to over 170 hm^3 [435, 436]. The level of exceptionality II could be lifted and with it the restrictions to outdoor uses[437]. However, the removal of the ban raised important criticisms, especially from the places where water was drawn to quench the thirst of Barcelona during the drought, i.e. the city of Tarragona providing water from wells to ship to Barcelona. To respond to the situation, the Catalan government decided to modify the Decree of drought[438] to avoid having to lift the ban on outdoor uses of water[439]. Water shipped from Tarragona was not coming solely from the wells but

[431] La Vanguardia, Viernes 18 de Abril 2008, Vivir en Barcelona p.3,"¡A remojo, por fin!", Frances Peirón
[432] La Vanguardia, Martes 22 de Abril 2008, Vivir en Barcelon p.4, "Las lluvias dan otra semana de respiro", Óscar Muñoz
[433] La Vangaurdia, Sábado 3 de Mayo, Vivir en Barcelona p.7,"Las reservas del Ter-Llobregat llegan al 25%"
[434] La Vanguardia, Sábado 10 de Mayo 2008, "Agua de mayo", Lluís Sierra and Antònia Justícia
[435] La Vanguardia, Lunes 12 de Mayo 2008, Vivir en Barcelona p.5, "Inyección a los embalses", Antonio Cerrillo
[436] La Vanguardia, Martes 13 de Mayo 2008, Vivir en Barcelona p.4, "Los embalses salvan un nivel de alerta", A. Cerrillo and L. Sierra
[437] La Vanguardia, Miércoles 14 de Mayo 2008, Vivir en Barcelon ap.3, "El Govern levanta la prohibición de regar jardines y llenar piscinas", Antonio Cerrillo
[438] Decret 108/2008, de 15 de maig, de modificació del Decret 84/2007, de 3 d'abril, d'adopció de mesures excepcionals i d'emergència en relació a la utilització dels recursos hídrics
[439] La Vanguardia, Jueves 15 de Mayo 2008, Vivir en Barcelona p.1-2, "El Govern rectifica", Antonio Cerrillo and Sara Sans

mixed with Ebro's water arriving to this city[440], as it was actually unveiled some days after the arrival of the first ship[441]).

Despite the increase of water stocks, the Catalan government insisted with the project to interconnect Tarragona and Barcelona networks, with the proviso that water would only flow in case of emergency[442]. By mid May, the first ship with water from Tarragona wells (some 20,000 m^3) arrived at Barcelona[443] with an average cost per journey of 280,000 Euros[444]. The 21st of May the first ship containing water from the Rhone arrived in Barcelona[445]. For some sectors, such as tourism, the arrival of water by ship would jeopardize the image of Barcelona and Catalunya to the rest of the world[446]; in fact, some English tabloids carried images of the ships which raised the anger of Barcelona city council and business interests.

Meanwhile, the Government of Aragon asked for the removal of the transfer/connection of water from the Ebro to Barcelona and also claimed that article 3 of the Spanish Decree that regulated the creation of a market of water rights was unconstitutional [447]. The Spanish government, however, was inflexible and argued again that the transfer would be reversible, that many rights had been already acquired, and that part of the investments was already spent[448]. In addition, the government refused the arguments deployed by Aragon regarding the mercantilization of water and responded that it was a free cession of rights[449]. Some days later, the Spanish government ratified their will to carry out the project, but this time some voices stated that in the case the reservoirs reaching 50 percent of their

[440] La Vangaurdia, Viernes 16 de Mayo 2008, Vivir en Barcelona, p.2, "El Govern mantiene la excepcionalidad por decreto", Antonio Cerrillo
[441] La Vanguardia, Martes 20 de Mayo 2008, Vivir en Barcelona p.5, "Tarragona envió agua del Ebro antes del acuerdo", Sara Sans
[442] La Vanguardia, Martes 13 de Mayo 2008, Vivir en Barcelona p.2, "El Govern mantiene el trasvase pese a la lluvia y Aragón dice que ya no urge"
[443] La Vanguardia, Martes 13 de Mayo 2008, Vivir en Barcelona p.1-2, "Llega el agua", Esteve Giralt
[444] La Vanguardia, Miércoles 14 de Mayo 2008, Vivir en Barcelon ap.1-2, "Del barco al grifo", Óscar Muñoz
[445] La Vanguardia, Miércoles 21 de Mayo 2008, Vivir en barcelona p.4, "Llega el agua del Ródano", Javier Ricou
[446] La Vanguardia, Martes 13 de Mayo 2008, Vivir en Barcelon ap.3, "Los comerciantes exigen que se detenga la llegada del barco", Antònia Justícia
[447] La Vanguardia, Viernes 16 de Mayo 2008, Vivir en Barcelona p.1-2, "La batalla del Ebro", Antonio Cerrillo
[448] idem p.3, "El minitrasvase se hará pese a todo", Antonio Cerrillo
[449] La Vanguardia, Sábado 17 de Mayo 1008, Vivir en Barcelona p.4, "El Gobierno replica a Aragón que Catalunya necesita el ministrasvase", Francesc Bracero and Sara Sans

capacity the project would be cancelled[450]. An op-ed of *La Vanguardia* strongly criticized the decision to overrule the transfer in case the reservoirs dramatically increased their stock of water[451].

Contestation in the *Terres de l'Ebre* was also growing, with 20,000 people, part of them coming from Aragon, Girona or even Barcelona, marching in Tortosa against the extension of the mini-transfer[452].

By the end of May rains had added over 120 hm^3 into the supply system since March. That was more than twice or even thrice the amount of water to be transferred from the Ebro through the mini-transfer. With the system at 40 percent of capacity, the technicians of the Ministry of the Environment forecasted that Barcelona could have water until the desalination plant came into operation. The lack of an imminent emergency combined with the legal threats raised by Aragon spurred the Spanish government to revoke the decree that enabled the extension of the mini-transfer from the Ebro[453]. However, the Generalitat had the right to pursue the project, although with its own funds.

Despite water levels approaching 50 percent of the capacity of the system, the Generalitat was reluctant to accept that the drought was over[454]. The position of the Catalan government was very ambiguous as some of components of the government (ICV and ERC) asked for stopping the works[455]. *La Vanguardia* continued to argue for the need to develop such project[456]. Eventually, the Catalan government assumed that the transfer was not going to be implemented after the notable increase of the water stocks[457]. However, the Generalitat still had the idea to connect at some point the Tarragona regional network with that of Barcelona[458], after the future

[450] La Vanguardia, Martes 20 de Mayo 2008, Vivir en Barcelona p.4, "El minitrasvase sólo se eludirá con embalses al 50%", Antonio Cerrillo and Laia Forés
[451] idem, p.20, op-ed "Una obra necessaria"
[452] La Vanguardia, Lunes 19 de Mayo 2008, Vivir en Barcelona p.1-2, "El Ebro se rebela", Esteve Giralt
[453] La Vanguardia, Martes 27 de Mayo 2008, Vivir en Barcelona p.3, "El Gobierno se replantea el minitrasvase a Barcelona", Mar Díaz Varela and Antonio Cerrillo
[454] La Vanguardia, Miércoles 28 de Mayo 2008, Vivir en Barcelona p.3, "Los embalses superarán el listón del 50% en pocos días", Antonio Cerrillo
[455] La Vanguardia, Miércoles 28 de Mayo 2008, p.12, "Carod y Saura exigen ahora a Montilla parar la obra de la tubería del trasvase", Francesc Bracero
[456] idem, p.22, op-ed, "Minitrasvase necesario"
[457] La Vanguardia, Jueves 29 de Mayo 2008, Vivir en Barcelona p.2, "El Govern asume que no habrá trasvase al subir las reservas", Antonio Cerrillo
[458]idem, p.1, "Tubería preventiva", Antonio Cerrillo

desalination plant in Cunit connected northwards with Barcelona and southwards with Tarragona.

Figure 5.8. The effects of the drought on culture: the tradition of the *L'Ou com* balla (the "dancing egg") and the lack of water

The impact of the drought in the metabolism of the city of Barcelona even affected the city's cultural and folkloric acts. A long-standing religious tradition, highly appreciated by the tourists, l'*Ou com balla*, consisting in an egg being pushed by water flushing from a fountain and 'dancing', was affected by the drought. Some fountains suspended the act and other ones, such as the one of the Cathedral were modernized and used recycled water. Furthermore, the egg was for the first time an organic egg.

Source: La Vanguardia[459]

At the end of May the reservoirs reached the threshold of 50 percent, with some 300 cubic hectometers stored[460]. This situation eventually led the Generalitat to ease the Decree of drought[461] (except in the Muga basin) and permit to water gardens, fill swimming pools or wash cars[462]. Restrictions for other uses, for instance public fountains[463], were maintained as the first level of alert for drought was still activated (see figure 5.8 for the impact of the restrictions on cultural and religious practices). The Spanish Decree for the drought of Barcelona was suspended and the contracts with the UTE cancelled. The president of AGBAR, the company leading the UTE, argued that Catalunya needed a "higher degree of guarantee in the supply" and proposed the construction of other desalination plants and the interconnection of networks.[464]. *La Vanguardia* insisted in defending the need of an interconnection of the networks (as that presented by the Generalitat through the future desalination plant of Cunit) and also to consider the transfer of the Rhone to complement the desalinization, which was too energy demanding and probably insufficient[465].

[459] La Vanguardia, Jueves 22 de Mayo 2008, Vivir en Barcelona p.5, "'L'ou com balla' se moderniza", Antoni López
[460] La Vanguardia, Viernes 30 de Mayo 2008, Vivir en Barcelon ap.6, "La región de Barcelona supera la alerta por la sequía", Antonio Cerrillo
[461] Acord de Govern de 3 de juny de 2008. El sistema Ter-Llobrega torna a l'estat d'excepcionalitat 1.
[462] La Vanguardia, Martes 3 de Junio 2008, Vivir en Barcelona p.1-3, "Agua Bendita"/"Menos restricción", Antonio Cerrillo
[463] La Vanguardia, Sábado 21 de Junio 2008, Vivir en Barcelona p.5, "Reservas en alza, fuentes secas", Antonio Cerrillo
[464] La Vanguardia, Sábado 31 de Mayo 2008, Vivir en Barcelona p.4, "El Gobierno se desentiende de la tubería de la Generalitat", Cristina Sen, our translation
[465] La Vanguardia, Miércoles 4 de Junio 2008, p.20, op-ed "En buen camino"

Despite the derogation of the Spanish decree[466,467] and the withdrawal of the Ebro transfer the Spanish government promised to study the option of the Rhone river but only as part of an analysis of the water necessities of Spain[468]. The proposal to study the transfer of the Rhone was backed in the Spanish Parliament even by the PSC (the main party in the Catalan government, which in the Catalan Parliament would not have the same vote).[469] The Spanish government wanted to reach a *Pacto Nacional del Agua* [National Water Pact] not only putting desalinization on the table but also acknowledging the existence of a number of other technologies to govern water[470]: the regulation of rivers, the modernization of irrigation systems, water reutilization, the improvement of urban networks and also improvement of water quality. The government did not rule out water transfers on specific occasions but they did fully reject one from the Ebro. Once more paradoxically, while this was being discussed, Zaragoza feared the Ebro flooding the Expo 2008 (devoted to water)[471].

5.2.6 The end of the drought and legal ways to face future events

In September 2008 the Catalan government still maintained the Decree of drought. The city of Barcelona asked the Generalitat for permission to fill the fountains[472], most of them functioning with a closed circuit. This petition was conceded as an exception[473] to recover the image of the city for the local celebration *La Mercè*. However, the rest of the fountains remained dry in November[474] or even in

[466] *Resolución de 6 de junio de 2008, de la Secretaría de Estado de Medio Rural y Agua, por la que se publica el Acuerdo del Consejo de Ministros de 6 de junio de 2008, por el que se declara la concurrencia de la causa de cese de la vigencia del Real Decreto-ley 3/2008, de 21 de abril, de medidas excepcionales y urgente para garantizar el abastecimiento de poblaciones afectadas por la sequía en la provincia de Barcelona*

[467] La Vanguardia, Sábado 7 de Junio 2008, Vivir en Barcelon ap.5, "Los embalses del Ter y el Llobregat, al 57%"

[468] La Vanguardia, Jueves 29 de Mayo 2008, p.19, "Zapatero y CiU pactan una resolución sobre el Ródano", Jaume V. Aroca

[469] La Vanguardia, Miércoles 4 de Junio 2008, p.15, "El Congreso insta al Gobierno a estudiar el trasvase del Ródano", Jaume V. Aroca

[470] La Vanguardia, Martes 3 de Junio 2008, p.14, "El Gobierno, abierto a los trasvases menos al del Ebro", Antonio Cerrillo

[471] La Vanguardia, Martes 3 de Junio 2008, p.14, "La crecida del Ebro amenaza la inauguración de la Expo", M. Sasot

[472] La Vanguardia, Miércoles 17 de Septiembre 2008, Vivir en Barcelona p.6, "Barcelona pide al Govern que le deje llenar las fuentes", Antonio Cerrillo

[473] La Vanguardia, Viernes 19 de Septiembre 2008, Vivir en Barcelona p.1, "Fluye la Mercè", Ramon Suñé and Raúl Montilla

[474] La Vanguardia, Viernes 14 de Noviembre 2008, Vivir en Barcelona p.1-3, "Embalses llenos, fuentes seca", Óscar Muñoz

December[475] when the level of stored water reached 76 percent of the capacity, thrice the volume stored a year before, and higher that the ten-year period average[476]. Even at the beginning of 2009 the decree was still on the first level of alert, banning some uses of water[477]. Eventually by mid January 2009 the decree was definitely derogated and shelved[478]. The legacy: 650 days of different levels of alert[479] and restrictions. Eventually the public fountains could be filled again[480]. In Spring 2009 reservoirs were over 90 percent and some of them had even to release excess water.

The total economic cost of the drought reached 490 million Euros, according to the Catalan ministry on the environment[481]. Other sources increased this figure to some 507 million Euros, of which 170 millions were unrecoverable[482].

As a result of the drought, a decision to elaborate a set of guidelines to act in case of drought (*Pla de Gestió de les Sequeres*) was taken. This plan would detail an array of actions to be carried out according to the decrease of water stored and would oblige all the municipalities over 10,000 people to have a contingency plan[483]. This plan would mean a turning point from the management of drought emergencies to the management of drought risk, with thresholds of probability of occurrence and magnitude. The surveillance would be permanent with the constitution of Drought Observatory (see table 5.5).

The Spanish Government started the study of a hypothetic transfer to Catalunya of water from the Rhone river[484] but this was eventually discarded in May 2009 due to

[475] La Vanguardia, Miércoles 17 de Diciembre 2008, Vvir en Barcelon p.1-2, “Fuentes sin indulto”, Antonio Cerrillo
[476] La Vanguardia, Martes 30 de Diciembre 2008, Vivir en Barcelon ap.1-2, “Las reservas se triplican”, Antonio Cerrillo
[477] La Vanguardia, Viernes 9 de Enero 2009, Vivir en Barcelona p.3, “Un decreto de sequía pasado por agua”, Antonio Cerrillo
[478] Decret 5/2009, de 13 de gener, pel qual es deroga el Decret 84/2007, de 3 d’abril
[479] La Vanguardia, Martes 13 de Enero 2009, Vivir en Barcelon ap.3, “El carpetazo a la sequía permite abrir las fuentes”, Antonio Cerrillo
[480] La Vanguardia, Jueves 15 de Enero 2009, Vivir en Barcelona p.5,“Las fuentes volverán a tener agua poco a poco”, Lluís Sierra and Maite Gutiérrez
[481] La Vanguardia, Jueves 4 de Septiembre 2008, Vivir en Verano p.11, “La sequía de los 490 millones”, Antonio Cerrillo
[482] Seminari “Cap a la garantia en l’abastament d’aigua a Catalunya”, Diagnosi de la situació actual, 16 d’octubre de 2009. Cambra de Comerç de Barcelona, Cercle d’Economia, Foment del Treball Nacional, RACC and Enginyers Industrials de Catalunya.
[483] La Vangaurdia, Miércoles 15 de Abril 2009, Vivir en Barcelona p.1-3, “Manual antisequías”, Antonio Cerrillo
[484] La Vanguardia, Viernes 10 de Octubre 2008, p.13, “El Gobierno activa los estudios sobre el trasvase del Ródano”, Enric Juliana

economic, social and environmental reasons[485]. In July 2009 the desalination plant of El Prat de Llobregat, next to the city of Barcelona, began to operate, providing Barcelona and its region with a new source of water.

Table 5.5. The new Drought plan. Levels of action.

	Probability	Volume	Measures	Raw water allowance
Prealert	<40	<60	Detection of evidences of drought and implementation of preventive measures. Request of information to bulk and urban water suppliers.	
Alert	<20	Variable	Implementation of saving measures in supply. Partial restrictions to non-priority uses (decrease of public gardens watering or street cleansing) Treated wastewater for agriculture (partial or total)	250 lpcd
Exceptionality	<10	Variable	Intensification of the restrictions to non-priority uses Banning of some uses served by the urban supply networks (public ornamental fountains)	230 lpcd
Emergency	<5	<15	Restrictions in supply Different levels in function of the level of drought.	210 lpcd

Source: Adapted from Agència Catalana de l'Aigua.2009. Pla de gestió de sequeres. Document preliminar, versió de 29 de gener de 2009. Barcelona.

[485] La Vanguardia, Jueves 7 de Mayo 2009, Vivir en Barcelona p.7, "El agua del Ródano dispararía la factura, según los expertos", Antonio Cerrillo

5.3 Barcelona goes desal!

> "If we could produce fresh water from salt water at a low cost, that would indeed be a great service to humanity, and would dwarf any other scientific accomplishment", John F. Kennedy, President of the United States of America (1962)
>
> "We have to leave behind the archaic rationale that we rely on the sky to have water and to start thinking that we only depend on our capacity of forecasting, planning and hydraulic management. The gift from the sky is not the rain of each season but our intelligence to make the most and preserve a planet of water", Enric Colet, 2008[486], professor of ESADE

Ecological modernization and the endless faith in technology to tame and produce new water flows is arguably the most wide-shared ideology in water management across Spain and also in resource management in general in the Western world. The quotations above reflect such state of mind, from two geographic and temporal moments. We have been able to tame water during the 20th century and we will be able to do so in the 21st century, thanks to the emergence of new technologies to produce and govern the water flow. The hydraulic paradigm (Saurí and Del Moral 2001, Kallis and Cocossis 2003), based on the construction of dams and transfers apparently seems to give place to demand-side management alternatives (chapter 2). We argue, however, that desalination plants could be envisaged as an extreme version of the hydraulic paradigm.

Desalination, in the Spanish case, is the new cornucopia that allegedly will solve 'forever' our unbalanced water equilibrium and will erase the frontiers between the 'dry' and the 'wet' Spain. Catalunya has chosen this technology to solve its water problems, with one of the biggest desalination plants in Europe in Barcelona, and with the construction of other plants along its coast.

[486] Enric Colet in La Vanguardia, Lunes 18 de Agosto 2008, p.15, piece of opinion "La inocencia del agua"

To understand how this change of paradigm and discourses have taken place, we must go back to 2004 (or even before in 2001, with the opposition to the PHN 2001) when the choreographies of power in the Spanish Parliament changed radically.

5.3.1 Providing the framework for the implementation of desalination: the role of the Spanish state

The Spanish socialist victory of 2004, the emergence of the New Water Culture in Spain and the European Water Framework directive set the framework for a wide change in Spanish water politics. José Luís Rodríguez Zapatero, the elected president in 2004, promised a radical change in these politics, modifying the controversial PHN of 2001 and changing how water was to be considered:

> "...I want to announce a new water politics, which is going to consider both the economic value and the social and environmental value of water, with the aim to guarantee its availabilty and quality, optimizing its use and restoring aquatic ecosystems", José Luís Rodríguez Zapatero, Discurso de Investidura, Congreso de los Diputados, 15th April 2008, our translation

The materialization of what the president Rodríguez Zapatero promised in the investiture session was the modification of the *Plan Hidrológico Nacional* of 2001, including the rejection of the polemic Ebro transfer[487]. The essence of the change of orientation of Spanish water politics is captured in the *Plan A.G.U.A.* (figure 5.9).

The plan A.G.U.A not only wanted a conceptual and legal change in water resources management, but also especially wanted this change to occur in demand side measures to bring about water savings, by means of full cost recovery, optimization of the storage and distribution infrastructure, or modernization of irrigation, among other actions. However, the 1,050 hm^3 that the PHN 2001 promised by means of the Ebro transfer could not be obtained with demand-side management strategies, and an increase of supply was also needed.

[487] *Real Decreto Ley 2/2004, de 18 de junio, por el que se modifica la Ley 10/2001, de 5 de julio, del Plan Hidrológico Nacional. Ley 11/2005, de 22 de junio, por la que se modifica la Ley 10/2001, de 5 de julio, del Plan Hidrológico Nacional.*

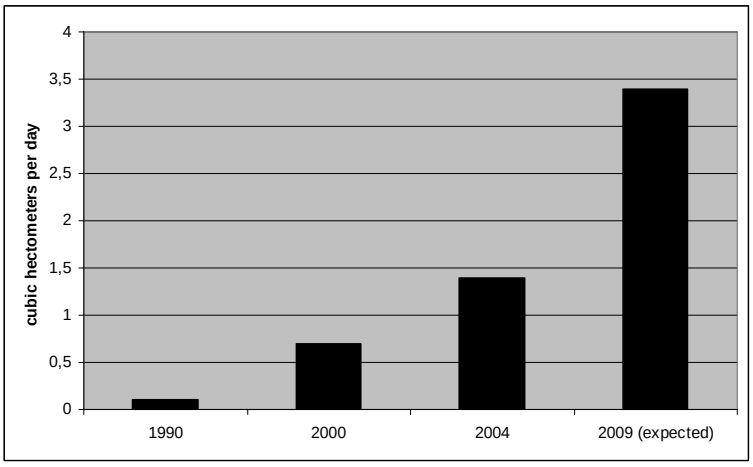
Figure 5.9. Main tenets of the *Programa A.G.U.A*

- **Water** both as a **right** and an **obligation**
- **Water** has an **economic**, **social** and **environmental value**
- **Integral management** of the resource at the **basin level**
- Complying with the **European Water Framework Directive 2000/60/EC**.
- **Water** as a **scarce resource** that must reflect the **full cost** of provision and the economic benefit that could generate.
- **Environmental flows** must be respected to maintain the health of aquatic ecosystems
- **Public participation** in **water planning**
- **Reallocation of historic water rights** under criteria of **equity, efficiency** and **sustainability** (setting of *Bancos Públicos del Agua*)
- **Technological innovation** as the cornerstone of water policy development. On the demand side equation, it would bring **water savings** as **efficiency** will increase. On the supply side it would enlarge the **quantity** of available resources and improve **quality.**

Source: Ministerio de Medio Ambiente, Medio Rural y Marino webpage, www.marm.es

To comply with the promise of not transferring more water, the Spanish government saw alternative technologies of "producing" drinkable water as the solution: water reutilization, and especially desalination.

Figure 5.10. Evolution of the production of water by means of desalination



Source: elaborated from data of the Ministerio de Fomento and Cedex

Some 3.4 hm^3 per day, or 1,240 hm^3 per year, were expected to be produced in Spain in 2009 according the Ministry of Public Works. Since 2004, when the plan A.G.U.A was launched, the installed capacity to produce freshwater has more than doubled (figure 5.10). Most of the new desalination plants have been placed along the Spanish Mediterranean coast, in regions where the water transfer from the Ebro would have arrived.

We argue that desalination plants are proposed as a compromise solution to the tension between increasing demands of water (increase of the supply) along the Mediterranean coast and the "New Water Culture" of Spanish water authorities. It is interesting to see how desalinization is to some extent presented as the "solution" to all our water problems as the alleged limiting source, the sea, is endless (figure 5.11):

> "The sea is an endless source of life, and thanks to it and desalinization plants we can have water regardless it rains or not. With this technology water supply for many municipalities is guaranteed", Campaign "Más Agua para Siempre", http://www.masaguaparasiempre.es/[488], Spanish Ministry of Environment, Rural and marine environment, our translation

Figure 5.10. Banners of the Campaign +Agua para siempre, of the Spanish Ministry of the Environment

Source: webpage of the Campaing +Agua para siempre (http://www.masaguaparasiempre.es/**)** and www.vistaalmar.es

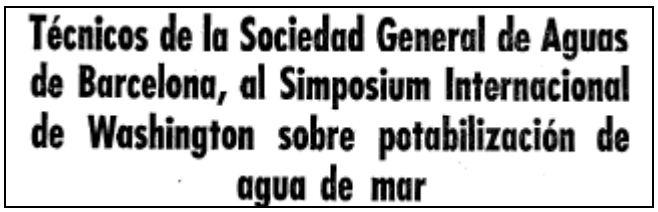
5.3.2 Desalination (and other alternative water sources) back in time

The desire to turn seawater into freshwater is not something of the 21st century. In 1965, under the Francoist regime, desalination was already seen by the SGAB with some interest. *La Vanguardia* (12th October 1965)[489] reported the presence of SGAB technicians and managers to the First Symposium on Water Desalination in Washington[490,491] (figure 5.12). By then, Spain, with its plant in Lanzarote, had joined the "club" of the countries with desalination technology: USA, Israel, etc.

[488] Last accessed 10th november 2009
[489] La Vanguardia, 12 de octubre 1965, p.34, "Técnicos de la Sociedad General de Aguas de Barcelona, al Simposium Internacional de Washington sobre potabilización de agua de mar"
[490] There is a publication of this conference: Girelli, Sea A. (ed.) "Water desalination", Proceedings of the First Symposium on Water Desalination, Washington, D.C., October 3-9, 1985. US Department of Interior, Office of Saline Water, USA.
[491] Other conferences dealing with water desalination Technologies Could be seen at http://www.desline.com/proc-others.shtml

Interestingly the news[492] emphasized that the physical and social conditions of Spain could make compulsory the study and implementation in a wide scale of such technologies.

Figure 5.11. News reporting the presence of technicians of the SGAB in a desalinization conference in Washington in 1965


Técnicos de la Sociedad General de Aguas de Barcelona, al Simposium Internacional de Washington sobre potabilización de agua de mar

Source: La Vanguardia[493]

Reutilization and recirculation, two other technologies that are gaining momentum in the water supply debate, are anything but a new idea (as it seems to happen with desalination). In an interview in *La Vanguardia* in 1982[494], the general director of the SGAB argued that reutilization and recirculation of water could be a viable option in the horizons of the year 2000. In 1983, the C*orporación Metropolitana de Barcelona* started to study reusing water (coming from wastewater treatment plants) for agricultural irrigation and the industry in the right bank of the Llobregat's delta; this was aimed to reduce pressure to the Llobregat's delta aquifer (with salinity problems). By that time, reutilization was seen already as an option to complement water supply:

[492] La Vanguardia, 12 de octubre 1965, p.34, "Técnicos de la Sociedad General de Aguas de Barcelona, al Simposium Internacional de Washington sobre potabilización de agua de mar"
[493] idem
[494]La Vanguardia, Viernes 12 de Febrero 1982, p.27, Interview to Josep Bernís (general director of SGAB), "Josep Bernis: 'Barcelona no debería tener dificultades de abastecimiento de agua'
[494] idem, our translation

> "reutilization is going to complement the protection to the environment done by wastewater treatment, as long as the reclaimed water is not only not harmful or polluting but is perfectly reusable, at least for some uses"[495]

In 2006, reutilization was seen by the administration as a cornerstone of the future mix of water supply alternatives. Thus, the director of the water regulator, the ACA, was convinced that:

> "Within ten years all the water coming from wastewater treatment plants will be reused. And peasants know that, and so they have acknowledged that eventually they will only have this water, an endless source", Jaume Solà, director of the ACA[496]

The water company, AGBAR, was more cautious regarding the role of reutilization, seeing the source as

> "another element of the new policy, but not the absolute solution because we are not going to be able to use 100 percent of it. Some wastewaters are not going to be able to be used as domestic water while they could be used for some industrial uses", Lleonart Carcolé, general director of AGBAR in Catalunya[497].

A clear example of how a river flow could be composed mostly of reutilized water is the Llobregat. The lower course of the Llobregat has become the first Spanish river with most of its water coming from wastewater treatment plants (up to 80% of the flow) because the treatment plant of AGBAR draws 2.8 out of the 3 cubic meters per second flowing in average [498]. The recirculation of treated water increases the final flow to 1 cubic meter per second, contributing to maintain the ecological flow and permitting to save water from the reservoirs. There were similar proposals for the Segre, Ebre or Ter rivers[499].

5.3.3 Desalination in Barcelona

In an article published in 1957 in *La Vanguardi*a two projects to guarantee water for a population of 4 million people until the end of the century[500] were presented: namely the regulation of surface water from the Llobregat and the future transfer

[495] La Vanguardia, Domingo 24 de abril 1983, p.29, "Probable reutilización de las aguas residuales", Mateu Serra, our translation
[496] La Vanguardia, 19 de Marzo 2006, Revista p.12, "Revolución en el grifo", Jordi Rovira
[497] Idem, our translation
[498] La Vanguardia, Jueves 26 de Octubre 2006, Vivir en Barcelona p.4, "El Llobregat, el primer río de agua reutilizada", Antonio Cerrillo
[499] La Vanguardia, Martes 24 de Junio 2008, p.60, Tribuna "Devuélvamen el agua", Modest Guinjoan
[500] La Vanguardia, Viernes 19 Julio 1957, p.16, "El suministro de agua ha de permitir el desarrollo de la ciudad"

from the Ter. Seen in perspective, the calculations were quite exact: at the outset of the 21st century the model of water supply in Barcelona collapsed (droughts of 2004-2005 and the critical one of 2008). New technologies were brought into the water conundrum together with new assemblages of networks composed by people, objects and quasi objects. Desalination and especially its core technology, reverse osmosis membranes, are currently the most desired "definitive solution" to the drought problem.

The Catalan government planned to increase available water resources for the Catalan Inner Basins by 300 hm^3 per year in 2012, reaching then a maximum capacity of 1,000 cubic hectometers, similar to that of the region of Madrid. Desalination will reign supreme in the new mix of new flows of water, producing some 200 hm^3 (table 5.6), i.e. 66 percent. However, reutilization of water from wastewater treatment plants and improvement of available flow would play a key role as well (producing some 25 percent of the new water)[501]. Eventually, the decontamination and recharge of polluted aquifers (by means of reverse osmosis technologies) would complement the mix.

Table 5.6. Existing and forecasted desalination plants in Catalunya

Location	Province	Capacity	ready in
El Prat de Llobregat	Barcelona	60	In operation
Blanes	Girona	10	In operation
Blanes	Girona	Enlargement of the plant in 10 hm^3 and connection with the ATLL network	2009-2010
Cunit	Tarragona	60	2010-2012
Tordera	Girona	60	2012
Muga	Girona	n.a	n.a

Source: own elaboration from data of Agència Catalana de l'Aigua

With the mini-transfer dismissed, the likely future interconnection of basins, and the Rhone river 'under study' by the Spanish government, desalinization rules unabated in the public discourse on water resources in Barcelona.

> "Today Catalunya has the technological and economic capacity to have all the water it desires. But bearing in mind this: the cost of supplying drinking water is different

[501] La Vanguardia, Domingo 15 de Junio 2008, Vivir en Barcelona p.2, "Objetivo: no tocar más los ríos", Antonio Cerrillo

> depending on the territory and the source used. We could have the water we desire, but not at a free cost. We have the technology to desalt seawater, to reuse water, to increase agricultural productivity with less water" Enric Colet, professor of ESADE [502]

Notwithstanding the harsh criticisms made by some media and politicians towards desalination as the unique policy to improve the reliability of water supply, some time later, perspectives converged and contributed to the discursive hegemony of this technology. Along these lines *La Vanguardia* qualified desalination as the "Marine solution" that would ease the ever increasing conflicts around water: "From the sea will come the water that has to avoid the territorial conflicts emerging every drought period"[503]. Again, the conception of an endless supply of water was resorted to. Another headline of *La Vanguardia* was very explicit: "Agua del mar por el grifo" [Seawater through the tap][504]

Water from desalination, apart from 'solving' the recurrent water crises was to dramatically improve tap water taste.[505] Despite the investments by the Ministry of the Environment (actually from the *disposició adicional tercera de l'Estatut*) , around 160 million Euros[506], part of the water infrastructure would have to be paid directly by the citizen. Thus, raw water sold by ATLL would also become more expensive[507] (not only because of desalination) with hypothetic increases up to 36 percent[508]. Related to this issue, water companies generally saw the desalination plant as over-dimensioned and feared an important increase of price for bulk water[509].

In 2009, with the completion of the plant, the Ter-Llobregat network would receive the water from two different rivers, from two different aquifers and also from the sea:

[502] Enric Colet in La Vanguardia, Lunes 18 de Agosto 2008, p.15, piece of opinion "La inocencia del agua", our translation
[503] La Vanguardia, Domingo 15 de Junio, Vivir en Barcelona p.1-3, "Solución marina", Antonio Cerrillo, our translation
[504] La Vanguardia, Miércoles 16 de Julio 2003, Vivir en Barcelona p.1, "Agua del mar por el grifo", Antonio Cerrillo
[505] La Vanguardia, Sábado 12 de Julio 2008, Vivir en Barcelona p.3, "El agua del grifo sabrá mejor", Lluís Benvenuty
[506] La Vanguardia, Miércoles 30 de Julio 2008, Vivir en Verano p.4,"Dinero del Estatut aliviará la factura del agua", Antonio Cerrillo
[507] La Vanguardia, Miércoles 23 de Julio 2008, Vivir en Verano, p.1-2, "Subidón del agua" / "Agua más cara para suplir una financiación insuficiente", Ramon Suñé and Antonio Cerrillo
[508] La Vanguardia, Jueves 24 de Julio, Vivir en Verano p.1-2, "Los muncipios se rebelan"
[509] La Vanguardia, Martes 8 de Marzo 2005, Vivir en Barcelona p.4, "Las compañías ven desmesurada la desaladora que propone el Govern", Antonio Cerrillo

1) Surface water from the Llobregat is captured directly from the river in the water treatment plant of Abrera treatment plant. Maximum capacity of 3 m^3/s
2) Surface water from the Llobregat captured in the Sant Joan Despí treatment plan. Maximum capacity of 5.3 m^3/s
3) Groundwater from the Besòs (for limited uses)
4) Groundwater from the Llobregat (for punctual situations)
5) Surface water from the Ter is captured from the reservoir of the Pasteral (Sau-Susqueda-Pasteral system) and conducted 50 km away through a pipe 3 meters of diameter to the treatment plant of Cardedeu. Once treated is distributed to the municipalities. Maximum capacity of 6.5 m^3/s
6) Water from the desalination plant in El Prat de Llobregat. Maximum capacity of 2.3 m^3/s

During a debate in February 2009 around the need of Catalan Pact for Water, a high representative of the Catalan Water Agency, Gabriel Borràs, director of planning, advanced the idea of the integral interconnection of water networks in Catalunya. A contribution of surplus water flows from the Segre and Noguera Pallaresa to reinforce the Llobregat network, with some 400 cubic hectometers would be desirable in the future. In that sense, he argued the need to talk about "single water" in Catalunya[510]. The concept of "single" water, with a hypothetic and subsequent unique water price, would mean the quasi-total commodification of the resource. H_2O from different rivers and sources could be diverted to wherever demand required it and mixed with other waters to obtain a standardized product.

5.3.4 Desalination is not enough! We want more water... preferable from the Rhone, please.

In our narrative of the drought we have noted how different political parties or lobby groups criticized desalination. However, once the drought was over and the desalination plant inaugurated in July 2009 began to supply Barcelona (despite working at a minimum capacity) it seemed that the debate around the water system

[510] La Vanguardia, Miércoles 11 de Febrero 2009, Vivir en Barcelona p.5, "Lleida propone un pacto para el reparto sostenible del agua catalana", Pau Echauz

of Catalunya was shelved and desalination and reverse osmosis would overcome all difficulties.

Nothing further from the truth: in October 2009, the same day that the Catalan Plan of Infrastructures was to be launched, the economic elites of the country raised against the water policy of the Catalan government[511]. Concretely, the *Grup de l'Aigua* [Water group], constituted by the so-called GTI4 (the Catalan Chamber of Commerce, the *Cercle d'Economia*, *Foment del Treball*, the *RACC*) and the *Enginyers Industrials de Catalunya* [Engineers' Association][512] denounced that water politics in Barcelona had three major deficits:

1) Consensus Deficit. The group remarked the lack agreement on how much water the Metropolitan Area of Barcelona and Catalunya needed. The analysis of the group had two main premises. On the one hand, they argued that water could not become a limiting factor of socioeconomic activity. At the same time they recognized the need to preserve the environmental flows to guarantee the life of water ecosystems. The environmental factor (but just taking into account Catalunya) was displayed as a determining factor to articulate and promote concrete projects.

   "The ongoing plan of actions of the Generalitat to add extra water flow in our water system could be insufficient, depending on the quantification of required environmental flows of the Catalan rivers", p.3 [513], our translation

2) Management deficit due to the lack of an integrated vision on the water resources in Catalonia. In that sense the group proposed to have a wider vision than the Catalan Inner Basins, similar to the idea of "single" water presented before, considering all Catalunya: "If. necessary, we should take into account wider territorial scopes in order to reach the necessary levels to guarantee the supply", (p.4)

3) Infrastructures Deficit. Without infrastructures it was not possible to carry out an integrated management of the different water resources. The report argued

[511] La Vanguardia, Sábado 17 de Octubre 2009, Vivir en Barcelona p.1, "El agua de la discordia", Antonio Cerrillo and Jaume V. Aroca
[512] Seminari "Cap a la garantia en l'abastament d'aigua a Catalunya", Diagnosi de la situació actual, 16 d'octubre de 2009. Cambra de Comerç de Barcelona, Cercle d'Economia, Foment del Treball Nacional, RACC and Enginyers Industrials de Catalunya.
[513] idem.

> that there was the need “to define a water storage system diversified and sustainable” (p.4)

The study appraised different infrastructures to increase the water flow in Catalunya. The interconnection of water networks, as in road and train transport or in the energy grid, was strongly backed. Groundwater resources could also contribute to the increase of resources thanks to the state-of-the-art technologies, but only as emergency flows. Water reutilization was also well valued, especially for industrial uses, although a legal framework was required to regulate this new resource.

Desalinization received harsh criticisms due to high economic and energetic costs. No mention was made regarding the environmental costs of such technology. According to the group, “desalinization could not be the main resource of the water supply” (p.5). Instead, the group prioritized the transfer of water from the Rhone river in the long term, as it could help to free part of the flow diverted from the Ter river, and it would be energetically lest costly that desalinization.

6 The economic geography of water supply in Barcelona and beyond

Or how a local water firm becomes a transnational company

As said before, the water company of Barcelona, *Compañía de Aguas de Barcelona*, was constituted in Liège (Belgium) the 19th June of 1867, with Belgian and French capital, that put together to 4,500,000 francs, mainly from *Crédit Général Liégeois* and *Compagnie Générale des Conduites d'Eau* (Voltes Bou 1967). The existence of a private water supplier in the 19th century was nothing special; most of the water companies in Europe by then were private as we reported in chapter 2. Within what is now the city of Barcelona[514] many private water companies coexisted supplying different parts of the urban fabric (chapter 4).

The particularity of the supply of Barcelona (as well as that of many French cities, hence the *French model* of water supply) lies in the fact that the private companies that emerged during the 19th century were not municipalized as it happened elsewhere in Europe or even the United States (Hall and Lobina 2007).

This factor has permitted a large accumulation of capital within those firms controlling water supply during the 20th century, which allowed them to expand in the late 20th and early 21st centuries. In this chapter we analyze how a company that was devoted merely to the water supply of a city became a key player in the international water business, giving service to over 37 million people around the world[515], and diversifying its business to sectors such as health, waste treatment, bottled water or product certification.

[514] By the 19th century, Barcelona was just what today we know as the Ciutat Vella district. With the time Barcelona annexed different neighboring municipalities such as Sant Andreu, Sants, Gràcia, Sant Gervasi, Sarrià, etc.
[515] According to AGBAR, www.agbar.es, last accessed 14th November 2009

6.1 Local monopoly, "nationalization" and expansion beyond the city

The *Compagnie des Eaux de Barcelone* was absorbed in 1882 by the *Societe Générale des Eaux de Barcelone* which was the precedent of what we know today as *Societat General d'Aigües de Barcelona* or AGBAR. As we have documented in chapter 4, the aforementioned company took over the control of most of the geographically atomized private water suppliers, in the city of Barcelona and neighboring towns, and it became the main water supplier of the city by the early 20th century. Several attempts were made by the town council of Barcelona to municipalize water supply, but the reluctance and opposition shown by industrialists, real estate owners or even by the SGAB, combined with radical changes within the town council or even typhus epidemics precluded such change. Contrary to many other European cities, Barcelona did not have a public control over water during the early 20th century.

In 1919, Catalan investors and bankers purchased the French society, and changed the name to *Sociedad General de Aguas de Barcelona* (SGAB). The takeover operation was initially performed simply for speculative reasons, as the bankers were thinking in selling the company to the municipality. However, as we have reported, the increasing incomes and benefits derived from the supply of water to Barcelona and neighboring towns changed the mind of most bankers, who decided to hold the company. Furthermore, following the tendency of Spanish capitalism in the 1920s SGAB bought some foreign service companies operating in Southern Spain, especially of electricity and lightening[516].

By late 1920s the SGAB had a monopoly of water supply in Barcelona. The arrival of the civil war precluded any kind of initiative of municipalization. In July 1936 the workers of the company, following the wave of collectivization in Barcelona, took the company, which eventually in 1937 was collectivized, and changed its name to "Aguas de Barcelona Empresa Colectivizada" (Gorostiza 2009).

[516] We could not trace the evolution of those firms and whether or not SGAB continued to own them in the future

6.1.1 Supplying Barcelona and the metropolitan area during the dictatorship

After the Civil War, a military board managed the firm for a short period of time and then gave it back to its former owners, the bankers. In turn, as we have reported, the owners compensated the new political regime with the handover of some urban properties in Barcelona[517].

The magnitude of the firm increased sharply during the post-war period, fuelled by the urbanization process and the arrival of important contingents of people from other parts of Spain. During the 1940s the volume of customers of the SGAB doubled from 75,000 in 1941 to more than 150,000 in 1950 (Voltes Bou 1967). By mid 20th century, some 70 hm^3 per year were extracted exclusively from the Besòs and Llobregat wells.

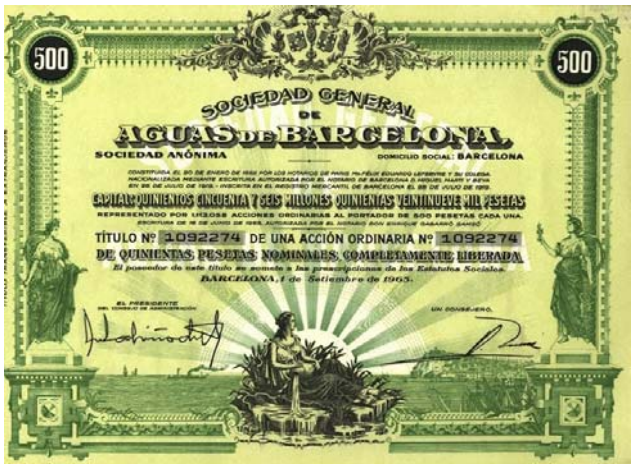
In 1953, as we mentioned, the SGAB obtained a concession to draw 2.2 m^3/s from the Llobregat river, soon increased to 5.3 m^3/s. A treatment plant, owned and managed by the SGAB, was built in Sant Joan Despí to treat these new flows. This supposed a major change as to how the company could do business out of water flows; since then onwards, surface water, actually a public resource, would become the main sources of revenue for the SGAB.

Population explosion in the 1960s in Metropolitan Barcelona reopened the search for new water resources to feed the hydrosocial cycle. In chapter 4 we have mentioned the transfer of the Ter river of the late 1960s. Here what we want to emphasize is how this large public project became a sort of "gold mine" for the SGAB, in two different ways. On the one hand, it was one of the contractors to develop the project paid with public money (by the State and by the municipality of Barcelona). On the other hand, SGAB reached an agreement in 1965 with the town council of Barcelona to manage the 6.5 m^3/s concession that Barcelona obtained from the State. The agreement was approved in the Town council plenary of 31st March 1966. We argue that this agreement signified the final rejection by the local authorities to control the urban flow of water in the city and definitely precluded the municipalization of the service. In 1966 the SGAB supplied water to Barcelona and 10 more neighboring

[517] El Palauet de la Diagonal (Gorostiza 2009)

municipalities[518] and was a well known firm in Spain with multiple shareholders (figure 6.1).

Figure 6.1. Share of the SGAB, 500 pesetas, 1965.

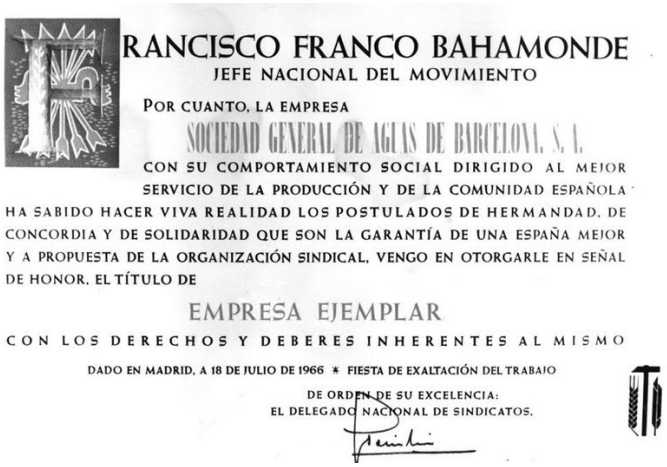


Source: Asociación de Trabajadores de Aguas de Barcelona, www.atab.cat

The linkages between the political regime and the firm were evident. While in the 1940s these linkages were materialized with the restitution of the pre-1936 SGAB board, in the mid 1960s they were best represented by the agreement between the municipality and the SGAB to manage the concession from the Ter river that the municipality had obtained years before. Another example of these linkages could be observed when the General Franco awarded the prize of *"Empresa Ejemplar"* (Exemplary firm) to the SGAB in 1966, just before its centenary (figure 6.2). This distinction was awarded every year by the *Organización Sindical* to those firms "that outperformed in economic and productive terms while taking seriously the welfare and social security of their employees" [519]. *La Vanguardia* [520] stressed the difficulties of supplying Barcelona with the waters from the Besòs and Llobregat due to their pollution, while pointing out the merit in doing so only with private capital. This newspaper also championed the merit of having created firms such as *Aguas del Besòs* or *Aguas de Valencia*. The company, according to *La Vanguardia*, had always kept in mind questions of "social justice", providing their employees with a number of welfare benefits (work safety, entertainment and training).

[518] La Vanguardia Española, Domingo 24 de Juko 1966, p.26, "La Sociedad General de Aguas de Barcelona, S.A., galardonada con el título de empresa ejemplar"
[519] La Vanguardia, Domingo 24 Julio 1966, p.26: "La Sociedad General de Aguas de Barcelona, S.A., galardonada con el titulo de empresa ejemplar", our translation
[520] idem

Figure 6.2. Title of Exemplary Firm (*Empresa Ejemplar*) granted by Francisco Franco in 1966



RANCISCO FRANCO BAHAMONDE
JEFE NACIONAL DEL MOVIMIENTO
POR CUANTO, LA EMPRESA
SOCIEDAD GENERAL DE AGUAS DE BARCELONA, S. A.
CON SU COMPORTAMIENTO SOCIAL DIRIGIDO AL MEJOR SERVICIO DE LA PRODUCCIÓN Y DE LA COMUNIDAD ESPAÑOLA HA SABIDO HACER VIVA REALIDAD LOS POSTULADOS DE HERMANDAD, DE CONCORDIA Y DE SOLIDARIDAD QUE SON LA GARANTÍA DE UNA ESPAÑA MEJOR Y A PROPUESTA DE LA ORGANIZACIÓN SINDICAL, VENGO EN OTORGARLE EN SEÑAL DE HONOR, EL TÍTULO DE
EMPRESA EJEMPLAR
CON LOS DERECHOS Y DEBERES INHERENTES AL MISMO
DADO EN MADRID, A 18 DE JULIO DE 1966 * FIESTA DE EXALTACIÓN DEL TRABAJO
DE ORDEN DE SU EXCELENCIA:
EL DELEGADO NACIONAL DE SINDICATOS.

Source: Asociación de Trabajadores de Aguas de Barcelona, www.atab.cat

By the late 1960s, the SGAB possessed full or partial control over many firms, especially water supply companies, beyond the Metropolitan Area of Barcelona, in Catalunya, and along the Mediterranean coast. In table 6.1 we list the main water companies participated by the SGAB.

Among these firms, we want to stress two in particular because of their relevance: the *Sociedad de Abastecimientos Urbanos y Rurales S.A* and the *Sociedad Regional de Abastecimientos de Aguas S.A*, more commonly known as Saur and Sorea respectively. Both companies were constituted as a response to the eagerness of the SGAB to expand their operations beyond the metropolitan area of Barcelona once the water from the Ter transfer was guaranteed. Thus, in 1963, the SGAB created with the *French Societé d'Amenagement Urbain et Rural,* the *Sociedad de Abastecimientos Urbanos y Rurales S.A. (Saur).* This company centered its initial activity in some coastal Catalan municipalities and in the Vallès plain (for instance the town of Granollers), especially in those areas receiving water from the future Ter water transfer[521]. Five years later, in 1968, the SGAB created the *Sociedad Regional de Abstecimientos de Aguas, S.A.* (Sorea). At its early stages it Sorea supplied mainly municipalities in the Maresme (north-east of Barcelona). This company increased its presence during the 1970s, especially in the Vallès and Maresme counties, close to Barcelona; in the Bages and Osona counties (still in the province of Barcelona); and

[521] The information has been extracted from the webpage of Sorea (http://www.sorea.es/), last accessed 19th September 2009.

further away, along the Costa Brava (north of Catalunya) and Tarragona (south of Catalunya).

Table 6.1. Water companies totally or partially controlled by the SGAB by late 1960s.

Name	Giving service to…	Type of firm
Compañía Industrial del Llobregat. S. A., known until 1961 as Empresa Concesionaria de Aguas Subterráneas del Río Llobregat;	Barcelona	PLC
Empresa de Aguas del Río Besos. S. A.;	Neighboring municipalities of Barcelona, Besòs right bank-side	PLC
Compañía Barcelonesa de Explotaciones Industriales;	n.a	n.a.
Aguas de Valencia, S. A.;	Valencia	PLC
Aguas Municipalizadas de Alicante, Empresa Mixta;	Alicante	Mixed economy
Aguas Residuales de Alicante. Empresa Mixta;	Alicante	Mixed economy
Aguas de Levante, S. A.;	n.a	PLC
Sociedad de Abastecimientos Urbanos y Rurales (Saur);	Province of Barcelona, latter Girona and Tarragona	PLC
Sociedad Regional de Abastecimientos de Aguas, S.A. (Sorea);	North-east Barcelona, latter all the Catalan territory	PLC
Aquagest, Promoción Técnica y Financiera de Abastecimientos de Agua, S.A	Some Spanish territories: Galicia, Castilla-León and Castilla-la Mancha	PLC
Auxiliar de Canalizaciones, S.A.	n.a	PLC

Source: compiled from La Vanguardia[522], SGAB and Sorea

At the end of the next decade, the company was awarded some contracts in the Balearic Islands (Menorca), and in the 1990s it expanded to the Baix Llobregat counties (next to Barcelona) and to more locations in Lleida and Girona. By 1997 Sorea and Saur would merge, supplying at the beginning of the 21st century over 220 municipalities, with a population of 1,800,000 people (over 3 million during summertime) [523].

[522] La Vanguardia Española, Miércoles 3 de Abril 1968, p.13, "Juntas Generales Ordinaria y Extraordinaria de la Sociedad General de Aguas de Barcelona, que fueron presididas por D. Mariano Calviño de Sabucedo Gras

[523] The information has been extracted from the webpage of Sorea (http://www.sorea.es/), last accessed 19th September 2009.

6.2 From grave to heaven: the diversification and internationalization of the AGBAR group

In 1974 the SGAB (henceforth Aguas de Barcelona) group had a turnover of 5,600 million pesetas and benefits of 683 million pesetas[524]. Two key elements took place in the 1970s that changed forever the scope of business of Aguas de Barcelona: the creation in 1975 of the *Coporación Financiera AGBAR, S.A.*, and the arrival at the end of the decade of Ricard Fornesa to the management board of AGBAR.

In 1975, the *Compañía Industrial del Llobregat* changed its name to *Corporación Financiera AGBAR, S.A*[525, 526, 527]. With this reconfiguration, this firm, founded in 1871, and owned by Aguas de Barcelona, became a holding company controlling the shares of 40 subsidiary companies of the water group[528]. In this way SGAB would have from then onwards just one subsidiary company: the *Corporación Finaciera AGBAR*. This operation was aimed at enhancing the development and diversification of the water corporation, not only in water supply services but in related fields, such as pollution control[529] or even construction. This would mean the opening of the company to the rest of the Spanish state and its internationalization in the near future. The concession of the water supply of Palencia (Castilla-León, Spain) to the group[530] is an example of this aperture towards Spain. A few days after, the holding group materialized this desire of internationalization with an agreement with the BGN International[531]. This model of collaboration and agreements with other corporations was quite generalized in the subsidiary companies of AGBAR[532]. The international importance of the AGBAR group was not only related to the agreements with other

[524] La Vanguardia, Viernes 28 de Noviembre de 1975, p. 21, "Apuntes y notas. Grupo AGBAR: Planificación y Diversificación"
[525] La Vanguardia, Martes 17 de Junio de 1975, p.27, " 'Compañía Industrial del LLobregat' cambia su nombre por el de 'Corporación Financiera AGBAR, S.A.' "
[526] La Vanguardia, Domingo 22 de Junio de 1975, p. 17, Announcement "Corporación Financiera AGBAR, S.A."
[527] Idem, p.19, Announcement "Junta General de Corporación Financiera AGBAR, S.A."
[528] La Vanguardia, Viernes 19 de Septiembre de 1975, p. 13, "Apuntes y notas: Toco fondo la desaceleración del crecimiento de depósitos y créditos bancarios?"
[529] idem
[530] La Vanguardia, Domingo 27 de Julio de 1975, p.17, "Sismograma Económico" (various economic brief news)
[531] La Vanguardia, Viernes 27 de Junio de 1975, p.19,"Colaboración entre 'Corporación Financiera AGBAR' y 'BGN Internacional' "
[532] La Vanguardia, Viernes 28 de Noviembre de 1975, p. 21, "Apuntes y notas. Grupo AGBAR: Planificación y Diversificación"

companies, but also expressed itself in its influence in some international organizations. For instance, the Managing Director of the holding group, José Antonio Linati, was appointed member of the International Law Association[533]. Among the issues dealt by this association, stood the legal regime of international water resources related to transnational companies[534]. Later, Linati will leave the company to become the Spanish Minister of Public Works[535].

In 1978 the AGBAR group was an important asset of the Barcelona Stock Exchange[536]. However, in the middle of the Spanish economic crises and political transition, the late 1970s were difficult times for Aguas de Barcelona, and increasing losses were reported.

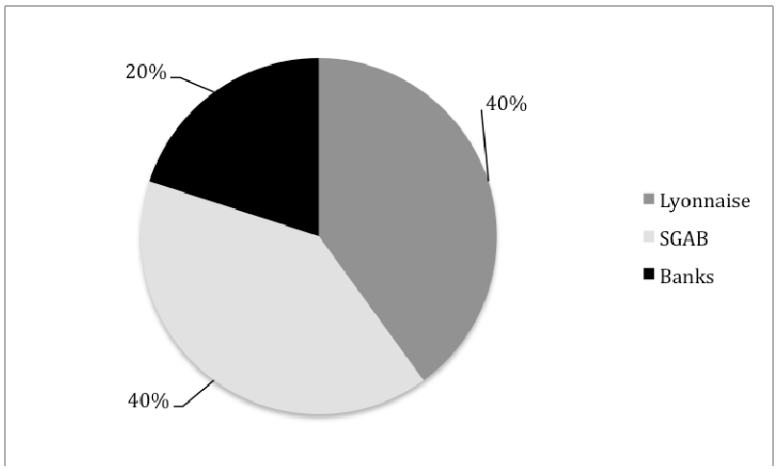
The entrance of a new managing board in 1979, with Ricard Fornesa as executive president, supposed a catalyst for change[537]. Several loss-making businesses were sold and successful ones were promoted. The structural change was aimed to integrate efficiently the management of all the societies owned by the group[538].

6.2.1 The entrance of French capital in the 1980s

A turning point in the history of the company, apart from the reconfiguration of the board, was the entrance of French capital in the firm (we must recall that in the 19th century, French capital was the owner of the firm, until the "nationalization" by Spanish private capital). The *Societé Lyonnaise des Eaux et de l'Eclairage* bought in 1981 40 percent of the shares of Corporación Financiera AGBAR (previously AGBAR had enlarged the number of shares)[539]; another 40 percent were held by SGAB and the remainder 20 percent by the banks Central, Español de Crédito, Santander and Mas Sardá[540] (figure 6.3).

[533] La Vanguardia, Miércoles 17 de Diciembre de 1975, p.18, "Don José Antonio Linati, miembro de la International Law Association"
[534] idem
[535] La Vanguardia, Domingo 19 de Febrero de 1978, p.36, "Sismograma Económico"
[536] La Vanguardia, Jueves 23 de Marzo de 1978, p.25, "La Bolsa de Barcelona"
[537] La Vanguardia, Sábado 30 de Noviembre 1985, p.35, "Aguas de Barcelona quiere inundar España", Armand Caraben
[538] La Vanguardia, Viernes, 12 de Octubre de 1979, p.35, "SGAB: restructuración"
[539] La Vanguardia, Viernes 17 de Julio de 1981, p.25, "Una sociedad francesa accionista de C.F. AGBAR"
[540] La Vanguardia, Lunes 26 de Abril 1982, p.18, "Periscopio empresarial"

Figure 6.3. Shareholders of the Corporación Financiera AGBAR in 1981



Source: own elaboration

The fact that the SGAB handed out many activities to *Corporación Financiera AGBAR*, which in turn, was partially sold to French private capital, raised concern among some sectors of Catalan society. For example, this is an excerpt from a letter to the editor of La Vanguardia showing this discontent:

> "[…] What it is really serious is the fact that in Cataluña a monopoly of water supply and sanitation is being created and it is not directly controlled by SGAB but by Corporación Financiera AGBAR. The former company depends on decisions that could be taken by groups located very far from *Cataluña* and *España*, with the aggravating circumstance that it affects water supply and sanitation of all the citizens"[541]

This debate recalls the "nationalization" of the SGAB, i.e. the takeover of the SGAB by Spanish capital in the 1920s as said before. It will also connect with the ongoing debates at the end of 2009 regarding whether a firm providing basic services should be controlled by foreign capital.

In previous chapters, we have mentioned the evolution of ownership and management of water services in the western world during the 19th and 20th centuries. While in most of Europe the urban infrastructure of water supply was held and managed by the municipality or even had been nationalized, for instance the case of England (chapter 2), in Barcelona it had been historically owned and managed by a private firm. The general director of the SGAB at the beginning of the 1980s defended the superiority of the private model over the public model of water supply,

[541] Our translation from La Vanguardia Domingo 16 de mayo 1982, p.21, "Las diponibilidades de agua en Barcelona", signed by Can Pous, S.A.

despite recognizing the need of control and regulation by the administration (figure 6.4).

Figure 6.4. Excerpts from the interview to Josep Bernis, general director of the SGAB, reflecting on the ownership of water services and the development of waterworks

"the current high cost of money is one of the factors that incentivizes public investments in the supply of water, where sunk costs are high and long-term. For this sector [referring to the public sector] those costs are thought to be lower or inexistent. In my opinion, this is a delusion, as at some point the real cost of money will have to be paid. On the other hand, regarding management of facilities, even those built with public money are run by private firms; the higher agility and efficacy for industrial activities, such as treatment and distribution of water, makes them more suitable for such duty. In addition the public administration holds a position of control and exigency over the supplier, more efficient and sharply different than being controlled and demanded"

"In the case of water supply, of vital need, there are some singularities in the form of sanitary control and tariffs. However, that does not have to mean that the firm has to stop being private. In my opinion, it is mandatory to seize the advantages [of the private firm] to provide water supply with technical and economic efficiency; at the same one has to be aware of and accept the singularities of the sector, called limitations by some, which are going to affect shareholders and workers of such firms". "Sanitary requirements have to be exhaustive. Economic control has to be exercised through tariffs, […] and have to protect the consumer on the one hand, and on the other ensure the evolution of the service under private initiative in the long term. Economic control has to be efficient but without erasing the aforementioned advantages; this has sometimes happened under non-realistic tariff schemes, to the point that the administration had to provide the service, seriously deteriorated, with higher prices"

Source: La Vanguardia[542]

With the arrival of democracy, and especially from the 1980s onwards, the configurations of power in the hydrological cycle were deeply modified, with the irruption of a Metropolitan regulator: the *Corporación Metropolitana de Barcelona.* We have already discussed in chapter 4 the implications that these new administrative level of regulation brought about in the infrastructural and economic aspects.

The supply of water to Barcelona and its metropolitan area was a limited business to Aguas de Barcelona, and had reached its ceiling by the mid 1980. To continue growing the company had to seek other market niches, especially through its subsidiary company Corporación Financiera AGBAR. This search, initiated already

[542] La Vanguardia, Viernes 12 de Febrero 1982, p.27, Interview with Josep Bernís (general director of SGAB), our translation

in the 1970s (with precedents in the 1920s), took place both at the Spanish and European levels.

In March 1983, the holding society changed its name to *Corporación AGBAR, S.A.*[543] By that time, the economic figures of the holding society were fairly impressive: 3,300 employees and a business activity of some 14,500 million pesetas[544], with prospects to reach 18,000 million[545]. Two years later another holding society, of minor importance was created: *Aplicaciones del Agua S.A.* (ADASA).

According to its president, Ricard Fornesa, the secret of economic recovery and optimal performance of the group was based on the diversification and investment in businesses with future[546]. In the 1980s this success was materialized in an important geographic expansion in Spain as we can observe in map 6.1.

The imminent incorporation of Spain into the European Economic Community made the water company seek the opportunities that would open up as well as the challenges, as the countries of the EEC appeared to favor private participation in many services:

> "The countries forming the Common Market are willing to withdraw from their nationalization policies and re-privatize some of their activities. They have reached the conclusion that political criteria inevitably influence the management of state-owned firms. Europe is realizing that private firms, at the level of direct service to the citizen, are the most suitable model, and we are committed to show it in practice"[547]

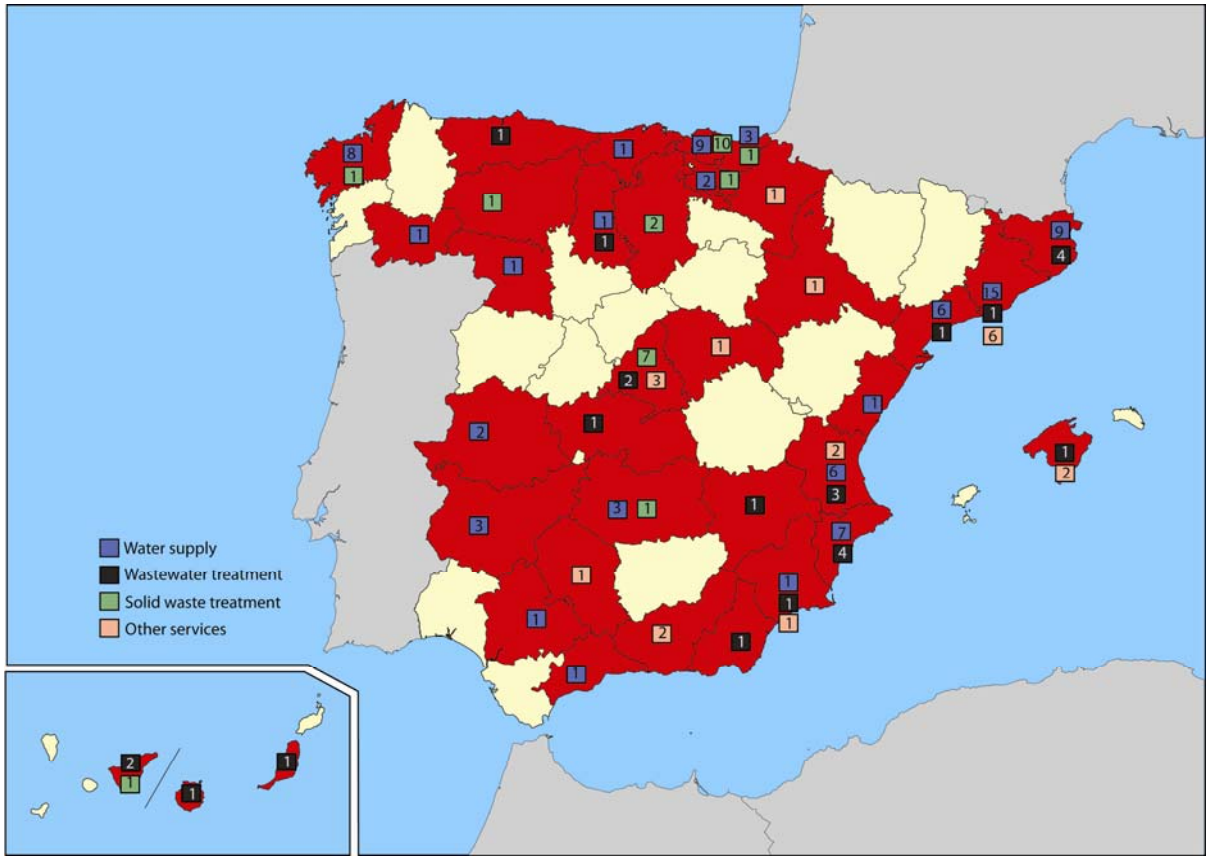
La Vanguardia by means of some of their columnists, such as Armand Caraben, complimented the performance of the private water company, and discredited the functioning of state-owned companies, and specifically the public water supplier of Madrid, the Canal de Isabel II:

> "We are in front of the most important private firm in the water sector of Spain. It could only be compared to the state-owned Canal de Isabel II, supplying the capital of

[543] La Vanguardia, Jueves 14 de Abril de 1983, p. 48, "Avisos Oficiales, Corporación Financiera AGBAR, S.A."
[544] La Vanguardia, Lunes 26 de Abril 1982, p.18, "Periscopio empresarial"
[545] La Vanguardia, Domingo 17 de Julio 1983, p.25, "Economia, Sismograma: Corporación AGBAR"
[546] La Vanguardia, Sábado 30 de Noviembre 1985, p.36, Interview to Ricardo Fornesa "La fijación de la tarifa del agua presenta menos problemas en la democracia que en la dictadura", Juan Hernández Puértolas
[547] La Vanguardia, Domingo 7 de Julio 1985, p.53, Business brief report, "Sociedad General de Aguas de Barcelona, S.A. Juntas Generales ordinaria y extraordinaria de accionistas", our translation

the country, needy of non-recoverable funds provided by the public administration and eventually by Spanish taxpayers."[548]

Map 6.1. Businesses of AGBAR group across Spain, in 1985



Source: Own elaboration, with data from La Vanguardia, 30th November 1985, p.35

This reflects the pride of having a successful private water group not depending on the Spanish treasury in comparison with the Canal de Isabel II (Chapter 7).

However, in the tightly regulated water sector, economic growth prospects were not very high. As a result, in 1987, Fornesa promoted a plan of diversification of the activities, including incursions to waste treatment and health insurance, as we will see in detail in the next section.

The emerging telecommunications sector, monopolistic in terms of service but open to competition in some subsectors[549], was one of the interests of the group as well. By the end of the decade, the group bought *Tenel*, a firm involved in the maintenance of telephone terminals. They also purchased part of *Eltec*, a firm devoted to the

[548] La Vanguardia, Sábado 30 de Noviembre 1985, p.35, "Aguas de Barcelona quiere inundar España", Armand Caraben, our translation
[549] For instance, the retail and maintenance of the telephone sets.

maintenance of banking computers. Even cable television for Barcelona was a major project in mind, although finally postponed[550].

The group also constituted a new holding company, *Promocinser, S.A.*, latter called AAC Group, together with the gas company *Catalana de Gas* and the cement company Asland[551], to develop projects and businesses in Spain and Europe. The holding society had participations in a wide range of sectors, from the building/real-estate sector to the food sector[552]. However, this holding did not last long, and in 1990 it was dissolved[553].

At the European level, at the end of the 1980s, Aguas entered into *Lyonnaise des Eaux*[554], buying 3 percent of the shares. Interestingly, Aguas owned part of Lyonnaise, while the latter owned an even major proportion of stocks of the former. By the end of the decade of 1980s, the aspirations of the French economic giant[555] were to create a supranational company to provide municipal services across Europe[556].

The popularity and success of the group were clear at the end of the decade: by 1988, some 20,000 investors had shares of *Aguas de Barcelona*[557]. In 1989, the value in the Madrid Stock Exchange of SGAB was of 86,500 million pesetas. In addition to this sum, the Corporación AGBAR was valued in 50,000 million pesetas[558]. The diversification strategy was yielding the first profits: *Aguas de Barcelona* saw its

[550] La Vanguardia, 9 de Septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico"
[551] La Vanguardia, Martes 1 de Marzo 1988, p.69, "Aguas de Barcelona, Asland y Catalana de Gas han creado un 'holding' para invertir en nuevos proyectos", F. Tintoré
[552] La Vanguardia, Sábado 9 septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico"
[553] La Vanguardia, Viernes 2 de Febrero 1990, p.55, "El holding ACC Grup acuerda su disolución"
[554] La Vanguardia, Miércoles 4 de Mayo 1988, "Aguas de Barcelona apuesta por ampliar negocios en Europa y entra con el 3% en Lyonnaise des Eaux", C. Esteban y F. Tintoré
[555] By then Lyonnaise des Eaux was present in many continents, providing services ranking from environmental urban services (water, their primarily business, energy and waste) to telecommunications, health and even leisure activities.
[556] La Vanguardia, Sábado 23 de Septiembre 1989, p.65, "Lyonnaise des Eaux quiere crear una compañía supranacional para prestar servicios municipales a nivel europeo", Carles Esteban y Enric Tintoré
[557] La Vanguardia, Lunes 18 de Abril 1988, p.37, "Aguas de Barcelona dobla su habitual ampliación de capital liberada parcialmente"
[558] La Vanguardia, Miércoles 27 de Diciembre 1989, p.70, "Croissier ordena seguir de cerca la evolución de Aguas y Catalana", Mar Díaz-Varela

benefits rocketing 74 percent from 1988 and 1989[559]. The benefits continued to grow in the year 1990 to an astonishing 70.6 percent increase respect the precedent year[560].

While the 1980s constituted the embryo of the expansion of *Aguas de Barcelona*, it was during the 1990s that the company became one of the most important water companies across the globe and also one of the major private health insurers and certification companies of Spain. During this period of internationalization and expansion, AGBAR underwent several major changes in the shareholder structure, with capital continuously flowing and shifting from banks to other banks, mergers and takeovers.

[559] La Vanguardia, 11 de Febrero 1990, p.70, "Los beneficios de Aguas de Barcelona crecieron el 73% durante 1989"
[560] La Vanguardia, Miércoles 27 de Marzo, p.45, "Los beneficios de Aguas de Barcelona crecieron un 70,6 por ciento el año pasado"

6.3 Economic choreographies of power within AGBAR in the 1990s

In 1990 *Lyonnaise des Eaux*, recently merged with the building and public works company Dumez[561], was the main shareholder of the water company, owning 26.75 percent of *Aguas de Barcelona* and 45 percent of Corporación AGBAR[562]. Other relevant owners of Aguas were the gas company *Catalana de Gas*, and the Spanish banks *Banco Central*, *Banesto* or *Banco Bilbao Vizcaya*, among other groups.

6.3.1 La Caixa enters *Aguas de Barcelona*

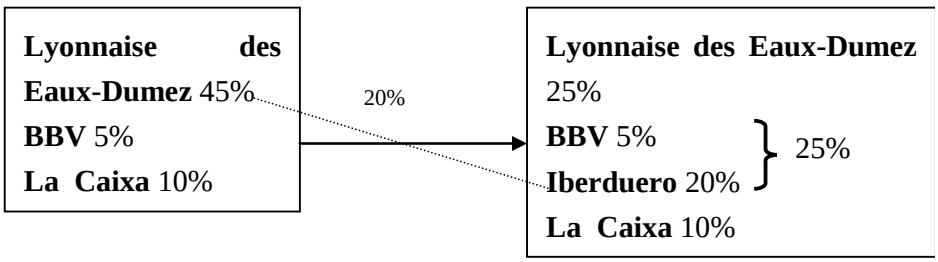
At the beginning of the 1990s, a major event that would deeply influence the trajectory of the water group took place. Because of an imminent merger between *Aguas de Barcelona* and the gas company *Catalana de Gas*[563], the Catalan bank *La Caixa* decided to enter the water company[564]. The Catalan Bank bought the shares formerly owned by the *Banco Central* (8 percent) and 3 percent of the shares owned by the Spanish bank *Banesto*, thus becoming the second major shareholder of *Aguas de Barcelona*, just behind Lyonnaise[565]. The merger between Aguas and *Catalana de Gas* would create an international holding company (*Lyonnaise des Eaux* and British Gas would be also present) valued in 260,000 million pesetas, with 140 subsidiary companies covering a wide range of services (water, gas, chemical products storage, engineering, etc.)[566]. Repsol, the Spanish energy giant also pretended to enter in the merger between the water and gas company[567]. The processes of fusion suffered

[561] La Vanguardia, 12 de Julio 1990, p. 50, "Lyonnaise des Eaux y Dumez se fusionan para crear un gran grupo de servicios", Pedro S. Queirolo
[562] La Vanguardia, Viernes 13 de Julio 1990, p.47, "Lyonnaise-Dumez canalizará su actividad en España a través de Aguas de Barcelona", Carles Esteban
[563] La Vanguardia, 24 de Diciembre 1989, p.1, "Catalana de Gas y Aguas de Barcelona inician el proceso de fusión"
[564] La Vanguardia, 24 de Enero 1990, p.55, " 'La Caixa' entra en Aguas ante la fusión con Catalana de Gas", Carles Esteban and Enric Tintoré
[565] La Vanguardia, Viernes 9 de febrero 1990, p.50, "La entrada de Isidre Fainé en el consejo de Aguas refuerza la posición de 'la Caixa',
[566] La Vanguardia, Lunes 25 de Diciembre 1989, p.41, "La fusión Aguas-Catalana aflorará unas plusvalías de 55.000 millones", Carles Esteban
[567] La Vanguardia, Viernes 30 de Marzo 1990, p.51, "Repsol negocia su participación en la fusión Aguas-Catalana de Gas"

several administrative setbacks[568], especially due to the reluctance of the Spanish Ministry of Industry to accept the creation of a holding society with foreign capital[569]. Eventually, this holding society was never materialized, and, instead, it was La Caixa who directly created the holding with Repsol[570] (Aguas did not take part in this operation).

In 1991, the gas company *Catalana de Gas* sold its shares (6.5%) of *Aguas de Barcelona* to the Spanish bank Banco Bilbao-Vizcaya (BBV), which increased its share to 14.6 percent[571]. At the same time, *Aguas Barcelona* sold its shares of the Catalan gas company[572]. On the other hand the French giant sold part of their shares in Corporación AGBAR, the subsidiary of Aguas, to Iberduero[573]-BBV group[574] (see figure 6.5).

Figure 6.5. Changes in the participation of Corporación AGBAR in 1991

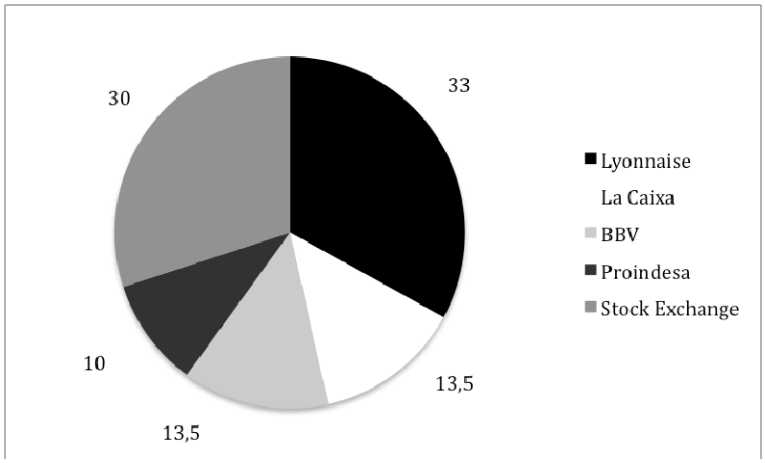


Source: own elaboration

In June 1991, *Aguas de Barcelona* took over *Corporación AGBAR* in order to increase its market size and continue growing. The leading position of Lyonnaise, with 33 percent of the shares of the new Aguas, was counterweighted by the important presence of the two Spanish banking giants: La Caixa and Banco Bilbao-Vizcaya, both with 13.5 percent of the shares each. Proindesa (a unit of *Hidroeléctrica Iberica Iberduero*) hold 10 percent of the shares, while the remainder 30 percent was left to float in the stock exchange (figure 6.6).

[568] La Vanguardia, Domingo 17 de Junio 1990, p.77, "Pujol y Solchaga se reúnen mañana para desbloquear la creación de la Supercaixa", Enric Tintoré
[569] La Vanguardia, Martes 12 de Junio 1990, p.80, "El Ministerio de Industria no quiere capital extranjero en el "holding" del gas español", Enric Tintoré y Carles Esteban
[570] La Vanguardia, Jueves 28 de Junio 1990, p.57, "La Caixa y Repsol desbloquean la creación del "holding" del gas", Enric Tintoré y Carles Esteban
[571] La Vanguardia, Martes 23 de Abril 1991, p.77, "Catalana de Gas ampliará la red de gasoductos de Cataluña a escala europea", Carles Esteban
[572] La Vanguardia, Sábado 13 de Abril 1991, p.58, "La Caixa y Repsol compran a Aguas el 6% de Catalana"
[573] By means of the subsidiary company Proindesa
[574] La Vanguardia, Miércoles 15 de Mayo 1991, p.72, "Iberduero refuerza presencia del BBV en Aguas de Barcelona"

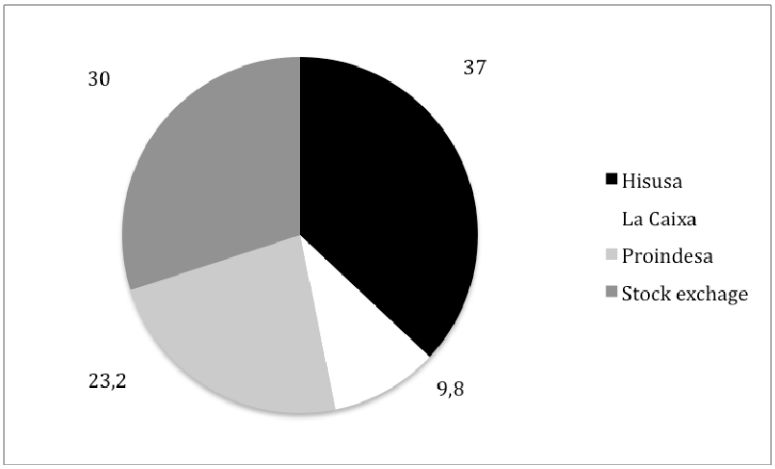
Figure 6.6. Ownership of the new "Aguas de Barcelona" after the absorption of Corporación AGBAR, 1991, in percentage



Source: elaborated from La Vanguardia[575]

The situation suffered another change when La Caixa and Lyonnaise de Eaux-Dumez created Hisusa, a holding society (51 percent Lyonnaise, 49 percent La Caixa) to operate services firms. This meant a participation of 37 percent in Aguas de Barcleona and 20 percent in Acesa (Autopistas Concesionaria Española)[576]. Proindesa, a society participated by the energy group Iberdrola and the bank BBV, became the second major owner, with 23,58 percent of the shares (figure 6.7).

Figure 6.7. Ownership of the new "Aguas de Barcelona" after the constitution of Hisusa, in %



Source: La Vanguardia

[575] La Vanguardia, Sábado 29 de Junio 1991, p.51, "Aguas de Barcelona absorbe a AGBAR para ganar tamaño y mantener la expansión"
[576] La Vanguardia, Sábado 28 de Diciembre 1991, p.44, "La Caixa y Lyonnaise des Eaux crean una sociedad conjunta para operar en empresas de servicios"

6.3.2 The birth of the AGBAR group

By 1992, the takeover of Corporación AGBAR was definitely finished[577] giving birth to the AGBAR Group. Apart from the core water sector operations, this group would extend its business to the health insurance sector (Adeslas), the car emissions control and certification (Applus), waste management and treatment (Cespa), building (Acsa), installations and computing maintenance, telecommunications, wastewater treatment (Degremont), leisure activities and even the bottled water sector in a move that some may consider rather cynical.

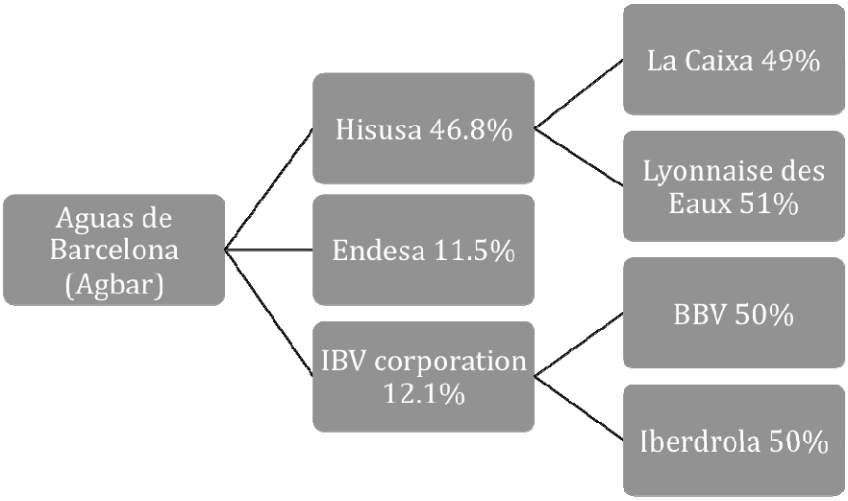
The water company had become so important, that in 1993 the president of the company, Ricard Fornesa, received the "Key of Barcelona"[578] [an award recognizing the trajectory of an individual relevant for the city]

The shareholder structure of the company rapidly changed during the 1990s. In 1994, Hisusa, controlled by Lyonnaise and La Caixa, had almost half of the shares. The IBV Corporation (or Proindesa) lost some weight in favor of the energy company Endesa, by then still participated by the State, which bought over 11 percent of *Aguas de Barcelona* to Iberdrola, against a pact of collaboration between the two electric companies[579,580]. The rest of the shares continued to be floated in the stock exchange (see figure 6.8).

By mid 1990s, the AGBAR group was controlled by banks (La Caixa and Banco Bilbao-Vizcaya), energy companies (Endesa and Iberdrola) and by a multi-utility company (*Lyonnaise des Eaux*). By then, non-core activities, i.e. those not related to the water cycle, represented more than the half of the revenues of the company. As figure 6.9 shows, the health sector almost yielded a quarter of the total revenues of the AGBAR group, behind water supply activities.

[577] La Vanguardia, Viernes 27 de Marzo 1992, p.45, "Aguas de Barcelona culmina la absorción de la Corporación AGBAR", Carles Esteban y Enric Tintoré
[578] La Vanguardia, Martes 11 de Mayo 1993, p.4, "Homenaje al señor de las aguas", Carles Esteban
[579] La Vanguardia, Sábado 19 de Febrero 1994, p.52, "Feliciano Fuster, vicepresidente de Aguas de Barcelona"
[580] La Vanguardia, Viernes 21 de Enero 1994, p.56, "Endesa firma hoy la compra del 11,8% de Aguas"

Figure 6.8. Main shareholders of AGBAR, 1994



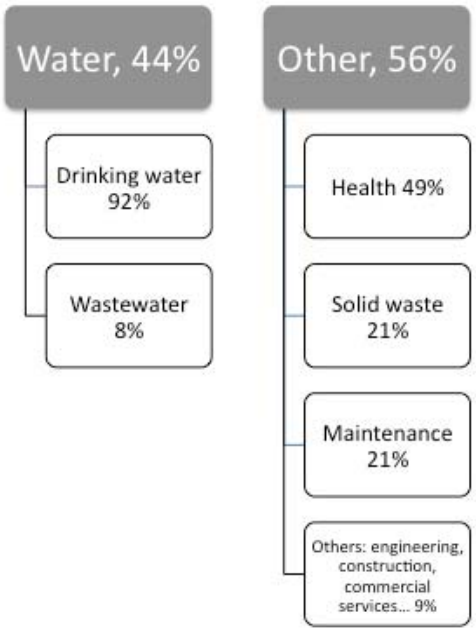
Source: own elaboration from La Vanguardia[581]

In 1995 Aguas de Barcelona was reincorporated in the Spanish stock exchange Index IBEX-35[582] after some months out, and the group entered into *Hidráulica de Santillana*[583]. IBV, the group formed by the bank BBV and Iberdrola, sold 5.3 percent of their shares to the investment bank BZW, who in turn put those shares in the international market[584]. FCC, would become latter one of the major private water suppliers in Spain after AGBAR.

In 1996 SGAB was the first water company in Spain in successfully applying the international quality standards ISO-9002[585]. In 1997, *Aguas de Barcelona* studied its merge with FCC (*Fomento de Construcciones y Contratas*)[586] but eventually this did not prosper. In 1997, the French giants *Lyonnaise des Eaux*, partial owner of AGBAR, and *Compagnie de Suez* merged[587,588].

[581] La Vanguardia, Miércoles 18 de Mayo 1994, p.64, "Aguas de Barcelona repite dividendo tras invertir 15.000 millones en 1993", Enric Tintoré
[582] La Vanguardia, Martes 4 de Julio 1995, p.71, "Una jornada sin pretensiones", Joan Jordi Clivillé
[583] ABC, Domingo 24 de Marzo 1996, p.48, "Ricardo Fornesa: La nueva ley del seguro favorece de alguna manera a las empresas más grandes", Paloma Díaz-Jares
[584] La Vanguardia, Viernes 22 de Noviembre 1996, p.76, "IBV vende un 5,3% de Aigües de Barcelona"
[585] La Vanguardia, Martes 22 Octubre 1996, p.24, "El agua de Barcelona obtiene nuevas garantías de calidad"
[586] La Vanguardia, Viernes 24 de Octubre 1997, p.74, "Aguas de Barcelona está dispuesta a estudiar una fusión con el grupo FCC", Encarna Pérez
[587] La Vanguardia, Sábado 29 de Marzo 1997, p.43, "Lyonnaise des Eaux y Compagnie de Suez ultiman su plan de fusión"
[588] La Vanguardia, Sábado 12 de Abril 1997, p.64, "La fusión de Lyonnaise des Eaux y Suez crean un nuevo gigante del sector servicios", Joaquín Luna

Figure 6.9. Main activities of AGBAR, 1994. In percentage the incomes provided by each sector.

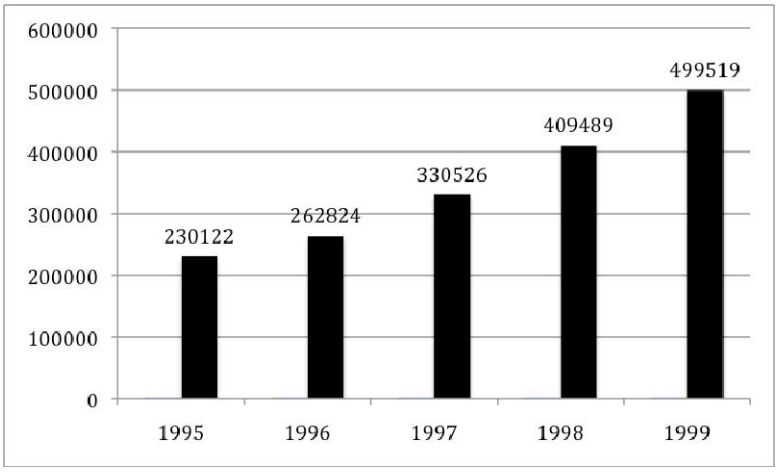


Source: adapted from La Vanguardia [589]

In 1979, Fornesa had joined the SGAB with an annual turnover of 2,200 million pesetas[590]; twenty years later, in 1999, this figure amounted to almost 500,000 million (figure 6.10). AGBAR continued to successfully grow as a service provider, participating in more than 180 firms, with rocketing benefits[591], and with big money to invest[592]. As Ricard Fornesa argued: "The problem is not the money […] but finding good opportunities"[593]. The firm has been growing some 20 percent yearly, both in turnover and benefits, and was one of the most important firms in Catalunya, just after Seat, Fecsa-Enher, and Gas Natural.

[589] La Vanguardia, Miércoles 18 de Mayo 1994, p.64, "Aguas de Barcelona repite dividendo tras invertir 15.000 millones en 1993", Enric Tintoré
[590] La Vanguardia, Miércoles 10 de Noviembre 1999, p.90, "AGBAR supera las previsiones y gana un 23% más en nueve meses", Enric Tintoré
[591] La Vanguardia, Jueves 25 de Febrero 1999, p.83, "El Escáner. Aguas de Barcelona: Despegue"
[592] La Vanguardia, Jueves 13 de Mayo 1999, p.86, "AGBAR invertirá casi 180.000 millones de pesetas en tres años", Albert Gimeno
[593] Words by Ricard Fornesa, source: La Vanguardia, Miércoles 10 de Noviembre 1999, p.90, "AGBAR supera las previsiones y gana un 23% más en nueve meses", Enric Tintoré, our translation

Figure 6.10. Turnover of the AGBAR group, 1995-1999, in million pesetas.



Source: own elaboration from data of La Vanguardia[594]

Increasing benefits notwithstanding, the shares of AGBAR in the stock exchange underwent a negative trend (while benefits increased by 25 percent the stocks decreased by 24 percent in 1999), possibly due to the boom of the *dotcom* market (AGBAR has historically behaved as a "secure value")[595]. However, after being dropped from the Ibex-35, in December 2000, AGBAR began to recover again[596] during the next months.

[594] La Vanguardia, Lunes 24 de Enero 2000, p.50, "La facturación del grupo AGBAR supera los 500.000 millones tras la expansión en Chile", Enric Tintoré
[595] La Vanguardia, Domingo 4 de Junio 2000, Revista p.19, "Sismograma: expansión de AGBAR", Feliciano Baratech
[596] La Vanguardia, Domingo 27 de Mayo 2001, Dinero p.1, "Aguas de Barcelona salió del Ibex…y empezó a subir"

6.4 The diversification strategies of the group from the 1990s onwards

Once arrived at this point of the dissertation, it is important to look back and analyze with some detail the characteristics of the main businesses the AGBAR group has been involved in.

To understand how the water company saw the environment as a business niche, it is very useful to read the editorial of the supplement *El Medio Ambiente* in *La Vanguardia*, written by Ricardo Fornesa[597] in 1999. The president of AGBAR argued that the major environmental challenge at the beginning of the 21st century was the proper management of liquid, solid and gaseous waste. It must be remembered that by then, AGBAR had business interests precisely in liquid (wastewater), solid (waste) and gaseous (MOT, ITV, emission control in cars) waste.

In the same issue of this supplement, there was a commercial advertisement of AGBAR (figure 6.11, our translation) that summarized perfectly the editorial: "We work to make possible the world you imagine". Health, waste management, car emissions control, and telecommunications were by the late 1990s the main business of the group, apart, of course, of water supply and sanitation services. The group had made thus incursions in other market niches beyond water supply. Telecommunications was one of them as we have already mentioned. AGBAR also joined sector of e-commerce for banks and businesses with the creation of AGBAR Global Market (AGM) in 1998[598]. Some of the businesses, such as the Internet Company AGM[599], did not work as well as desired. In 2002, the Internet business of AGBAR was abandoned[600], together with the telecommunication business[601]. The group also penetrated into other businesses such as bottled water. The incursion of the group in the bottling business was a very rare case that serves to illustrate how

[597] La Vanguardia, Viernes 19 de Marzo 1999, Ecología y Medio Ambiente, Editorial: Medio Ambiente, Ricard Fornesa
[598] La Vanguardia, Jueves 17 de Septiembre 1998, p.78, "El grupo AGBAR crea una división de comercio electrónico para empresas y bancos", Jordi Palarea
[599] La Vanguardia, Sábado 26 de Mayo 2001, p.78, "Fornesa defiende una fusión de AGBAR para doblar tamaño y ganar presencia internacional", Dolors Álvarez
[600] La Vanguardia, Domingo 23 de Junio 2002, p.83, "AGBAR vende su consultora de Internet a ocho directivos", Lalo Agustina
[601] La Vanguardia, Sábado 31 de julio de 1999, p.55, "El Escàner. Debis: compra"

the company considered the environmental flows, both the inputs and the outputs to the urban metabolism, as the basis of its activity.

Figure 6.11. Advertisement of AGBAR.

Source: La Vanguardia, 19th March 1999, Barcelona Ciudad Sostenible p.11 /28th april 1999, Ecología y Medio Ambiente, p.7

6.4.1 Bottled water: the business that did not thrive

As said, in the 1980s *Aguas de Barcelona* was in the quest of new niches to expand its business reach. Bottled water was a very promising market with a great potential in Spain and in Europe according to economic analysts[602]. In 1986 the group entered this sector with the acquisition of the bottling company *Aguas de Lanjarón*[603] and also of other minor groups: Fondtalt waters (in Reus) and Aguamur waters (in Murcia)[604].

The bottled water business seemed to explode in the early 1990s, with Aguas de Lanjarón, reaching revenues tenfold those of 1986[605] (over 5,500 million pesetas in 1993[606]), building a new plant and being awarded with the exclusive concession to supply bottled water to the Expo 92 in Seville[607]. When asked if the idea to buy the bottling company had any relation with the poor quality of the Llobregat river, the president of the SGAB denied such idea as *Aguas de Lanjarón* only had important market share in Andalucía and the Levante, but not in Barcelona[608]. In 1993, Aguas de Barcelona sold half of the bottled water company *Aguas de Lanjarón* to the French group BSN Danone (the owner of Font Vella, a very well-known brand in Catalunya)[609] to enlarge the scope of the bottled water business in Spain. Eventually Aguas de Barcelona sold the rest of its business to the Danone group as part of disinvestment policies.

Seen in perspective, the claims that bottled water was a promising business were correct: Spain is currently one of the countries with a higher growth in the consumption of bottled water, with around 150 liters per capita and year in 2007. However, consumption was geographically very uneven: in the Metropolitan Area of

[602] La Vanguardia, 9 de Septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico"
[603] This company is sold some time later to the food company Danone.
[604] La Vanguardia, 9 de Septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico"
[605] La Vanguardia, Martes 18 de Mayo 1993, p.73, "Aguas de Barcelona vende a BSN el 50% de Aguas de Lanjarón por 2.750 millones", Félix Badia
[606] idem
[607] La Vanguardia, Viernes 27 de Marzo 1992, p.45, "Aguas de Barcelona culmina la absorción de la Corporación AGBAR", Carles Esteban y Enric Tintoré
[608] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré
[609] La Vanguardia, Martes 18 de Mayo 1993, p.73, "Aguas de Barcelona vende a BSN el 50% de Aguas de Lanjarón por 2.750 millones", Félix Badia

Barcelona, bottled water is consumed in excess of tap water[610]. Because of mere fetishization (Opel 1999, Wilk 2006, De Wolff 2007) , lack of reliable sources (such as happens in many parts of the developing world), or even due to the bad taste in some other developed cities, as it could be the case of metropolitan Barcelona, the bottled water sector is continuously expanding in the world.

6.4.2 Waste management and street cleaning

Solid waste management and related services were during the 1990s one of the main activities of the company, yielding over 10 percent of the income of the water group in 1994 (figure 6.9).

Although in the 1980s solid waste treatment was already an important niche of market for the group, with ventures especially in the North of Spain (see map 6.1) it was during the 1990s when important progress was made. The subsidiary Cespa was the vehicle of this expansion. In 1994, Cespa was awarded with the concession of street cleaning in some districts of the city of Barcelona (Gràcia, Sants-MontjuÏc, Sarrià-Sant Gervasi and Les Corts) until the year 2000[611]. Aguas also made important headway in the solid waste management sector, buying several Spanish companies, and becoming therefore the second most important group in the sector (after FCC)[612].

At the international level, in 1996 the group won the concession of solid waste collection in Barranquilla, Colombia, (altogether with the water supply and sanitation services as we will see) [613] and in 2000 in some locations of Morocco[614]. By 2002, Cespa's income reached around 590 million Euros per year, providing service to 444 municipalities and a population around 12.5 million people. Furthermore it managed 29 waste treatment sites with a capacity to treat 24 million m^3 of waste[615].

[610] La Vanguardia, Miércoles 17 de Octubre 2007, Barcelona bebe más agua embotellada que del grifo
[611] La Vanguardia, Miércoles 23 de Noviembre 1994, p.30, "Fomento y Aguas de Barcelona se reparten la ambicionada contrata de la limpieza urbana"
[612] La Vanguardia, Miércoles 26 de Agosto 1998, p.48, "El grupo AGBAR ha invertido 40.000 millones en su plan de expansion el primer semester", Enric Tintoré
[613] La Vanguardia, Jueves 28 de Noviembre 1996, p.67, "Protagonistas. Ricard Fornesa"
[614] La Vanguardia, Sábado 27 de Mayo 2000, p.86, "AGBAR compra el 50% del líder argentino de la limpieza urbana por 6.300 millones", Dolors Álvarez
[615] Press realease AGBAR, 29th August 2003, "AGBAR vende sus actividades de residuos sólidos a ferrovial"

In 2003 AGBAR sold all the shares of Cespa to Ferrovial[616] in order to focus its activities in the health, certification and water business[617]. A year later, in 2004, the group continued its disinvestments with the selling of the waste treatment firm Trasa to Ferrovial as well as real estate in Madrid[618].

6.4.3 Controlling emissions and certifying: another niche of business

The group imagined the environment as key arena of business. Flows of capital could not only be obtained from capturing and distributing flows of water to the city, but also they could be obtained from the management of the undesired flows: wastewater, solid waste or even emissions. Following this rationale, in 1996 the group entered the business of car inspection (ITV in Spain, MOT in the UK)[619] with the division *AGBAR Automotive*. Car inspection is not only directed to guarantee the security of the vehicles but relies heavily on checking the environmental performance of vehicles in terms of emissions and noise. By 1998 this company had a potential market of 2.5 million vehicles in Spain and operated also abroad, in Portugal and even Argentina[620].

The internationalization AGBAR was undergoing at the same time also had its share in the car inspection business. As South America for water, North America was the special target of the AGBAR group in the MOT sector. At the end of 2000, the acquisition of the North-American Keating, turned the AGBAR group into a world leader of MOT test and emissions control[621]. Just in the United States, AGBAR controlled the car emissions of 6.5 million units[622], with a total of over 12.5 million vehicles revised every year[623] in the world in 2002.

[616] La Vanguardia, Martes 17 de Junio 2003. p.71, "AGBAR se convierte en el primer accionista de Emte y estudia nuevas adquisiciones en Europa"
[617] Press realease AGBAR, 29th August 2003, "AGBAR vende sus actividades de residuos sólidos a ferrovial"
[618] La Vanguardia, Viernes 12 de Noviembre 2004, p.79, "AGBAR gana un 137% más por la venta de participaciones", Dolors Álvarez
[619] La Vanguardia, Jueves 20 de Junio 1996, p.71, Protagonistas
[620] La Vanguardia, Martes 24 de Febrero 1998, p.62, "El Grupo AGBAR invertirá 70.000 millones en 1998 para ampliar sus programas de diversificación", Enric Tintoré
[621] La Vanguardia, Sábado 16 de Diciembre de 2000, p.77, "AGBAR compra la norteamericana Keating por 11.000 millones", Dolors Álvarez
[622] La Vanguardia, Viernes 14 de Diciembre 2001, p.79, "En línea. AGBAR: Línea de negocio en EE.UU"
[623] La Vanguardia, Martes 7 de Mayo 2002, p.91, "AGBAR Automotive conquista EE.UU."

A new line of business, in synergy with MOT (ITV in Spanish) was initiated in Spain: the recycling of cars and the car spare parts market[624]. This was a promising business due to the European directive[625] that obliged to recycle all used cars from 2002 on.

In 2003 AGBAR won the public tender of privatization of the *Laboratori General d'Assaigs de la Generalitat* (LGAI), committing to invest 300 million Euros within three years[626,627]. LGAI worked in a wide range of fields from chemistry to polymers and other fields such as the environment, acoustics, laser, etc., and offered services ranging from calibration, analysis, and standardization, to quality control and certification. The acquisition of the LGAI, combined with the previous takeover of Tecinco in 2002[628], implied the entrance of the group in the certification business. This required a rebranding of the division, giving place to the birth of Applus+.

The internationalization of Applus continued with further MOT concessions in the United States[629], and also incursions in the Chinese MOT and certification market. In 2003 the company obtained a MOT concession in Nanjing (China). At the same time it became the first European standardization firm to obtain a license in China to standardize vehicles and components before being exported to Europe[630]. This expansion would also include the acquisition of the whole MOT network in Denmark[631] in 2005.

Applus increased its reach and entered into the food certification industry, with the acquisition of Cayace and the *Entidad Certificadora de Alimentos de España* (ECAL)[632]. AGBAR, very keen on public-private collaboration and partnerships,

[624] La Vanguardia, Jueves 26 de Octubre 2000, p.83, "AGBAR gestionará una planta de reciclaje de coches y un mercado de recambios", Dolors Álvarez
[625] Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of life vehicles. *Official Journal of the European Communities* (21 October 2000).
[626] La Vanguardia, Domingo 19 de Enero 2003, p.64, "AGBAR invertirá 300 millones en el LGAI de la Generalitat", Dolors Álvarez
[627] La Vanguardia, Sábado 8 de Febrero 2003, p.57, "La Generalitat adjudica el LGAI a AGBAR, la única candidata a la privatización"
[628] La Vanguardia, Lunes 4 de Febrero 2002, p.59, "En línea. AGBAR: Compra la mayoría de Tecinco"
[629] La Vanguardia, Sábado 22 de Febrero 2003, p.60, "AGBAR gana un 32% más y da valor cero a sus activos argentinos", Dolores Álvarez
[630] La Vanguardia, Sábado 8 de Noviembre 2003, p.83, "Applus, filial de AGBAR, inicia en Nanjing la conquista del mercado chino", Rafael Poch
[631] La Vanguardia, Martes 18 de Enero 2005, p.65, "Applus compra la red de ITV de Dinamarca por 64 millones de euros", Dolors Álvarez
[632] La Vanguardia, Martes 14 de Octubre 2003, p.75, "AGBAR desembarca en la alimentación", Dolors Álvarez

reached PPP agreements in the certification sector: the managing of *Laboratorio de Análisis de la Feritilidad de Suelos (LAF)*[633] is an example. The technical certification was consolidated as one of the main lines of growth of the AGBAR group. Soluziona Calidad, the environmental and quality division of Soluziona, owned by Fenosa, was absorbed by Applus[634,] and became the leader of the certification sector in Spain.

At the Catalan level, the concessions of the ITV service hold by AGBAR were renewed before the expiration until 2014 just before the Parliamentary elections and the subsequent political change[635] of 2003. With the political change by the end of 2003 in Catalunya new legislation on ITV services was enacted aimed to reduce the monopolies in this sector and opening new tenders[636], therefore precluding the dominance of AGBAR in the sector. A few months latter, AGBAR sold 20 percent of the shares of Applus to Caja Madrid[637], still retaining 55 percent with the remainder hold by Soluziona.

In 2006 Applus+ (AGBAR) and Soluziona (*Unión Fenosa*) reached and agreement to expand in the international market[638] together. A result of this was the acquisition of the Dutch RTD[639] by Applus in April 2006. Despite this agreement and in line with AGBAR's policy of disinvestments, in 2006 Applus was agreed to be sold[640] to an English society. Negotiations, however, did not succeed[641] with the British buyers, and other groups became interested in the take over[642]. Eventually, in 2007 AGBAR

[633] La Vanguardia, Sábado 12 de Marzo 2005, p.79, "Applus compra el 70% del laboratorio de Sidamon"
[634] La Vanguardia, Sábado 6 de Noviembre 2004, "AGBAR absorbe Soluziona Calidad, valorada en 130 millones de euros", Dolors Álvarez
[635] La Vanguardia, Martes 23 de Septiembre 2003, p.65, "Indústria amplía ocho años hasta el 2014, la concesión de las ITV a AGBAR y RVSA", Dolors Álvarez
[636] La Vanguardia, Viernes 3 de Junio 2005, p.71, "Indústria sacará a concurso las ITV y vetará posiciones de domino en el sector", Dolors Álvarez
[637] La Vanguardia, Jueves 28 de Julio 2005, p.55, "Ricardo Fornesa y Miguel Blesa pactan la compra del 20% de Applus por Caja Madrid", Mariano Guindal
[638] La Vanguardia, Martes 21 de Marzo 2006, p.78, "Applus+ y Soluziona firman un acuerdo"
[639] La Vanguardia, 7 de Abril 2006, p.71, "Applus compra la holandesa RTD por 193 millones y fija su expansión en Asia", Dolors Álvarez
[640] La Vanguardia, Jueves 6 de Julio 2006, p.71, "AGBAR vende Applus+ a una sociedad de inversión inglesa por 1.015 millones", Dolors Álvarez
[641] La Vanguardia, Martes 1 de Agosto 2006, p.46, "Candover renuncia a comprar Applus y AGBAR destituye a los negociadores", Dolors Álvarez
[642] La Vanguardia, Sábado 23 de Septiembre 2006, p.69, "Cinco fondos se interesan por comprar Applus+ al grupo AGBAR", Ramon Aymerich

reopened the selling of Applus+[643] (owned by AGBAR, Fenosa and Caja Madrid), with many potential bidders, among them the American Carlyle[644] with the support of different banking institutions (La Caixa, Barclays, Calyon or Caja Madrid)[645]. Eventually the American group bought the company[646] and Applus disappeared from the AGBAR portfolio. That was the end of the adventures of AGBAR in the MOT and certification businesses, from then on the company would focus on their core businesses: health and water.

6.4.4 Health as a key driver of economic expansion

The health sector was an important target for the expansion of the group. In 1988 AGBAR created *AGBAR Salud*, with the objective to take part in private health insurance companies and prosper in the health sector[647]. Despite the fact that Spain had universal public healthcare, the president of the group saw interesting perspectives for the private participation in the health sector:

> "Private medicine in Spain plays an important role as a complement to the public heath system and has still prospects for important growth. […] The private initiative could cover the necessities of population that could not be covered by public medical care; such is the case of senior citizens care or terminally ill people. In both cases there is an important demand not met"[648]

A year later, in 1989, AGBAR Salud was already the third most important private health insurance group in Spain[649]. In 1990 the AGBAR group took hold of Adeslas

[643] La Vanguardia, Sábado 5 de Mayo 2007, p.64, "Fornesa dice que hay inversores para Applus+"/La Vanguardia, Martes 8 de Mayo 2007, p.63, "Applus reinicia su venta con la búsqueda del banco asesor"/La Vanguardia, Martes 19 de Junio 2007, "Más de diez grupos presentan ofertas por el 100% de Applus"
[644] La Vanguardia, Lunes 23 de Julio 2007, p.59, "Carlyle y las cajas encabezan la puja por Applus aunque Eurazeo iguala la oferta", Conchi Lafraya
[645] La Vanguardia, Martes 24 de Julio 2007, p.57, "Carlyle financiará la compra de Applus con La Caixa, Barclays, Calyon y Caja Madrid", Conchi Lafraya
[646] La Vanguardia, Miércoles 25 de Julio 2007, "AGBAR obtendrá 210 millones de plusvalías netas por la venta de Applus a Carlyle", Conchi Lafraya
[647] La Vanguardia, Miércoles 28 de diciembre 1988, p.60, "Corporación AGBAR crea una empresa para el sector de la salud"
[648] Comments of Ricard Fornesa, La Vanguardia, 9 de Septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico", our translation
[649] La Vanguardia, Sábado 9 de Septiembre 1989, p.51, "El grupo Aguas de Barcelona consolida su presencia en el sector del seguro médico"

and merged it with its subsidiary company AGBAR Salud to create one of the most important firms in the health insurance sector[650].

In 1994 Adeslas, the health insurance company owned by the AGBAR group, had over 800,000 members[651], with an outstanding presence in Catalunya (figure 6.12) and yielding over a quarter of the total revenues of the water group (figure 6.9). In 1996 it became the second most important health insurance group in Spain[652].

Figure 6.12. Advertisement of Adeslas in the press.

Source: La Vanguardia, 14th June 1993, p.22

Though water related activities constituted more than half of the benefits of the group by 1996, non-related water activities were gaining momentum[653]. In 1997 AGBAR made a step forward in its health business when given the management of the hospital of Alzira (València). This was the first experience in Spain of private

[650] La Vanguardia, Martes 3 de Abril 1990, p.47, "AGBAR toma el control de Adeslas para liderar los seguros médicos", Carles Esteban
[651] La Vanguardia, Lunes 28 de Marzo 1994, p.43, "La compañía de seguros médicos Adeslas invierte 3.000 millones en su expansión", Rosa Salvador
[652] La Vanguardia, Martes 21 de Mayo 1996, p.68, "Adeslas se convierte en la segunda aseguradora de salud de España"
[653] La Vanguardia, Martes 3 de Septiembre 1996, p.54, "El grupo Aguas de Barcelona ganó casi 4.000 millones de pesetas en el primer semestre"

management in the public health system[654]. Regarding the health sector, and referring to the private initiative of building a hospital, Fornesa argued: "If this model was generalized, waiting lists would be over and public health would save a lot of money"[655]. Once built by AGBAR, the hospital would be privately financed and managed for 10 years, although remaining a public service[656]. This was possible thanks to the new legal framework enacted by the conservative *Partido Popular*, in the Spanish government since 1996. This new legal framework[657] permitted the private participation in the public Spanish health system. Since then on, private participation in the public health system sharply increased, until the point that this model is widespread in 2009 in some regions of Spain, such as Madrid (see chapter 8).

It is very interesting to briefly comment the rationale of private participation in the health sector by the AGBAR group. The following excerpt shows how PPPs, i.e. public-private partnerships, are said to be the best mechanism to cope with the changing needs of society regarding basic services:

> "From the private initiative we have much to offer to the public health system. We recognize its big achievement [referring to the public health system] and the leading role it has performed as pillar of the welfare state in Spain. We think that the State does not have to abandon its role as guarantor and funder. The private sector could provide economic resources and management capacity, at the time that would introduce a factor of concurrence that would only result in advantages", Antonio Paredes director of Adeslas, 1998 [658]

The State has neither to disappear nor to roll back, but instead to roll out the mechanisms to create new markets, in Peck and Tickell (2002) sense. In other words, the State has not to deregulate but instead to reregulate in order to grant private capital the opportunity to prosper. In Peck's (2004:394) words the sate does not "fade out" but instead becomes an "animateur" of the neoliberalization process,

[654] AGBAR's webpage, http://www.AGBAR.es/esp/a-3_historia.asp, last accessed 20th September 2009.
[655] Words by Ricard Fornesa, source: La Vanguardia, Miércoles 10 de Noviembre 1999, p.90, "AGBAR supera las previsiones y gana un 23% más en nueve meses", Enric Tintoré, our translation
[656] La Vanguardia, Miércoles 26 de Agosto 1998, p.48, "El grupo AGBAR ha invertido 40.000 millones en su plan de expansión el primer semestre", Enric Tintoré
[657] *Ley 15/1997, de 25 de Abril, sobre habilitación de nuevas formas de gestión en el sistema nacional de Salud*. See also: *Real Decreto-Ley 10/1996 de 17 de Junio, sobre habilitación de nuevas formas de gestión del Insalud*
[658] La Vanguardia, Sábado 28 de Marzo 1998, p.55, Publireportaje, "Desde el sector privado tenemos mucho que ofrecer al sistema público", our translation

performing quite an interventionist role. The Law 15/1997, whereby the Spanish public health system was opened to private capital, is a good example of the crucial role of reregulation performed by the State.

This rhetoric around the private participation in the health sector is exportable to the water sector or other sectors where AGBAR operates. For this company, public-private partnerships seem the best way to deliver services, from water supply and sanitation to health insurance, solid waste collection, and treatment or car emission control.

The internationalization of the health insurance business was in the agenda of the group. Example of this was the incursion into the Portuguese private health insurance market in 1998[659] by means of a partnership with the Portuguese Império. The company also penetrated into the Argentinean health insurance sector[660].

In Spain, the steady progression of Adeslas was patent. By 1999 Adeslas, had some 1.5 million clients, representing one fourth of the Spanish citizens with private insurance[661]. In 2002 AGBAR sold some 25 percent of Adeslas[662] to the French Méderic, which would buy 20 percent more of the shares in 2004-05[663], thus arriving to control 45 percent of Adeslas. Adeslas continued its expansion, with the buying a quarter of shares of the insurance company IMG [664].

The private health insurance sector could not avoid the effects of the international economic crisis, with the sector loosing clients. Adeslas asked the government to provide fiscal incentives for private health insurances as they argued that the decrease in the number of private health insurance holders would increase the pressure on the public health system, leading toward an eventual collapse[665]. We observe again how in the eyes of AGBAR the State has an important role to

[659] La Vanguardia, Martes 10 de Febrero 1998, p.64, "Adeslas se asocia con Império para entrar en los seguros de salud de Portugal"
[660] La Vanguardia, Miércoles 26 de Agosto 1998, p.48, "El grupo AGBAR ha invertido 40.000 millones en su plan de expansión el primer semestre", Enric Tintoré
[661] La Vanguardia, Jueves 30 de Diciembre 1999, p.79, "El Escàner. Adeslas: facturación"
[662] La Vanguardia, Sábado 22 de Febrero 2003, p.60, "AGBAR gana un 32% más y da valor cero a sus activos argentinos", Dolores Álvarez
[663] La Vanguardia, Viernes 12 de Noviembre 2004, p.79, "AGBAR gana un 137% más por la venta de participaciones", Dolors Álvarez
[664] La Vanguardia, Sábado 31 de Diciembre 2005, p.71, "Adeslas: Finaliza la compra del 25% de IMG Seguros por 40,6 millones"
[665] La Vanguardia, Jueves 5 de Marzo 2009, p.51, "Adeslas pide ayudas fiscales para impulsar el seguro de salud", Rosa Salvador

reregulate and to aid private capital to prosper in moment of crises, such as in the financial crunch beginning in 2007.

Adeslas would play a decisive role at the end of 2009 in the reconfiguration of the water company as we will see later. Before, however, we will present the pillar of the AGBAR group, the water sector, tracing the evolution of the business at the international and Spanish level from the 1990s until 2009.

6.5 Back to the core: the water business of AGBAR in Spain and abroad from the 1990s

In the previous sections we have shown how AGBAR, from providing water to some parts of the city of Barcelona in the 19th century, expanded tremendously its scope, enlarging its set of activities (health, car inspection, solid waste treatment, telecommunications and internet, etc.) and becoming inserted in the global circuits of capital. Now, we return to the original flow, water, to analyze how the group expanded in the water supply and sanitation sector around the world on the one hand, while pursuing new "resources" in the water cycle, such as desalination and water reuse.

6.5.1 The internationalization of the water business of AGBAR

By 1992, Aguas de Barcelona had reached "its limits of diversification", according to its president, Ricard Fornesa. In that sense, he argued the necessity "to not try one's luck and to growth cautiously in the sectors were the company is strong". In the previous section we have explained how the diversification of activities took place. Regarding the water sector, the consolidation in Spain and the expansion in Portugal, as well as the international presence, were their main goals[666]. "Water supply and treatment privatization is in process of growing", acknowledged the director of the group in a interview in La Vanguardia[667].

By then, the company that had absorbed the Corporación AGBAR, was considered "a potent group without debts and secure profitability"[668], standing between the 10 largest private companies in the stock exchange of Madrid, and among the three most important if banks and energy companies were excluded[669]. The Spanish Ministry of Public Works qualified the model of water supply in Barcelona as "an example for other cities" due to its private initiative combined with the role of the town

[666] La Vanguardia, Sábado 27 junio 1992, p.63, "Aguas de Barcelona invertirá 20.000 millones durante este año", our translation
[667] La Vanguardia, Domingo 18 de Abril 1993, p.68, Entrevista a Ricard Fornesa, presidente de Aguas de Barcelona, "Invertiremos 15.000 millones para afrontar nuevos proyectos de abastecimiento de agua", Enric Tintoré, our translation
[668] La Vanguardia, Viernes 27 de Marzo 1992, p.45, "Aguas de Barcelona culmina la absorción de la Corporación AGBAR", Carles Esteban and Enric Tintoré, our translation
[669] La Vanguardia, Domingo 21 de Junio 1992, p.87, Sismograma (Economia), Feliciano Baratech

council[670]. Public private collaboration and partnerships were gaining momentum in Spain, in the context of privatization of an important number of state-owned firms. Despite the clear positive outcomes for the private sector of such tight collaboration with the administration, which had permitted to expand the business in Spain, we have to remember that at the same time the sector was highly regulated. In 1992, the water businesses of Aguas grew 20 percent in front of the 49 percent increase of the rests of its activities[671], denoting the 'slow' speed of growth of a highly regulated sector (water supply) in front of the other ventures of the group. This could have been one of the reasons Aguas decided to seek new water business overseas. Hence, the company took part in tenders for the privatization of the water supply in Latin American cities such as Buenos Aires, Ciudad de Mexico or Valparaíso[672].

By 1998, more than 200,000 million pesetas had been invested in Latin America, most of them in Argentina[673], supplying water to some 14 million people[674]. According to the former responsible of AGBAR for South America, Jordi Oliveras, doing business in Latin America, provided, 'high rates of profitability'[675]. In 1999, Gérard Mestrallet, the president of Suez *Lyonnaise des Eaux*, the partner and partial owner of AGBAR showed its commitment with AGBAR to expand internationally: "We are going to consolidate our international leadership together with *Aguas de Barcelona*". Water scarcity was depicted as a main challenge for the world, and private capital had to work to overcome this problem: "We have to investigate how to solve water scarcity in the world"[676]. Different international organizations, such as the World Bank or the International Monetary Fund backed the participation of private capital in the water sector (Dinar et al. 1998). The same organizations were those that promoted privatizations in developing countries as a condition to receive loans.

[670] La Vanguardia, Sábado 5 de Septiembre 1992, p.27, "Barcelona, modelo de abastecimiento y saneamiento del agua", our translation
[671] La Vanguardia, Domingo 7 de Marzo 1993, p.67, Sismograma, Feliciano Baratech
[672] La Vanguardia, Jueves 17 de Septiembre 1992, p.61, "Aguas de Barcelona prevé realizar inversiones de 14.000 millones de pesetas en este ejercicio", Pablo Fernández
[673] La Vanguardia, Martes 1 de Diciembre 1998, p.83, "AGBAR se refuerza en Argentina"
[674] La Vanguardia, Domingo 23 de Agosto 1998, p.64, "España, primer inversor en la zona", Mayte Rius
[675] La Vanguardia, Lunes 10 de Agosto 1998, p.42, Entrevista a Jordi Oliveras, economista, ex director de AGBAR en América del Sur "Las PYMES tienen grandes oportunidades de ampliar mercados en América del Sur", Patrici Tixis
[676] La Vanguardia, Domingo 10 de Enero 1999, p.78, Entrevista a Gérar Mestrallet, presidente de Suez Lyonnaise des Eaux, "Vamos a consolidar nuestro liderazgo mundial de la mano de Aguas de Barcelona", Encarna Pérez, our translation

At the beginning of the 21st century, the international branch of AGBAR raised some 25 percent of the total benefits of the group[677]. The benefits of the group in 2000 continued its rocketing pace (21% growth)[678]. The Latin American financial turmoil, especially the Argentinean crisis of 2001, however, changed completely this picture and forced the company to re-imagine its foreign investments in the water sector.

Next, we will trace, country by country, the international water businesses controlled by AGBAR, reflecting upon the successes and failures of such capital movements. South America has been the region where AGBAR expanded in a more significant ways during the last two decades. Hence we begin with those countries to document the international trajectory of the water company.

a) Argentina

Argentina represents in metaphoric terms both the cradle and the grave of the AGBAR adventure in Latin America. The Argentinean adventure constituted without any doubts the most notable failure of AGBAR in South America, and probably in the world.

At the end of 1992, a consortium[679] with the presence of Aguas de Barcelona won the international tender to supply water to Buenos Aires for 30 years[680]. The group engaged in a process of participation in different Argentinean water firms. In 1998 AGBAR increased its direct presence in *Aguas Argentinas* (25 percent), *Aguas Cordobesas* (15.39 percent) and *Aguas Provinciales de Santa Fe* (10.89 percent). Regarding the latter, the Argentinean firm Interagua (participated by AGBAR in a 50 percent) increased its shares up to 14.92 percent[681]. To observe how Argentina was the central target of AGBAR at the international level we must just realize that 80 percent of the 30,000 million pesetas invested in Latin America by AGBAR by 1998

[677] La Vanguardia, Miércoles 1 de Marzo 2000, "El grupo AGBAR mejora sus beneficios un 25% y gana 16.828 millones de pesetas"
[678] La Vanguardia, Viernes 23 de Febrero 2001, p.83, "El grupo AGBAR gana un 21% más en el 2000"
[679] This consortitum was configured by Lyonnaise des Eaux-Dumez (28,1%), Aguas de Barcelona (14%) Général des Eaux (8,9%), Anglian Water (5%), Sociedad Comercial del Plata (23%), Meller SA (12%) and Banco Galicia (9%). Source: La Vanguardia 19/12/92, p.73.
[680] La Vanguardia, Sábado 19 de diciembre 1992, p.73, "Aguas de Barcelona gana el concurso internacional para suministrar agua a Buenos Aires", Elisenda Vallejo
[681] La Vanguardia, Martes 1 de Diciembre 1998, p.83, "AGBAR se refuerza en Argentina"

were directed to this country. Furthermore, in 2000 AGBAR bought 50 percent of the leading Argentine company on street cleaning[682].

The Argentinean crisis of 2001, with the ensuing drop in the exchange rate of the *peso*, had a dramatic impact on the economic performance of the group. Benefits, for the first time in years, presented a negative growth (-17.7%) regarding the previous year[683]. In 2002 the Latin American crisis continued to affect *Aguas de Barcelona*. For example, its subsidiary company *Aguas Argentinas* cancelled the payments of financial debts (in dollars) due to the plunge of the *peso argentino*[684]. Despite the financial problems and losses in Argentine, Aguas would continue to yield important benefits[685], partly as a result of the divesting of 25 percent of Adeslas[686], reported in the previous section.

Besides the economic crisis Argentina was suffering and the subsequent economic impacts, AGBAR faced problems related to the alleged unfulfilment of the concession conditions in *Aguas Argentinas*, and thus received fines adding up to 3.5 million pesos [687, 688]. Political turmoil in Argentina continued, to the point that Néstor Kirchner, the president of Argentine in 2004, even threatened to withdraw the AGBAR concession arguing non-fulfillment of the contract:

> "Unfortunately, water was privatized. It has come the time the managers of those private firms become accountable to society. There is not going to be any impunity. If they want to exploit [the concession] ¡they have to invest! If not, we are going to talk in other ways", Néstor Kirchner, president of Argentine, 2004[689]

Eventually an agreement was reached between the government and Suez and AGBAR to guarantee the temporal continuity of the concession. That did not impede, however, that in 2005 Suez and AGBAR quit the Argentinean *Aguas de*

[682] La Vanguardia, Sábado 27 de Mayo 2000, p.86, "AGBAR compra el 50% del líder argentino de la limpieza urbana por 6.300 millones", Dolors Álvarez
[683] La Vanguardia, Viernes 1 de Marzo 2002, p.65, "AGBAR gana un 17.7% menos al provisionar 132 millones por la devaluación del peso"
[684] La Vanguardia, Jueves 11 de Abril 2002, p.78, "La filial argentina de Aguas de Barcelona suspende pagos"
[685] La Vanguardia, Jueves 1 de Agosto 2002, p.62, "AGBAR gana un 70% más y da por concluido el saneamiento de sus filiales argentinas", Dolors Álvarez
[686] La Vanguardia, Miércoles 23 de Enero 2002, p.57, "AGBAR vende el 25% de Adeslas por 200 millones de euros", Mariano Guindal
[687] La Vanguardia, Jueves 1 de Enero 2004, "Multa de 2,9 millones a Aguas Argentinas, filial de AGBAR"
[688] La Vanguardia, Sábado 17 de Enero 2004, p.62, "Multan a Aguas Argentinas por cortar el suministro"
[689] La Vanguardia, Miércoles 5 de Mayo 2004, p.59, "Kirchner pacta con Suez y AGBAR y tranquiliza a los inversores", our translation

Santa Fe as conversations with the administration to increase water charges failed[690]. The two groups also decided to leave the concession of *Aguas Argentinas*, while the president of Argentine tried to convince them to stay 2 more years[691], with the fear of not finding a new operator[692]. Eventually, it was the Argentinean government who cancelled the concession alleging "dreadful" service[693]. In 2008, AGBAR still had presence in Argentina, with 25 percent of *Aguas Argentinas*, S.A., 26 percent of *Aguas Provinciales Santa Fe*, S.A., and 5 percent *Aguas Cordobesas*, S.A.

b) Chile

Chile represents probably the other side of the coin of water privatization in Latin America. It is then a success story, at least from the perspective of private capital. Despite not being the main priority of AGBAR at the outset, already in 1995 AGBAR supplied water to the Chilean municipality of Valdivia[694].

Along the atmosphere of increasing privatizations in Chile, in 1999, a consortium leaded by AGBAR and Lyonnaise partially bought the public *Empresa Metropolitana de Obras Sanitarias* (EMOS)[695], the most important water supplier in Chile with an indefinite concession for the water supply service of the city of Santiago de Chile, with 5 million people[696]. A year later, in 2000 AGBAR increased its dominance over the Chilean water supply market with the acquisition of *Aguas Cordillera*, the supplier of the well-off districts of Santiago de Chile. With that movement, AGBAR controlled some 44 percent of the urban water supply in this

[690] La Vanguardia, Jueves 20 de Enero 2005, p.69, "Suez se plantea abandonar Argentina al no llegar a un acuerdo con el Gobierno Kirchner"/La Vanguardia, Miércoles 4 de Mayo 2005, p.49, "Suez y AGBAR abandona su inversión en la argentina Aguas de Santa Fe"/La Vanguardia, Martes 21 de Junio 2005, p.73, "Suez formaliza su marcha de Aguas de Santa Fe y vende su participación"

[691] La Vanguardia, Viernes 30 de Septiembre 2005, p.72, "Aguas Argentinas exige la devolución de las garantías"/ La Vanguardia, Domingo 16 de Octubre 2005, p.76, "Kirchner intenta que AGBAR siga dos años más en Argentina", Joaquim Ibarz

[692] La Vanguardia, Miércoles 31 de Agosto 2005, p.44, "Kirchner se acerca a Suez y AGBAR para que continúen en Argentina"

[693] La Vanguardia, Miércoles 22 de Marzo 2006, p.57, "Kirchner rescinde el contrato de Suez y AGBAR, que ya anunciaron su marcha del país", Alfred Rexach/ La Vanguardia, Jueves 23 de Marzo 2006, p.73, "Aguas Argentinas replica a Kirchner y califica de "ejemplar" el servicio prestado

[694] La Vanguardia, Sábado 1 de Julio 1995, p.11, "Los embajadores españoles en Latinoamérica, envueltos en una trifulca", Joaquim Ibarz

[695] In 2001 this company changed its name to Aguas Andinas

[696] La Vanguardia, Sábado 12 de Junio 1999, p.73, "AGBAR y Lyonnaise pagan 150.000 millones por la concesión de agua en Santiago de Chile", Félix Badia

country, approaching the 50 percent threshold the Chilean law established[697] to preclude monopoly over the market.

The Argentinean crises notwithstanding, AGBAR continued its business in Latin America and bought 50 percent of the Chilean water firm *Aguas Manquehue*. Interestingly, the clients of this company presented the second highest water consumption rate in Chile, so it was a clear strategic investment[698]. *Aguas Andinas*, subsidiary of AGBAR, bought the free water use rights owned by the town council, immersed in an important debt, of Santiago de Chile for 12 million Euros[699]. In 2003, AGBAR increased its participation in *Aguas Andinas* until 25 percent[700]. Again, in 2004, AGBAR increased its participation in this company, through the company *Inversiones Metropolitanas Limitada* (with Suez), holding 51.2 percent of Aguas Andinas[701].

The Latin American experience of AGBAR seemed to have an expiration date in the long term, except for the case of Chile[702]. This country has been in the last years a platform of launching for diverse multinationals to expand in Latin America. Apart form AGBAR other examples are[703]: Alcatel, Packard, Ericsson, Telefónica, Unizyz, Oracle, Alstom, Lafarge, Sumitom, General Electric, Sanofi-Aventis, etc. After leaving the main concession in Argentina in 2005 and taking advantage of economic recovery of South America, the Chile water business was the one providing more revenues and benefits for AGBAR: some 12 percent of the revenues and 16 percent of the benefits[704]. The group continued its expansion in this country with the buying

[697] La Vanguardia, Viernes 2 de Junio 2000, p.85, "AGBAR compra a Endesa una concesionaria chilena de aguas por 33.000 millones", Dolores Álvarez
[698] La Vanguardia, Sábado 2 de Febrero 2002, "AGBAR compra el 50% de la chilena Aguas Manquehue por casi 9 millones de euros", Marc Homedes
[699] La Vanguardia, Sábado 6 de Julio 2002, p.67, "AGBAR invierte 12 millones de euros en Santiago de Chile"
[700] La Vanguardia, Viernes 10 de Enero 2003, p.57, "AGBAR invierte 180 millones en elevar al 25.6% su participación en Aguas Andinas"
[701] La Vanguardia, Viernes 12 de Noviembre 2004, p.79, "AGBAR gana un 137% más por la venta de participaciones", Dolors Álvarez
[702] Cinco Días, 12/9/2005, AGBAR pone en marcha una salida ordenada de América Latina, Toni Garganté
[703] La Vanguardia, Domingo 12 de Julio 2009, Dinero p.6, "A la sombra del cesarismo"; Josep Maria Cortés
[704] La Vanguardia, Domingo 25 de Mayo 2008, p.78-79, "Latinoamérica da respiro a la inversión española"; Dolors Álvarez

through *Aguas Andinas* of more than the half of the shares of *Aguas Essal*[705] (*Empresa de Servicios Sanitarios de los Lagos*) from Iberdrola[706].

Table 6.2. Companies directly or indirectly participated by AGBAR in Chile, in 2008.

Name	Direct control, in %	Indirect control, %
AGBAR Chile, S.A.	39	61
AGBAR Latinoamérica, S.A.	100	
Cía. Hispa. Americana Servicios, S.A.		50
Brisaguas, S.A.		26
AGBAR ConoSur, Ltd		100
Inversiones Aguas del Gran Santiago, S.A.		100
Inversiones Aguas Metropolitana, S.A.		57
Aguas Andinas, S.A.		28
Análisis Ambientales, S.A.		58
Eco-riles, S.A.		28
Gestión y Servicios, S.A.		28
Aguas Manquehue, S.A.		28
Inversiones Iberagus Limitada, S.A.		28
Aguas Cordillera, S.A.		28
Empresa de Servicios Sanitarios de los Lagos, S.A. (Essal, S.A.)		15
Empresa Depuradora de Aguas Servidas (EDAS)		50

Source: adapted from AGBAR (2009)

Despite the expansion of the group in Chile, some disinvestments were also programmed. The group sold 49.9 of the Chilean subsidiary *Aguas Metropolitanas*, owner of *Aguas Andinas*, in order to improve economic health of the latter. The concession of *Aguas Andinas* had no temporal limitations and provided water to some 6 million people[707]. In total, AGBAR divested assets based in Chile related to the water cycle, health insurance sector, construction, and inspection sector amounting up to 530 million Euros[708]. During 2005, however, AGBAR signed 30

[705] AGBAR webpage
[706] La Vanguardia, Jueves 22 de Mayo 2008, p.64, "Iberdrola vende Aguas Essal a AGBAR",
[707] La Vanguardia, Sábado 22 de Octubre 2005, p.65, "AGBAR vende el 49,9% de su filial chilena Aguas Metropolitanas por 420 millones", Dolors Álvarez/La Vanguardia, Viernes 17 de Febrero 2006, "AGBAR vende el 60% de Aguas de la Costa y sale de Uruguay"
[708] La Vanguardia, Jueves 9 de Febrero 2006, p.62, "AGBAR desinvierte 530 millones en Chile"

new agreements of urban water supply (servicing some 160,000 people) and renewed 24 more (servicing some 850,000 people) [709].

In 2009 *Aguas Andinas* expanded its business perspectives beyond the regulated water supply and sanitation services in Chile (see table 6.2 showing all the participations AGBAR had in the country by early 2009). This implied both the expansion beyond the Chilean frontiers (by means of Chile-based companies), with for instance a concession together with the Spanish building company OHL of a reservoir in Perú to supply water to Lima.

> "Chile, in South America, is the more serious country, and it gives us guarantees; furthermore we have Aguas Andinas, a natural partner to develop many projects here", Joaquín Villarino, vice-president of Aguas Andinas and president of AGBAR Lationoamerica, 2009[710]

Within the Chilean borders, a new business emerges: desalination. The Chilean state was preparing in 2009 a new legal framework for seawater concessions[711] and AGBAR was willing to engage talks with the government. Regarding the desalination business, the AGBAR group said that:

> "*Esto es un negocio sin orilla,* we pretend to turn over as much as with the regulated water business", Joaquín Villarino, vice-president of Aguas Andinas and president of AGBAR Lationoamerica, 2009[712]

In November 2009, the Chilean branch of the AGBAR group was already planning to build a desalination plant in the region III of Chile, with a budget of 285 million US dollars[713], able to treat 1 m^3/s.

c) Other Latin American countries

Brazil: In 2000 and by means of the subsidiary Interagua, AGBAR was awarded with the water supply concession of Campo Grande (some 650,000 people)[714]. After

[709] idem
[710] La Tercera (Chilean newspaper), Sábado 8 de Junio 2009, "Aguas Andinas construirá plantas desaladoras y con la ibérica AGBAR logra contratos en Perú y Brasil", our translation
[711] La Tercera, Martes 30 de Junio 2009, "Gobierno alista plan de concesiones para transformar agua salada en potable en el norte"
[712] La Tercera, Sábado 8 de Junio 2009, "Aguas Andinas construirá plantas desaladoras y con la ibérica AGBAR logra contratos en Perú y Brasil", our translation
[713] Business News Americas, Friday November 20, 2009, "AGBAR plans to build US$ 285mn desalination plant"

the economic and political turmoil, related to the Argentinean crises, AGBAR left the country in 2005. Nonetheless, the company returned four years later, in 2009, with the adjudication of the commercial management of Sanego, the state owned water and sanitation firm servicing the state of Goiás with some 1,8 million 'clients'[715].

Mexico: The group is also present in Mexico by means of a partnership with *Grupo Mexicano de Desarrollo* to intervene in the water cycle[716]. By 2008, AGBAR indirectly controlled 49 percent of *Aguas de Saltillo* (AGBAR 2009).

Colombia: By means of a legal change[717] in the Colombian legislation in 1994 a new framework was established enabling the private participation in the delivery of public services. A year later the SGAB won a lease to constitute a mixed company for the water supply and sewerage system of Cartagena de Indias. The main shareholder of the new society was the District of Cartagena, with 50 percent, followed by the SGAB, with 45.91 percent, whereas the remainder 4.09 percent was owned by the local private sector[718]. Important riots took place in Cartagena de Indias to complain about the privatization of the local public water company[719].

In 1996, Aguas won the concession of water supply, sewage and solid waste collection[720] of the city of Barranquilla, in Colombia, with 1.4 million people. However this concession did not last long. In 2000 AGBAR left the water business in Barranquilla due to alleged security problems and lack of agreement with the local partner[721]. However, by 2008 AGBAR still controlled 46 percent of Aguas de Cartagena (Acuacar) (AGBAR 2009).

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[714] La Vanguardia, Miércoles 19 de Julio 2000, p.72, "Aguas de Barcelona consigue su primera concesión en Brasil"
[715] La Vanguardia, Jueves 14 de Mayo 2009, p.65, "AGBAR vuelve a Brasil al adjudicarse la gestión del agua del estado de Goiás"
[716] La Vanguardia, Domingo 28 de Junio 1998, p.66, "Alianza de Aguas de Barcelona con un grupo mexicano"
[717] *Ley 142 de 1994 (julio 11) por la cual se establece el régimen de los servicios públicos domiciliarios y se dictan otras disposiciones.*
[718] "Expericencia de AGBAR Empresa Mixa: Cartagena de Indias (Colombia)" presented at *II Conferencia sobre Tecnología para el Desarrollo Humano, 25-26 Abril*, Ingeniería sin Fronteras, Barcelona.
[719] La Vanguardia, Sábado 1 de Julio 1995, p.11, "Los embajadores españoles en Latinoamérica, envueltos en una trifulca", Joaquim Ibarz
[720] La Vanguardia, Jueves 28 de Noviembre 1996, p.67, "Protagonistas. Ricard Fornesa"
[721] La Vanguardia, Sábado 16 de Diciembre de 2000, p.77, "AGBAR compra la norteamericana Keating por 11.000 millones", Dolors Álvarez

Cuba: The water group was not only interested in 'liberal democracies' but also in 'socialist' countries. In Cuba, by 1998 Aguas de Barcelona managed the supply of Varadero and western Habana. The responsible of Aguas in Cuba by then, Miguel Lluch, was satisfied with the relation with the Cuban authorities:

> "Cuba scrupulously complies with all their economic commitments. They have realized that the indirect management of services yields good results" [722].

The expansion in Cuba continued with the constitution of a mixed firm (45 percent Canaragua, subsidiary of AGBAR) with the Cuban *Instituto Nacional de Recursos Hidráulicos (INRH)* to manage for 25 years the integral urban water cycle of La Habana[723]. By 2008, AGBAR indirectly controlled 41 percent of *Aguas de la Habana* (AGBAR 2009).

The case of Cuba is a paradigmatic example of how the firm was keen on tightly regulated and intervened markets, where the continuous negotiation and partnership with the administration was crucial. We would argue that AGBAR's involvement in Cuba is probably related to the important presence of Spanish tourist interests in the island, and the need to guarantee reliable water resources to the tourist sector.

Uruguay: At the end of 1997 AGBAR controlled 60 percent of *Aguas de la Costa*[724], holding a concession to supply part of the *Departamento de Maldonado* region[725]. A modification of the Uruguayan Constitution in 2004 changed the jurisdictions of water supply and entitled the government with the duty of supplying water[726]. As a consequence, AGBAR sold the assets of *Aguas de la Costa* in Uruguay[727].

d) North America

The water business of AGBAR also reached North America, concretely the United States. However, the activity here was not as successful as that in parts of South

[722] La Vanguardia, Lunes 5 de Octubre 1998, p.55, "El grupo AGBAR gestiona el suministro de agua a Varadero y la Habana", our translation
[723] La Vanguardia, Miércoles 19 de Enero 2000, p.79, "El Escáner: AGBAR abastecerá de agua a la Habana"
[724] La Vanguardia, Viernes 30 de Enero 1998, p.70, "AGBAR adquiere un 60% de la uruguaya Aguas de la Costa"
[725] Aguas de la Costa had a 25-years concesión since 1993.
[726] La Vanguardia, Sábado 11 de Diciembre 2004, p.70, "AGBAR recurre ante el Gobierno de Uruguay"
[727] La Vanguardia, Sábado 9 de Septiembre 2006, p.55, "AGBAR se desprende de Aguas de la Costa"

America. In 1998, Aguas acquired the society Water Company, devoted to the buying and selling of water rights[728], and also a share of 10 percent of Western Water Company, water supplier in California[729]. However the business did not perform as well as desired[730] and the company withdraw from the American water market.

e) Europe

In Europe, apart from Spain, the water company has focused in two countries: Portugal and England. Actually, **Portugal was** the country where AGBAR initiated its early internationalization with the creation in 1987 of *Lusagua*. The subsidiary company obtained some concessions, among them, for instance, that granted in 1995, to supply water to the Aveiro region for 20 years[731], or the one in Carvoeiro (Algarve region) for 20 years[732]. However, in 2001 AGBAR decided to leave Lusagua (by then the leading private company of water supply and sanitation in Portugal) and sold its participation to the state-owned company *Aguas de Portugal*. The change in privatization politics in Portugal with the creation of public water suppliers with whom AGBAR did not want to compete prompted this movement[733].

AGBAR entered the **British** water market with the take over of Bristol Water[734] in 2006. We recall that the British water industry was fully privatized and divested in 1989 (chapter 3). AGBAR acquired first all the whole shares of Bristol Water and it afterwards floated 49 percent in the Spanish stock market[735].

[728] La Vanguardia, Martes 1 de Diciembre 1998, p.83, "AGBAR se refuerza en Argentina"
[729] La Vanguardia, Miércoles 14 de Octubre 1998, p.79, "El escáner. El grupo AGBAR llega a California"
[730] La Vanguardia, Sábado 26 de Mayo 2001, p.78, "Fornesa defiende una fusión de AGBAR para doblar tamaño y ganar presencia internacional", Dolors Álvarez
[731] La Vanguardia, Viernes 24 de Noviembre 1995, p.66,"Aguas de Barcelona gana un contrato en Portugal"
[732] ABC, Domingo 24 de Marzo 1996, p.48, "Ricardo Fornesa: La nueva ley del seguro favorece de alguna manera a las empresas más grandes", Paloma Díaz-Jares
[733] La Vanguardia, Jueves 26 de Julio 2001, p.69, "AGBAR vende su participación en Lusagua de Portugal"
[734] La Vanguardia, Sábado 22 de Abril 2006, p.71, "AGBAR adquiere la britànica Bristol Water por 246 millones", Eduardo Magallón/ La Vanguardia, Martes 16 de Mayo 2006, p.64, "AGBAR toma el 84,7% de la británica Bristol Water"/La Vanguardia, Jueves 8 de Junio 2006, p.81, "AGBAR ya controla el 95% de Bristol Water"
[735] La Vanguardia, Sábado 23 de Septiembre 2006, p.71, "AGBAR sacará a bolsa el 49% de Bristol"

f) North-Africa

Aguas de Barcelona started its North-African venture with technical help to improve the water supply of metropolitan Argel (Argelia) in 1997[736]. Ten years later, in 2007, AGBAR would enter into the Argelian water supply and sanitation market, to manage the state-owned firm S*ociété des Eaux Oran*[737] servicing the region of Oran with over 1.5 million people. In Argelia AGBAR conducted a new type of management, delegated management, involving the transfer of technology, knowledge, procedures and methodologies of water management. This PPP arrangement shares some features with the service and management contracts described in chapter 3, although it present specific characteristics.

g) Asia

The Asian water market came next. If desalination constitutes the technological fix to widen some of the seemingly exhausted markets, China was envisaged as the spatial solution to increase the revenues of the group. In 2007, in the province of Jiangsu, AGBAR obtained, in partnership with the local Golden State Water, owned by Chinese investors and Merrill Lynch, the management of some treatment and wastewater treatment plants as well as the supply network, and also the permit to build one of this plants[738]. With this move AGBAR would own 49 percent of the Jiangsu Water Company Limited (AGBAR 2008). In December 2008 AGBAR increased by 22.5 percent its interest in Jiangsu Water Company Limited (linked to the Jiangsu Water Group operating in China) up to 71.5 percent of the company, [739]. This increase in the direct participation in the Jiangsu Water Company Limited, permitted AGBAR to participate indirectly in the following companies (AGBAR 2009):

- China Oriental Water Company (72 percent control)
- Taizhou Golden Harbor Water Company Limited

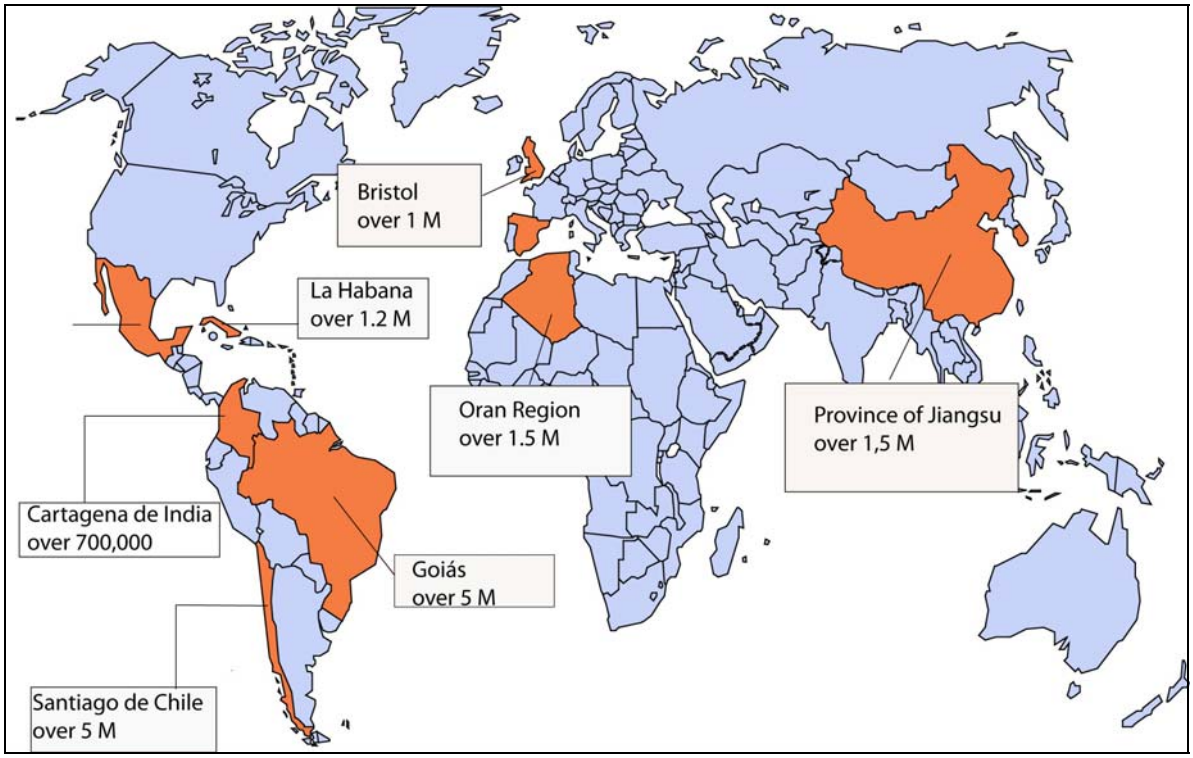
[736] La Vanguardia, Lunes 24 de Marzo 1997, p.27, "Maragall sella el hermanamiento de Barcelona y Argel, que se festejará en la Mercè del 98", Isabel Ramos Rioja
[737] La Vanguardia, Sábado 16 de Febrero 2008, p.65, "La venta de Applus duplica el beneficio de AGBAR"
[738] La Vanguardia, Miércoles 14 de Noviembre 2007, p.75, "AGBAR entra en el mercado chino de gestión y tratamiento de aguas", Eduardo Magallón
[739] AGBAR webpage, 05/05/2009 "AGBAR logra un beneficio de 36,8 millones de euros en el primer trimestre del 2009", press release

- Xuyi Golden State Water Company Ltd.
- Nanjing Golden State Chengbei Wastewater Treatment Company Ltd
- Taizhou Golden State Water Company Limited (this one with an indirectly 66 percent control)

AGBAR continued its Asian adventure to the South Korean water market in 2009. The water company bought 50 percent of Taeyong Entenc[740] and would collaborate with a local partner (similar to the model developed in China) reaching 6 percent of the Korean market (and 21 percent of the private market). The company also had plans to get into the Saudi Arabian water supply sector[741]. However and according to the information available it seems that these initiatives had not made much progress.

In figure 6.13 we show the presence of AGBAR in the world in 2009, including the main cities served.

Figure 6.13. Main world cities and regions supplied by the AGBAR group in 2009, with the approximate population



Source: own elaboration from data from AGBAR (2008, 2009)

[740] La Vanguardia, Sábado 6 de Junio 2009, p.77, "AGBAR desembarca en Corea del Sur con un socio local"
[741] La Vanguardia, Viernes 16 de Noviembre 2007, p.71, "AGBAR quiere poner un pie en el mercado de Arabia Saudí"

6.5.2 The Spanish water market

The AGBAR group has maintained an increasing presence in Spain over the years. Three different waves of expansion led AGBAR to have a predominant control over the Spanish market of water supply and sanitation services. During a first wave, in the late 19th and early 20th century the SGAB expanded in the city of Barcelona and its metropolitan Area. In the 1960s the group created Sorea and Saur, expanding the business mainly in Catalunya and Mediterranean Spain. A third wave, spatially more blurred, begins in the 1970s, when both Sorea and Saur continued to expand through concessions and the SGAB also constituted other subsidiary to companies covering other geographies of the State. At the same time, the group also increased its participation in mixed-economy water firms.

By 1994, in Spain, Aguas had concessions in 500 municipalities (some 65 percent of the municipalities that had privatized the system), amounting to 9 million people[742]. The same year, in Catalunya the SGAB supplied water to half of the population, some 2.8 million people, mostly from metropolitan areas[743]. Despite the decrease of consumption in Barcelona, AGBAR continued to growth in 1994 by 3.8 percent[744].

In 1997 and despite continuous water consumption decrease in Barcelona (3.2%), the water group increased its incomes by nearly 9 percent[745]. The decrease in water demand in Barcelona and its metropolitan area was attributed to the shrinking population. However, the real reason was said to be the water saving plans in manufacturing, which was consuming 33 percent less water than in 1989[746].

By 2009, AGBAR supplied some 12 million people in Spain, representing 27 percent of the Spanish population, and over 50 percent of the private market share of urban water supply. It also provided sanitation services to over 10 million people, representing the 30 percent of the private market share in this sector[747]. In Spain, as we have mentioned, urban water supply is a legal duty the local administration has to

[742] La Vanguardia, Miércoles 18 de Mayo 1994, p.64, "Aguas de Barcelona repite dividendo tras invertir 15.000 millones en 1993", Enric Tintoré
[743] La Vanguardia, Sábado 3 de Diciembre de 1994, p.26, “La compañía Aguas de Barcelona ya abastece a la mitad de la pobalción de Cataluña”, Jaume V. Aroca
[744] La Vanguardia, Jueves 2 de Mayo 1995, p.62, “El grupo Aguas de Barcelona ganó 9.131 millones en 1994”
[745] La Vanguardia, Viernes 23 de Mayo 1997, p.69, “Aguas de Barcelona nombra vicepresidente a Martín Villa”, Elisenda Vallejo
[746] La Vanguardia, Sábado 22 de Marzo 1997, p.36, “Aguas de Barcelona pide al usuario que contamine menos el agua residual doméstica”, Antonio Cerrillo
[747] Press release Suez Environnement, 22nd October 2009

provide. However, Spanish legislation considers that this service could be directly or indirectly provided, or even it could be provided under a mixed economy firm.

In general terms, the expansion of AGBAR across Spain has been based mainly in two different, though interlinked strategies, both of them types of Public-Private Partnerships:

a) The participation in tenders for the concession of water supply and sanitation tenders, directly by means of the SGAB or other subsidiary companies such as Sorea

b) The participation in municipal water firms, by means of buying part of the company. In turn, some of the mixed economy firms could provide water supply or sanitation services to other municipalities where they have won a concession.

In order to facilitate the understanding of how this group has expanded through Spain we are going to present the firms partially owned directly or associated to the AGBAR group related to the water supply and sanitation in Spain.

This exhaustive listing (tables 6.3, 6.4, and 6.5) provides some basic information regarding where these companies are located (Autonomous Community) and which is the percentage of participation by AGBAR (be it direct or indirect).

Table 6.3. Water companies, located in Catalunya, where AGBAR has direct or indirect presence

Name	Direct control, in %	Indirect control, in %
Aigües de l'Alt Empordà, S.A.		49
Aigües de Segarra-Garrigues, S.A.	22	
Aigües d'Osona, S.A.		46
Clavegueram de Barcelona, S.A.	54	
Companyia d'Aigües de Palamós, S.A.		56
Conducció del Ter, S.L.		48
Depuradores d'Osona, S.L.		25
Drenatges Urbans del Besòs, S.L.		50
Empresa Municipal d'Aigües de la Costa Brava, S.A.		42
Empresa Municipal Mixta d'Aigües de Tarragona, S.A.		49
Girona S.A.	31	
Mina Pública d'Aigües de Terrassa, S.A.	33	
Secomsa Aigües, S.L.		49
Empresa d'Aigües i Serveis de Cervera i la Segarra, S.L.		45
Sorea Rubatec AIE		45
Simmar, Serveis Integrals del Maresme, S.L.		63
Sorea-Searsa-Aqualia AIE		63
Aigua de Rigat, S.A.		68
Construccions i Rebaixos, S.L.		100
Aigües Sant Pere de Ribes, S.A.		97
Anaigua, Companyia d'Aigües de l'Alt Penedès I l'Anoia, S.A.		100
Aquagest Soluciones Industriales, S.A.		100
Aguagest, Promoción Técnica y Financiera de Abastecimeintos de Agua, S.A.		100
Aqua/plan, S.A.		100
AGBAR Mantenimiento, S.A.	100	
Aquagest Medio Ambiente, S.A.	100	
Interagua, Servicos Integrales del Agua, S.A.	100	
Sorea, Sociedad Regional de Abastecimeinto de Aguas, S.A.	100	

Source: Own elaboration form Annual Report of AGBAR 2008 (AGBAR 2009)

Table 6.4. Water companies, located in Valencia, where AGBAR has direct or indirect presence

Name	Direct control, in %	Indirect control, in %
Aguas del Arco Mediterráneo, S.A		74
Aguas Municipalizadas de Alicante Empresa Mixta		50
Aigües de Cullera, S.A.		48
Aigües Municipals de Paterna, S.A.		49
Aigües i Sanejament d'Elx, S.A.		45
Sagapyr, S.A.		45
Empresa Mixta de Aguas Residuales de Alicante, S.A.		50
Empresa Mixta d'Aigües de l'Horta S.A.		49
Aguas de Levante, S.A.	100	
Aquagest Levante, S.A.	100	
Labaqua, S.A.		81

Source: Own elaboration form Annual Report of AGBAR, 2008 (AGBAR 2009)

Most of the companies mentioned are municipal companies that supply one or more towns. However, there are some companies that supply or provide services to many urban areas. *Aquagest*, for instance, serves over 210 municipalities[748] of Aragon and Northern Spain and *Aquagest Levante* supplies some 36 municipalities[749] of the Valencia region, *Aguagest Región de Murcia* serves 6 municipalities[750] of this region, or *Aquagest Sur* over 50 municipalities of Andalusia[751]. *Aquagest Extremadura* supplies over 120 municipalities[752] of this region. Apart AGBAR owns *Sorea, Sociedad Regional de Abastecimiento de Aguas, S.A.*, which has the concession of the water supply service in more than 260 municipalities[753] in Catalunya, Valencia and Mallorca. AGBAR, with the building society *Marina d'Or*, created Sagapyr, devoted to water cycle services[754].

[748] According to the information in www.aquagest.es, last accessed 14th November 2009
[749] According to the information in www.aquagest-levante.es, last accessed 14th November 2009
[750] According to the information in www.aquagest-regiondemurcia.es, last accessed 14th November 2009
[751] According to the information in www.aquagestsur.es, last accessed 14th November 2009
[752] El Periódico de Extremadura, Sábado 21 de marzo 2009, p.44, "Aguagest Extremadura: desde y para nuestra tierra"
[753] According to the information of www.sorea.com, last accessed, 14th November 2009
[754] La Vanguardia, Sábado 29 de Septiembre 2007, p.66, "AGBAR y Marina d'Or crean una empresa conjunta"

Table 6.5. Water companies, located in the rest of Spain, where AGBAR has direct or indirect presence

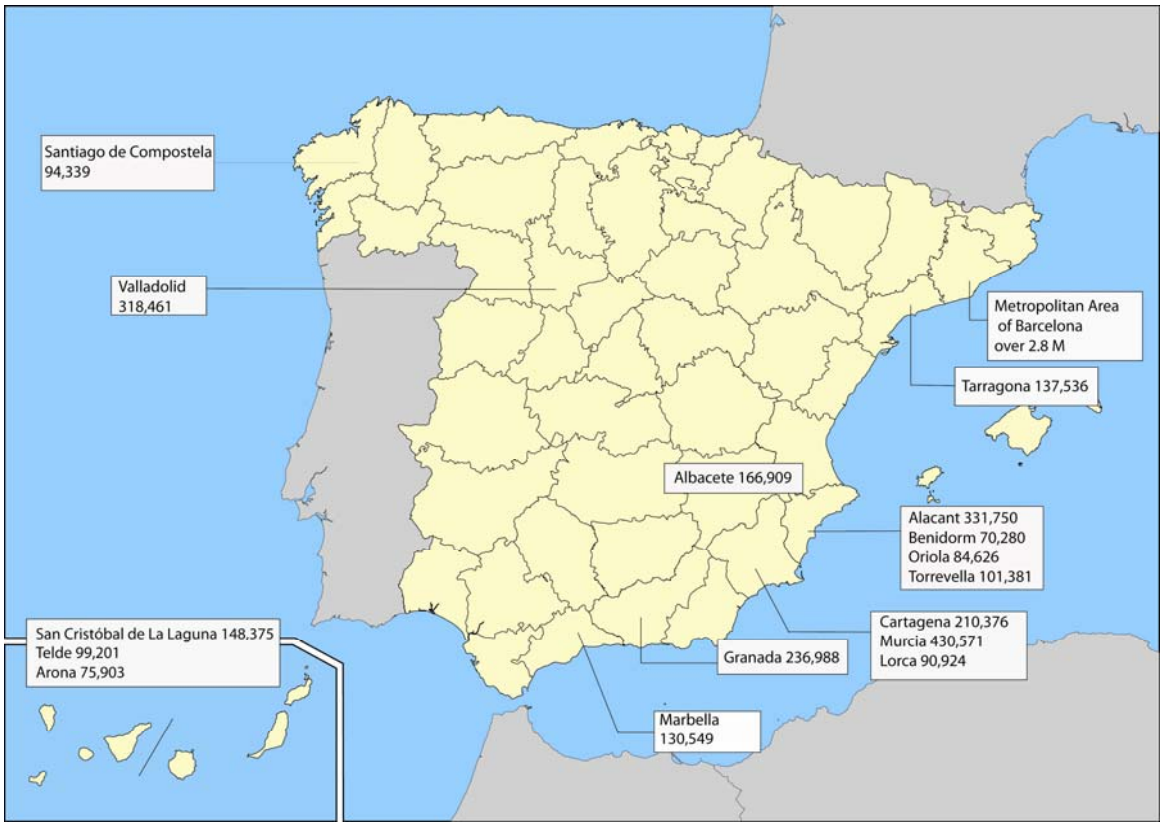
Name	Region	Direct control, in %	Indirect control, in %
Gestión de Aguas de Aragón, S.A.	Aragón		100
Aguas Término de Calvià, S.A.	Balearic Islands		80
Aguas del Norte, S.A.	Basque country		100
Aguas de Albacete	Castilla-La Mancha		74
Aguas de Valladolid, S.A.	Castilla-León		100
Aguas de Arona	Canary Islands		74
Aguas de Telde	Canary Islands		45
Teidagua S.A.	Canary Islands		50
Canaragua, S.A.	Canary Islands		90
Pozos y Recursos del Teide, S.A.	Canary Islands		90
Aguas de Ciez	Murcia		49
Aguas de Jumilla, S.A.	Murcia		49
Aguas de Lorca, S.A.	Murcia		49
Empresa Municipal de Aguas y Saneamiento de Murcia, S.A.	Murcia		49
Sermubeniel, S.A	Murcia		49
Aquagest Región de Murcia, S.A.	Murcia	100	
Ingeniería, Tecnología y Servicios del Agua y Medio Ambiente, S.L	Murcia		100
Aguas de Lucena	Andalucía		25
Aguas Vega-Sierra Elvira, S.A.	Andalucía		20
Aguas y Saneamientos de Torremolinos, S.A.	Andalucía		25
EDAR Cádiz-San Fernando	Andalucía		11
Aguas de Montilla, S.A.	Andalucía		25
Empresa Municipal de Abastecimiento y Saneamiento de Granada, S.A.	Andalucía		25
Aquagest Sur, S.A.	Andalucía		50
Aquagest Extremadura, S.A.	Extremadura		55

Source: Own elaboration form Annual Report of AGBAR, 2008 (AGBAR 2009)

In the map below (figure 6.14), we represent some of the cities supplied by the AGBAR group in Spain. Note that the population is that figuring in the census and in many of the coastal places the population served sharply increases in summer with the arrival of tourists and second-residence owners. Furthermore, we have only

located the cities with their population and not the metropolitan areas (except for the case of Barcelona), which in some cases could also been served by the group.

Figure 6.14. Some Spanish cities supplied by the AGBAR group, with the population in 2008



Source: own elaboration, with data from the census of the Instituto Nacional de Estadística

AGBAR continued to expand its business in the water sector of Catalunya by means of the partial take over of *Aigua de Rigat*, supplying some 60,000 people mainly in Igualada (close to the MRB)[755]. In Catalunya, the prospect of AGBAR was to win the future management of the desalination plant of Barcelona[756]. AGBAR, together with Drace, Dragados (ACS) and Degrémont (Suez), won the tender to build and exploit it for 2 years[757]. This plant, with a budget of 158.7 million Euros was to be financed mostly by European funds (75%). After the two-year exploitation period the management would be handed out to the public ATLL (*Aigües Ter-Llobregat*).

[755] La Vanguardia, Viernes 27 de Octubre 2006, p.83, "AGBAR: Compra la mayoría de Aigua de Rigat"/La Vanguardia, Martes 13 de Febrero 2007, p. 75, "AGBAR: Compra de un 67% de Aigua de Rigat"

[756] La Vanguardia, 22 de Junio 2006, p.91, "Simón: AGBAR espera ganar la desaladora de Barcelona"

[757] La Vanguardia, Jueves 20 de Julio 2006, Vivir en Barcelona p.5, "El 17% del agua para el área de Barcelona será de mar el 2009"

6.6 New choreographies of power in AGBAR in the 21st century

> "Aguas de Barcelona: Una apuesta por el petróleo del siglo XXI", Expansión, Martes 2 de Junio 2009, p.22

Despite being a very successful firm at the Spanish level (among the 25 most important) and employing 44,000 people (across the world), Fornesa remarked how "tiny" they were in comparison with transnational giants such as Vivendi[758]. In this sense, Fornesa raised again the need of a merge (remember the unsuccessful merge of 1990) if AGBAR wanted to be important internationally[759].

The emphasis in the collaboration and cooperation with the public sphere continued to be the main premise. Back to the year 2000, Ricard Fornesa joined the prestigious *Academia de Economia* [Economics Spanish Academy]. In the official act Fornesa pronounced the speech: "*Gestión Privada del Servicio Público*" [Private management of public services][760], that was articulated around the idea that the administration should hand out to the market what the market knows better to manage, "without political criteria, just economic ones". What was said in this conference is critical to understand not only the mentality of the director of AGBAR, but the trajectory of the group in the last quarter of a century. Far from presenting a radical discourse on private firm and state non-intervention, Fornesa talked about the tight collaboration between the public administration and the private sphere when managing public services. According to the speaker, "the administration should be devoted to govern, not to manage". Within the activity of governing, "the administration should keep their power on control", but at the same time must acknowledge the recognized superiority of private in front of public management. The administration should "guarantee transparency and the proper handing out to the private sector" and also oversee its activity, in order to guarantee the quality and the profitability of the service. According to Fornesa public administration would not

[758] La Vanguardia, Domingo 3 de Junio 2001, Dinero p.22, "Sismograma. Expansion de AGBAR. Fornesa, experto en alianzas", Feliciano Baratech
[759] La Vanguardia, Sábado 26 de Mayo 2001, p.78, "Fornesa defiende una fusión de AGBAR para doblar tamaño y ganar presencia internacional", Dolors Álvarez
[760] La Vanguardia, Viernes 17 de Marzo 2000, p.76, "Fornesa defiende la gestión privada de los servicios públicos", Jordi Palarea, our translation

lose the control of the service: "[…] we should recall that a serious and consistent public administration never transfers the control to the private holder of the service. And it [the administration] could exercise it [this control] not only with penalties or full surrender formulas, but also, and concretely, with price controls". He added that the price setting mechanism could even "lead to undesirable perversions, blocking concessionary tariffs due to reasons not related to economic issues or quality of the service". According to him, this is sign of the power of the administration over the service.

The financial turmoil in Latin America (Latin America's nightmare, according to *La Vanguardia*[761]) and the dotcom and technological bubble bust had a clear effect on the Ibex, with Spanish companies investing in Latin America plunging (especially banks). By that time a quarter of the total capital movements were not related to Spanish economy but to Latin American[762]. The shares of AGBAR in September 2002 fell due to the uncertainty regarding water prices and the fears of nationalization[763] in those countries. The company valued their assets in Argentina in zero; however, the balance for 2002 outperformed that of 2001 thanks to the partial selling of Adeslas[764].

According to the Chamber of Commerce of Barcelona, AGBAR was in 2003 the 20th most important firm located in Catalunya in what concerned exports[765]. The study underlined the dramatic change from the traditional sector of the textile, leather and iron and steel industry to the building sector and services. In 2004, 25 years since Fornesa became the president of AGBAR, the company turned from one with great economic pains into a multinational[766].

In 2003 AGBAR was preparing the selling of the solid waste treatment Cespa[767] to Ferrovial. According to the group, the reasons underlying this disinvestment

[761] La Vanguardia, Domingo 5 de Agosto, Dinero p.5, "Parches argentinos y dudas para el futuro", Miguel Artola
[762] La Vanguardia, Domingo 29 de Abril 2001, Dinero p.3, "Latinoamérica toma el Ibex", José Manuel Garayoa
[763] La Vanguardia, Domingo 22 de Septiembre 2002, p.11, "Cuestión de crédito", M. Sandri
[764] La Vanguardia, Sábado 22 de Febrero 2003, p.60, "AGBAR gana un 32% más y da valor cero a sus activos argentinos", Dolores Álvarez
[765] La Vanguardia, Miércoles 11 de Agosto 2004, p.51, "Las empresas industriales pierden peso como motor de las exportaciones catalanas"
[766] La Vanguardia, Lunes 5 de Julio 2004, p.63, "Fornesa cumple 25 años en AGBAR", Dolors Álvarez
[767] La Vanguardia, Martes 17 de Junio 2003. p.71, "AGBAR se convierte en el primer accionista de Emte y estudia nuevas adquisiciones en Europa"

responded to the desire to focus on water, health and certification and emissions control[768]. A year later, in 2004, the group continued its disinvestments with the selling of the waste treatment firm Trasa to Ferrovial as well as well as real estate in Madrid[769]. The electric company Endesa quit the AGBAR group in 2004[770] and two of the richest Spanish businessmen, Juan Abelló (through Torreal) and Amancio Ortega (owner of the textile group Inditex), bought the Endesa's shares in the water company (11.64%)[771]. In 2005, the disinvestment policy seem to conclude with the selling of the building society Acsa[772] and other divestments of low profit businesses where AGBAR did not have enough critical mass to become a key actor in the market[773].

At the same time, AGBAR showed its desire to focus on activities with high added value. Thus, it became the main shareholder of the engineer consultancy and service maintenance EMTE[774] (with the integration of the subsidiary engineer and maintenance companies). The benefits obtained by AGBAR in 2005 mounted to 252 million Euros (increase of 16.7%) thanks to the good performance of the Chilean IAM and health insurance and inspection activities[775]. Suez accorded to merge with *Gaz de France* (GDF); as the last one was participated by the French State, the latter indirectly controlled 9-10 percent of AGBAR[776]. Some months later La Caixa and Suez reissued the agreement to hold the participation in AGBAR through Hisusa[777].

[768] Press realease AGBAR, 29th August 2003, "AGBAR vende sus actividades de residuos sólidos a ferrovial"
[769] La Vanguardia, Viernes 12 de Noviembre 2004, p.79, "AGBAR gana un 137% más por la venta de participaciones", Dolors Álvarez
[770] La Vanguardia, Jueves 11 de Marzo 2004, p.72, "Endesa encarga a La Caixa la venta de su participación de Aguas de Barcelona", Encarna Pérez
[771] La Vanguardia, Viernes 7 de Mayo 2004, p.1 and 68, "Juan Abelló y Amancio Ortega compran el 11,6 por ciento de AGBAR", Mar Díaz-Varela
[772] La Vanguardia, Martes 5 de Julio 2005, p.61, "AGBAR negocia la entrada de un socio en su constructora Acsa", Dolors Álvarez/La Vanguardia, Sábado 6 de Agosto 2005, p.59, "Sorigué compra a AGBAR el 60% de su constructora", Javier Ricou/La Vanguardia, Sábado 10 de Septiembre 2005, p.65, "AGBAR vende su constructora a Sorigué por 50,7 millones"
[773] La Vanguardia, Sábado 21 de Mayo 2005, p.60, "AGBAR anuncia desinversiones en los negocios poco rentables", Dolors Álvarez
[774] La Vanguardia, Viernes 12 de Noviembre 2004, p.79, "AGBAR gana un 137% más por la venta de participaciones", Dolors Álvarez
[775] La Vanguardia, Sábado 25 de Febrero 2006, p.64, "El beneficio de AGBAR alcanza los 252 millones y sus ingresos crecen un 20%
[776] La Vanguardia, Miércoles 1 de Marzo 2006, p.58, "Suez garantiza que seguirá como socio de AGBAR tras la fusión con GDF", Dolors Álvarez
[777] La Vanguardia, Jueves 20 de Julio 2006, p.60, "La Caixa y Suez actualizan su pacto en AGBAR"

After 27 years leading AGBAR, Ricard Fornesa left the presidency and passed it on to Jordi Mercader[778]. On the other hand, Àngel Simón, which had been the director of the metropolitan state-owned water firm SOGEMASA[779], became the general director of AGBAR in September 2004[780].

AGBAR was concentrating in two main sectors: the environment (including water) and health. Along that line it was carrying out disinvestments in non-strategic sectors, for instance selling its firm of urgent transport, ASM to the German holding Arques Industries[781]. The company also handed out Tribugest, a subsidiary company devoted to tax collection[782]. Six year after being dropped from the IBEX-35, in December 2006 AGBAR entered again into the index[783] (it was the third time in the IBEX).

AGBAR enhanced R+D activities were especially oriented to the sustainability of the water cycle through technological improvement. Partnerships with other research centers and public money was involved in some of the projects[784]. It also founded Cetaqua, a center devoted to research on water technologies, in partnership with a public university (UPC) and the national research council (CSIC)[785].

2007 was a turning point in the restructuration of the ownership of AGBAR. La Caixa sold their participation in the Suez group[786] and Suez and la Caixa launched a takeover bid for the remaining part of AGBAR they did not control (50.3%)[787]. The objective of Suez was to convert AGBAR in a pillar of the water sector in Europe[788],

[778] LaVanguardia, Miércoles 1 de Febrero 2006, p.61, "Fornesa deja la presidencia de AGBAR después de 27 años y le sustituye Jordi Mercader"
[779] La Vanguardia, Domingo 12 de Junio 1988, p.19, "El agua, un bien escaso"
[780] La Vanguardia, Miércoles 29 de Septiembre 2004, p.71, "Simón, nombrado director general"
[781] La Vanguardia, Lunes 5 de Mayo 2008, p.67, "Los fondos oportunistas llegan a España con 65.000 millones para compras", Conchi Lafraya
[782] La Vanguardia, Miércoles 24 de Diciembre 2008, p.48, "AGBAR vende su filial Tribugest"
[783] La Vanguardia, Domingo 17 de Diciembre 2006, Dinero p.11, "AGBAR regresa a primera tras seis años", Eduardo Magallón/ La Vanguardia, Miércoles 3 de Enero 2007, p.54, "AGBAR cotiza en el Ibex en sustitución de Prisa"
[784] La Vanguardia, Lunes 19 de Febrero 2007, p.79, "AGBAR, Gas Natural y MediaPro se llevan los Cenit"
[785] La Vanguardia, Martes 27 de Febrero 2007, p.65, "AGBAR, UPC y CSIC destinan 5 millones a investigar sobre agua", Paula Mateu.
[786] La Vanguardia, Viernes 5 de Enero 2007, p.51, "La Caixa vende el 1,35% del grupo francés Suez con una plusvalía de 281 millones", Dolors Álvarez
[787] La Vanguardia, Miércoles 11 de Abril 2007, p.55, "La Caixa y Suez lanzan una opa sobre el 50,3% de AGBAR que aún no controlan", Dolors Álvarez
[788] La Vanguardia, Sábado 21 de Abril 2007, p.79, "AGBAR: Segundo pilar europeo de Suez"

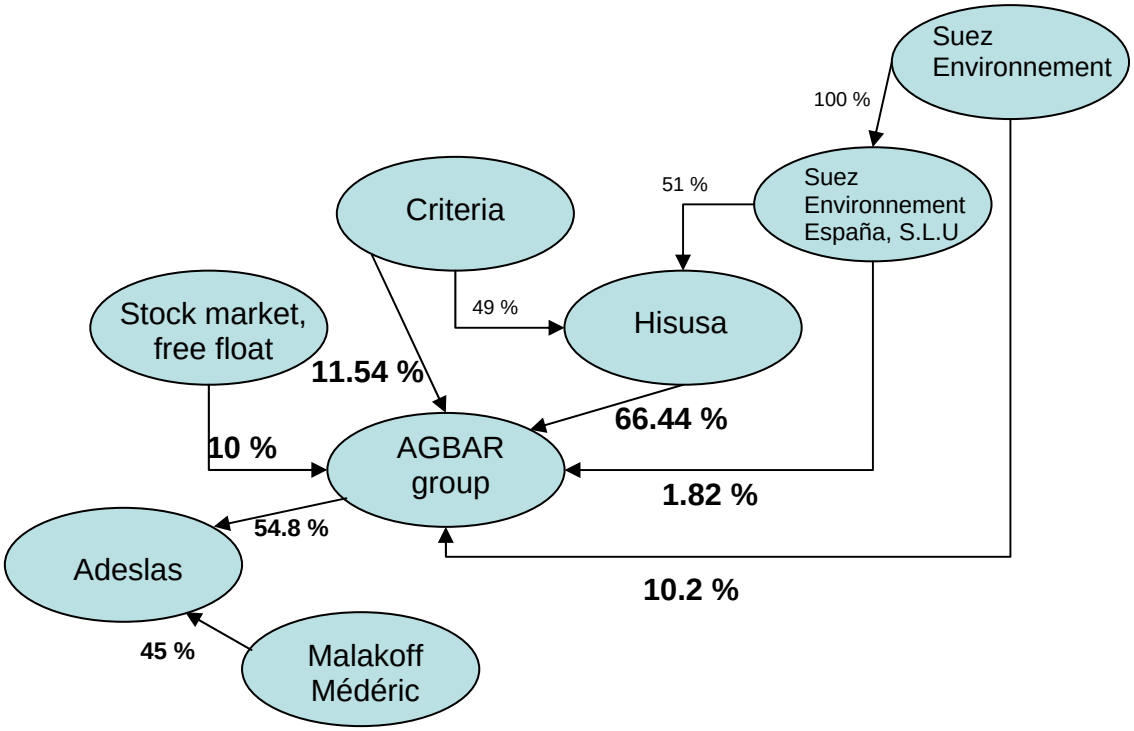
and also to increase its participation in the energy company Gas Natural[789]. The Spanish stock market regulator accepted the takeover bid some months later[790]. The same year, the energy company *Gaz de France* and *Suez* merged. With the eventual merge of GDF and Suez, part of Suez Environment (which in turn owned part of AGBAR) had to be floated in the market[791].

La Caixa created a holding of their industrial participations (Gas Natural, Telefónica, Repsol, Abertis and AGBAR)[792]. This holding society would be named Criteria Caixa Corp., with assets over 25,000 million Euros, and would occupy the 8th position in the Ibex[793]. Concretely the society held all the participation of La Caixa in service and infrastructure sectors: Gas Natural (35.5%), Telefónica (5,5%), Repsol (12,5%), Abertis (24,8%) and AGBAR (23,5%), and also the financial sector participations in BPI (25%) and Boursorama (20.2%) and subsidiary companies[794].

La Caixa and Suez agreed the "joint management" of AGBAR, and increased their stocks in AGBAR up to 56,45 percent[795]. Subsequently both companies launched a takeover which resulted in a further increase of their weight in Aguas. At the beginning of 2008 Criteria CaixaCorp and Suez controlled over 90 percent of the capital of AGBAR[796] (figure 6.15). While Suez and La Caixa were taking hold more and more of AGBAR, the latter sold its participation in Suez (0,16 percent)[797].

[789] La Vanguardia, Miércoles 16 de Mayo 2007, p.63, "Suez eleva al 8,8% su participación en Gas Natural y se refuerza en España", Dolors Álvarez
[790] La Vanguardia, Jueves 11 de Octubre 2007, p.74, "La CNMV admite la opa de Criteria y Suez"
[791] La Vanguardia, Domingo 16 de Septiembre 2007, Dinero p.25, "Una fusión arrancada con fórceps", Lluís Uria
[792] La Vanguardia, Viernes 18 Mayo 2007, p.68, "La Caixa adjudica hasta un 2% de su holding de participadas a sus empleados", Eduardo Magollón
[793] La Vanguardia, Viernes 21 de Septiembre 2007, p.68, "Criteria saldrá a cotizar a un precio de entre 5 y 6,75 euros por acción", Eduardo Magallón
[794] La Vanguardia, Domingo 16 de Septiembre 2007, p.79, "La Caixa se vuelca en la salida de Criteria"
[795] La Vanguardia, Jueves 22 de Noviembre 2007, p.80, "La Caixa y Suez pactan el 'control conjunto' de AGBAR", Dolors Álvarez
[796] La Vanguardia, Sábado 19 de Enero 2008, p.63, "Criteria y Suez alcanzan el 90% de AGBAR tras la opa"
[797] La Vanguardia, Martes 3 de Junio 2008, p.59, "AGBAR sale de Suez"

Figure 6.15. Shareholder structure of the AGBAR group, before October 2009



Source: own elaboration from AGBAR data and Global Water Intelligence (Global Water Intelligence 2009b)

The disinvestments to be performed by Spanish *Cajas* due to the scenario of lack of liquidity and more strict regulations[798] would affect AGBAR to some extent. We recall that one of the major owners of AGBAR by then was La Caixa through the holding society Criteria. The benefits in 2008, (up to 235 million Euros) decreased some 33 percent[799], and the benefits of AGBAR continued to experience a dropping trend due to decreasing consumption in the water and environmental activities, the negative trends of exchange rates and the decreasing profits in the health sector[800]. Nonetheless, the president of AGBAR, Jordi Mercader, saw the company in an optimal position to go on growing both at the national and international level[801].

In January 2009, *AGBAR Medioambiente*, AGBAR's section devoted to the environment, especially to desalination and other water technologies, bought STC (*Sistemas de Transferencia de Calor*)[802]. The latter firm had developed a system to

[798] La Vanguardia, Lunes 12 de Mayo 2008, p.61, "Las cajas cuentan con una cartera de participaciones de 50.000 millones", Eduardo Magallón
[799] La Vanguardia, Lunes 6 de Abril 2009, p.55, "La empresa crecerá en España y fuera"
[800] LaVanguardia, Miércoles 6 de Mayo 2009, p.58, "El grupo AGBAR gana 36,8 millones"
[801] La Vanguardia, Lunes 6 de Abril 2009, p.55, "La empresa crecerá en España y fuera"
[802] La Vanguardia, Viernes 30 de Enero 2009, p.62, "AGBAR Medioambiente compra STC"

dry wastewater plant sludge at low temperature. Months later, this firm won a contract to install and exploit the sludge drying process in a new wastewater treatment plant in Dublin (Ireland) servicing some 180,000 people[803].

In 2009 Ricard Fornesa, the 'architect' of AGBAR's expansion and success, left the presidency of Criteria, the holding company of La Caixa. *La Vanguardia* in an op-ed praised the importance of this businessman:

> "Men like Fornesa, are, without any doubt, those who contribute to economic progress and make this country greater"[804]

Against the economic crisis and resource scarcity, the president of AGBAR pleaded for the promotion of public-private partnerships in the services sector. According to Mercader a new management model would aid to optimize resources and result in better services for all the citizens.[805] This collaboration between private firms and public administrations reached new dimensions when the Catalan minister of economy went to Brazil to promote Catalan firms. AGBAR signed an agreement with sanitation company Sabesp, of the state of Sao Paolo, to share knowledge and strategies of future[806].

[803] La Vanguardia, Miércoles 30 de Septiembre 2009, p.63, "La filial STC gana un contrato en Dublín"
[804] La Vanguardia, Viernes 8 de Mayo 2009, p.18, op-ed "Ricard Fornesa", our translation
[805] La Vanguardia, Miércoles 20 de Mayo 2009, p.61, "Mercader aboga por impulsar las alianzas entre el sector público y el privado"
[806] La Vanguardia, Jueves 23 de Julio 2009, p.67, "Acuerdo con la brasileña Sabesp"

6.7 The blurring of the public-private frontier and the "foreignization" of the private supplier of Barcelona

> "Aguas de Barcelona: Una apuesta por el petróleo del siglo XXI" [Aguas de Barcelona: a bet for the oil of the 21st century], Expansión, Martes 2 de Junio 2009, p.22

In this last section of the chapter, we will expose the current situation of the water supplier of Barcelona and its geographic reach. These figures will permit to observe how a water company supplying a city has become one of the major water providers of the world (see table 6.6)

Table 6.6. Top five private water and wastewater service companies in 2009

Company	Origin	Latest water turnover, in million Euros	Number of people served	Percentage of people served in their country
Veolia Environnement	France	12,558	122,374,000	20
Suez Environnement[807]	France	6,653	112,729,116	11
AGBAR	Spain	1,771	29,690,476	51
FCC	Spain	845	27,344,000	48
Sabesp	Brazil	6,352	26,200,000	100

Source: adapted from Global Water Intelligence (2009a)

We will end the chapter, and the empirical case study of Barcelona, with the analysis of the change in the choreography of powers within the firm and the appraisal of how this change could eventually modify the hydrosocial cycle of this urban region.

6.7.1 *Aguas de Barcelona* now: a picture of the company in 2009

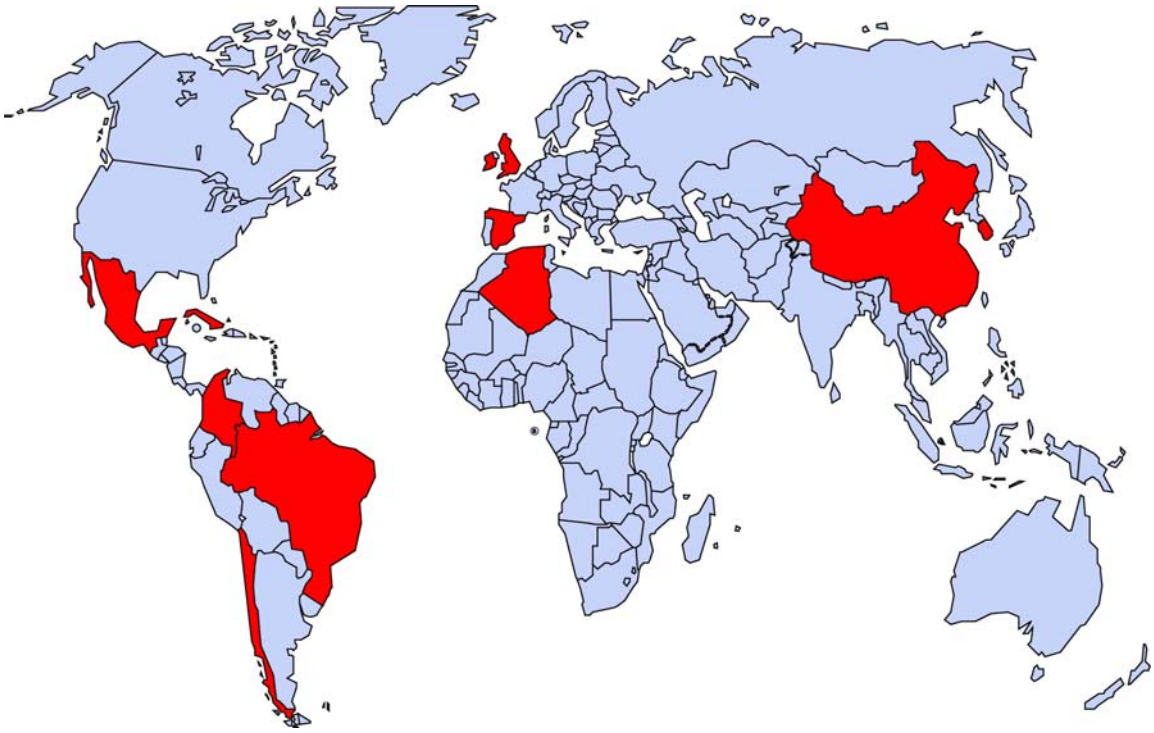
At the international level (map 6.2), AGBAR owns water concessions and water firms in many South-American countries, especially in Chile, but also in Brazil or Colombia. In Central America, Cuba and Mexico are the main markets of the group. Britain, in Europe, is the second most important water market for AGBAR, thanks to the ownership of Bristol Water. In Argelia, the group serves some 1.5 million people

[807] Includes the AGBAR group

through the management of the state-owned firm *Eaux d'Oran*. Eventually, Asia is probably the most appealing market. In China (and Hong Kong) AGBAR has some water and sanitation concessions, and could be one of the targets of internationalization of the company in the next years. North Korea has become recently the other pillar of the Asian adventure of the water group.

In total, AGBAR supplies over 11 million people in the aforementioned countries (table 6.7) and controls some 1,270 hm^3 per year. Note that these figures do not include the latter concessions in Brazil or North Korea, so the real numbers could be even higher.

Map 6.2. Water and environmental business of the AGBAR group.



Source: own elaboration

Thus, apart from providing solutions to the water problem in Catalunya (such a the participation in the shipping of water, for instance from the Rhone, or the rejected minitransfer from the Ebro; see chapter 4 and 5), the business group AGBAR entered on the search for new ventures in the water business markets abroad as the Spanish market showed a very limited growth and AGBAR was just acquiring small firms[808]. China was one of the most important targets for expanding. The other one was the

[808] La Vanguardia, Sábado 31 de Mayo 2008, p.75, "AGBAR busca negocios en China y en la ribera mediterránea"

Mediterranean, in relation to the resurgence of the Barcelona Process (Euro-Mediterranean Partnership)[809]. Eventually, we argue that desalination projects in Chile could be the third cornerstone of the business project of the AGBAR group for the coming years.

Table 6.7. Figures of the AGBAR group regarding water supply and sanitation.

Water Supply	Spain	International
Total number of municipalities supplied	1,205	75
Total population supplied (inhabitants)	12,658,013	11,590,476
Total number of customers	6,239,372	2,823,164
Volume delivered to the network (hm^3/year)	1,315	1,273
Number of drinking water treatment plants	204	36
Total treatment capacity (m^3/day)	2,477,691	3,285,216
Total length of the distribution network (km)	58,968	24,576
Sanitation		
Municipalities provided with a sewer system	381	62
Total population provided with a sewer system (inhabitants)	8,377,872	8,746,233
Length of the collector sewer and sewer network (km)	20,645	14,003
Municipalities provided with wastewater treatment	442	64
Number of wastewater treatment plants	426	30
Inhabitant equivalent	9,180,306	3,772,441
Total wastewater treatment capacity (m^3/day)	2,626,473	1,218,577

Source: AGBAR webpage, www.agbar.com, last accessed 12th October 2009

In Spain, the company supplies more than 1,200 municipalities, and a population over 12 million people, through concessions or directly participating in mixed-economy firms, as we have seen previously. These figures mean that AGBAR is the main water supplier of Spain, doubling the figure of the public Canal de Isabel II, with an outstanding income volume (figure 6.16).

Down to the scale of the Metropolitan region of Barcelona, where the story began 150 years ago, AGBAR holds a clear control of the water supply. Allegedly it has the

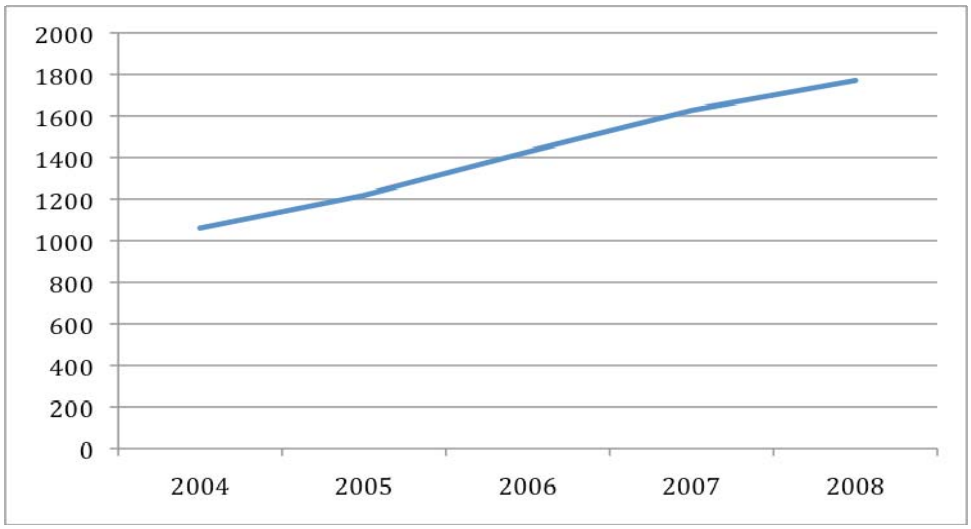
[809] The Euro-Mediterranean Partnership, formerly known as the Barcelona Process, was re-launched in 2008 as the Union for the Mediterranean at the Paris Summit for the Mediterranean in July, with the new network of relations endorsed at the Marseille Meeting of the Euro-Mediterranean Ministers of Foreign Affairs in November. The Partnership now includes all 27 member states of the European Union, along with 16 partners across the Southern Mediterranean and the Middle East. This re-launching aimed to infuse a new vitality into the Partnership and to raise the political level of the strategic relationship between the EU and its southern neighbors (extracted from European Commission External Relations webpage, http://ec.europa.eu/external_relations/euromed/index_en.htm, last accessed 9th October 2009.

indefinite concession[810] over the water supply of Barcelona and other neighbouring municipalities:

> "The Parent's core business is the distribution and supply of water in Barcelona and it holds the right to provide this service for an indefinite period (AGBAR 2009:14)

The company does not only control the water supply within the cities of this area but also is a major bulk water provider thanks to the concession since the 1950s to withdraw water from the Llobregat river and the water treatment plant it owns in Sant Joan Despí. In addition, it also holds in ownership the water tanks that store the treated water from both the Llobregat and the Ter. Regarding groundwater, AGBAR manages the plants of groundwater extraction and treatment of the Besòs and Llobregat, despite their public property character.

Figure 6.16. Aggregated operating income (in thousands Euros) of the water and environmental sector of AGBAR, 2004-2008



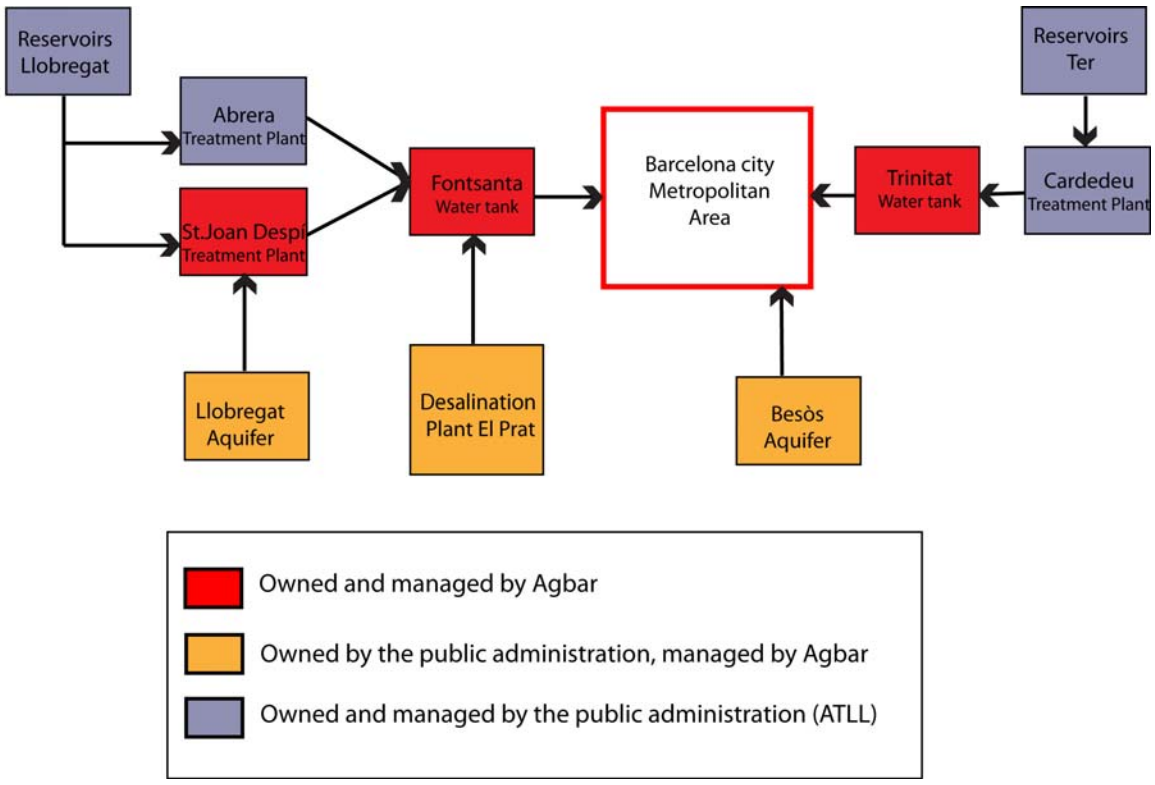
Source: AGBAR webpage, www.agbar.com, last accessed 12th October 2009

Besides, AGBAR won the BOT (Build, Own and Transfer) for the Desalination plant in El Prat de Llobregat, including a two-year management of the plant (see figure 6.17). The plant, as we have mentioned, began to operate in summer 2009. Despite the plant theoretically is to be handed out to the public sector within two years (when the concession expires) AGBAR could buy the plant or hold the concession to manage it due to the financial problems of the water regulator.

[810] La Vanguardia, Jueves 20 de Diciembre 2007, Vivir p.3, "La Administración es responsable del suministro", Eduardo Magallón

Desalinization is probably one of the most thriving businesses of the AGBAR group, already operating some 30 plants around the world that in turn produce some 680,000 m^3/s[811]. The desalination plant in Barcelona represents the "jewel of the crown", hence its importance.

Figure 6.17. Water supply system of the Metropolitan Region of Barcelona, ownership and management



Source: own elaboration

As we have seen in chapter three, there are multiple configurations of private participation in the water supply and sanitation services. The AGBAR group almost fulfils all the levels displayed.

a) Service contract, whereby the private company provides a defined technical or administrative task for a public operator. As an example, we can mention the administrative task of client management that AGBAR has been carrying out for *Sanego* in Goiás (Brazil).

[811] Words by Salvador Villarino in Revista Area Minera, Viernes 20 de Noviembre de 2009, "AGBAR Chile construirá planta desalinizadora por US$ 285 millones en Atacama", our translation

b) Management contract, whereby a private company is contracted to carry out core responsibilities with a production unit. That would be the case for instance of the contract the group maintains with the *Societé des Eaux d'Oran* (Argelia).

c) Operation and maintenance, similar to the management contract. As an example we can mention the contract with *Gestión de Aguas de Aragón* (Spain)

d) Lease contract, similar to a management contract but this time the private contractor is the one bearing the legal responsibility for operating the service in exchange for payments to the public administration, who is the asset owner. As an example we can mention the case of *Aguas de Varadero* in Cuba.

e) DBO (design, build and operate), a variant of a BOT contract (Build, own and transfer), could be observed with the desalination plant AGBAR built and manages in Barcelona.

f) Concession contract, very similar to the lease contract, but in this case the private contractor also finances the expansion of the network (and not only of the basic replacements as it happens with the lease). Here we have the example of *Aguas de Valladolid*, among many other cities in Spain.

g) Joint venture arrangement, whereby a company is created for an specific purpose, and is owned jointly by the public administration (central or local government) and the private sector, being later run under lease or concession contract. At the international level, we have the examples of *Aguas del Saltillo* (Mexico) or *Aguas de Cartagena* (Colombia). At the Spanish level, EMASAGRA[812] in Granada or *Mina Pública d'Aigües de Terrassa* could be examplea among many others.

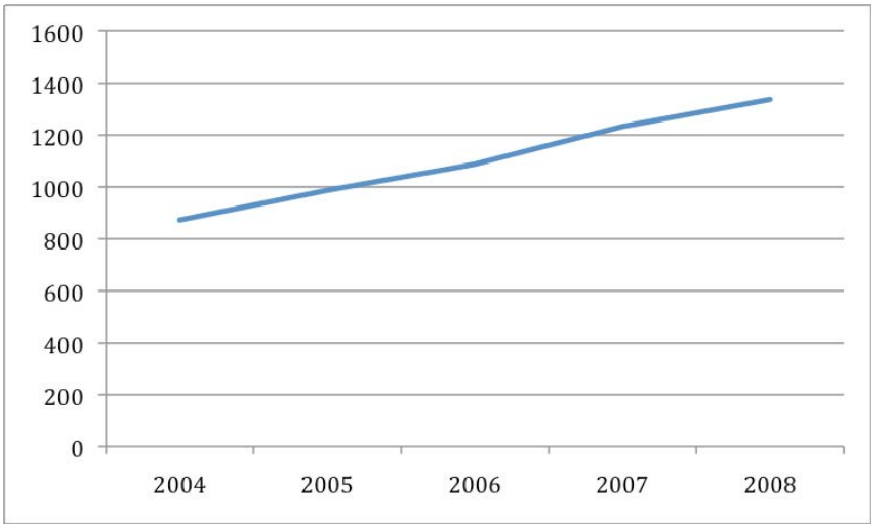
h) Full ownership/Divesture, where the entire infrastructure and assets of a publicly-owned water utility are sold to the private sector. This extreme case could only be seen in England and Chile, where the legislation permits such

[812] La Vanguardia, Sábado 28 de Junio 1997, p.66, "Un grupo liderado por Aguas de Barcleona compra el 49% de Emasagra por 4.016 millones", Cristina Prieto

kinds of arrangements. AGBAR owns two important water suppliers: Bristol Water in the former and Aguas Andinas in the later one.

Until October 2009, AGBAR held most of the health insurance company Adeslas (54.79 percent) while the French mutual company Médéric controlled the rest (some 45 percent). With over 3 million policyholders[813], some 1,100 medical-healthcares centers or 12 owned hospitals[814] across Spain, Adeslas is currently one of the leaders of private health services insurance in this country. As we can see in the figure 6.18 the volume of aggregated operating income is not by far insignificant and has been growing steadily in the last few years.

Figure 6.18. Aggregate operating income (in thousand Euros) of the health business of AGBAR, 2004-2008



Source: own elaboration from AGBAR

As we have already mentioned, the collaboration with the Spanish public health system has been constant along the trajectory of the company to the point of managing a state-owned hospital. The prospects for this company are high in front of the European single market, as the company recognizes:

> "Products of quality, personalized service of the insured, capacity of investment and lines of collaboration with the public health have allowed Adeslas to maintain a privileged position to face new challenges in the new European single market", AGBAR webpage, www.agbar.com, last accessed 12th October 2009

[813] Including the policyholders of insurance companies partially owned by Adeslas (up to 37 subsidiary companies), as well as those companies that have agreements of re-insurance with Adeslas. Source: www.agbar.com

[814] Source: AGBAR webpage, www.agbar.com, last accessed 12th October 2009

Eventually, the third pillar of the company, once Applus is no longer part of the group, is the holding comprising the companies Aserco and Comagua, which in supply chain services, information and telecommunication systems, remote control system and some specialized services.

6.7.2 The end of history? The final erasure of the division line between public and private

> "Suez Environment is a world leader exclusively dedicated to water and waste management services and is committed to the challenge of protecting resources and ecosystems", Suez Environment webpage[815]

In 2009, La Caixa and Suez had been negotiating for months the future of AGBAR[816]. The 22nd of October 2009 an agreement was finally reached: the savings bank agreed to sell 20-25 percent of AGBAR to Suez Environnment[817]. As a result of the operation, Suez (by means of the subsidiary Lyonnaise) is expected to gain major control of the company and will launch a bid to delist the water utility from the stock exchange. AGBAR could be dropped thus from the stock exchange in 2010 after 90 years of presence, which effectively happened just a few days before this dissertation went to print (January 2010). Suez could end up owning some 75 percent of the company while La Caixa could retain between 15 and 20 percent of the stocks, depending of the takeover bid of Suez[818] (figure 6.19).

On the other hand, the savings bank agreed with AGBAR and French mutual company Malkoff Mederic to acquire 100 percent of Adeslas. Adeslas will be integrated in the insurance holding SegurCaixa. This change in the composition of

[815] http://www.suez-environnement.com/en/profile/, last accessed 28th December 2009

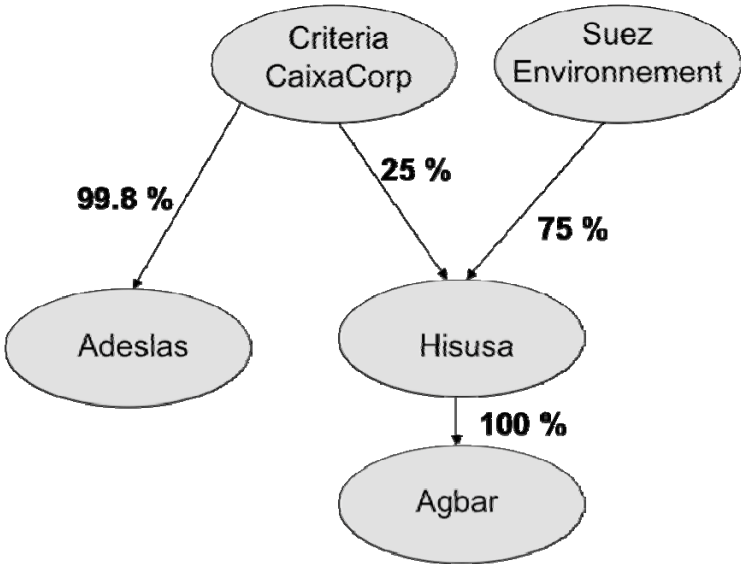
[816] Expansión.com, 26/6/2009, "Adeslas, el bocado más deseado", Sergi Saborit. Last accessed: 13th October 2009.

[817] Expansión, Jueves 22 de Octubre 2009, p.3, "La Caixa cede el control de AGBAR a Suez a cambio de quedarse Adeslas", Sergi Saborit/ El País, Jueves 22 de Octubre 2009, p.18, "Aguas de Barcelona pasa hoy a manos del grupo francés Suez", Ariadna Trillas/ La Vanguardia, Jueves 22 de Octubre 2009, p.1, "Criteria cede AGBAR a Suez a cambio de Adeslas"/ idem, p.40, "Suez Environnement se hace con la mayoría del capital del Grupo AGBAR", Ramon Aymercih and Conchi Lafraya/ The Wall Street Journal, Digital Network, October 22 2009, "La Caixa to sell AGBAR stake to Suez, to buy Adeslas-Report"

[818] For specific data on the prices of shares, and mechanisms of takeover see http://www.agbar.es/archivos/noticias/HR_Criteria_%20Suez_Env.pdf , last accessed 23rd October 2009.

Criteria portfolio responds to the shift of focus to the banking and insurance business in detriment of industrial activities[819].

Figure 6.19. Shareholder structure of AGBAR and Adeslas after the agreement reached in October 2009



Source: own elaboration from Global Water Intelligence (Global Water Intelligence 2009b)

Most economic and generalist newspapers, such as *La Vanguardia* underscored the economic benefits of this reconfiguration:

> "the operation agreed by La Caixa and Suez regarding AGBAR and Adeslas is beneficial for both firms, but it has to be especially positively valued because it reinforces the prospects of business and expansion of the first financial institution"[820]

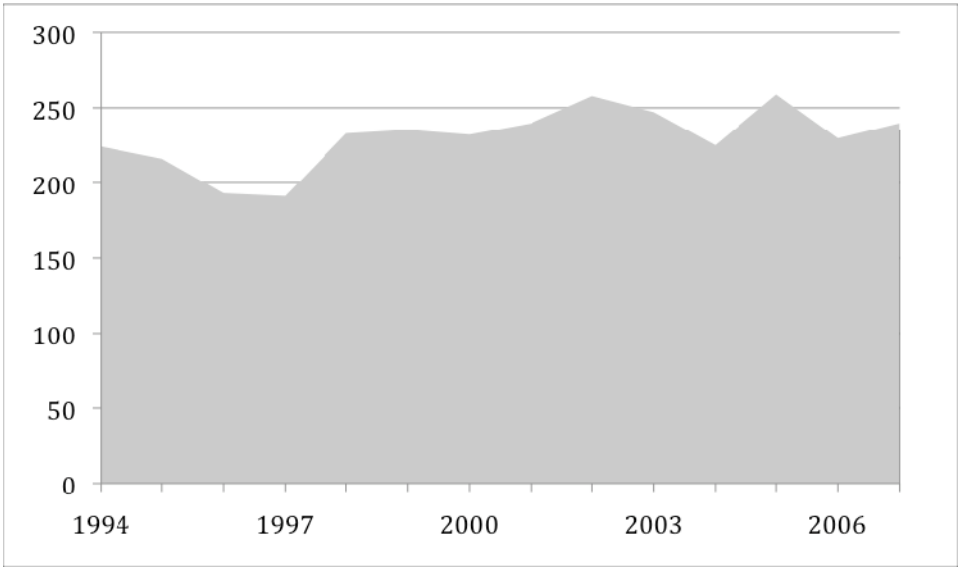
But what would be the effects that such change would have on the service of water supply? In parallel to the announcement of the reconfiguration, the Generalitat de Catalunya was searching for formulas to avoid that decisional powers would be *de facto* moved to Paris (despite the social headquarters of AGBAR would allegedly stay in Barcelona). According to sources close to the Catalan government[821] a real option, backed by the main party in the government (the Catalan Socialist party, PSC) could entail the Generalitat becoming a shareholder of a new society that would bring together the assets AGBAR has in the Metropolitan Area of Barcelona. What is also very important is that the participation of the Catalan government in the

[819] Expansión.com, Martes 20 de Octubre 2009, "Criteria encaja las piezas del puzzle"
[820] La Vanguardia, Viernes 23 de Octubre 2009, p.26, op-ed, "El pacto entre Suez y la Caixa", our translation
[821] Expansión.com, Jueves 22 de Octubre 2009, "La Generalitat se suma a la venta de AGBAR a Suez", Sergi Saborit

company would materialize: with the transference to this society of the public bulk water supplier ATLL. It is important to note in this respect that the water regulator, the Catalan Water Agency (ACA) had economic deficit of 1197 million Euros in 2009[822].

According to the economic journal *Expansión*[823], the resulting company from an hypothetic merger of ATLL with the "new" metropolitan AGBAR (being a subsidiary of Suez) would own the three treatment plants (Abrera, Cardedeu, and Sant Joan Despí) plus the desalination plant of El Prat that serve water to over 4.5 million people spread in 100 municipalities. This newspaper, in the op-ed of the 22nd October, qualified the hypothetic initiative of the Catalan government as "a commendable decision as long as his position be financial or of social representation, but did not condition the management of a private firm such as AGBAR"[824].

Figure 6.20. Raw water supplied by Aigües Ter-Llobregat (ATLL), 1994-2007, in hm^3



Source: adapted from ATLL (2008).

The ATLL network has more than 500 km of pipes, over 140 water tanks, over 50 pumping stations and over 200 points of raw water delivery (ATLL 2008). It supplies raw water directly to 88 municipalities, indirectly to the 15 supplied by SGAB, representing a total population of 4,5 million people (ATLL 2008), and manages

[822] La Vanguardia, Miércoles 15 de Abril 2009, Vivir en Barcelona p.3, "La deuda del agua no tiene fin", Antonio Cerrillo
[823] Expansión.com, Jueves 22 de Octubre 2009, "La Generalitat se suma a la venta de AGBAR a Suez", Sergi Saborit
[824] idem, op-ed, "La nueva AGBAR y la Generalitat", our translation

most of the water coming from the Ter-Llobregat reservoir system for urban supply (figure 6.20 and table 6.8)

Table 6.8. Current Reservoir capacity Ter-Llobregat system

Basin	Reservoir	Operative since	Storage capacity (hm^3)
Ter	Susqueda	1968	233
	Sau	1962	151,3
	Pasteral, el	1960s	2
	Total Ter		386,3
Llobregat	Baells, la	1976	109,5
	Llosa del Cavall, la	1997	79,4
	Sant Ponç	1954	24,4
	Total Llobregat		213,3
	Total Ter+Llobregat		**599,66**

Source: own elaboration from Agència Catalana de l'Aigua

ATLL, who supplies raw water to local water companies, charges a fixed fee plus a variable fee according to the water served, with full cost recovery of the service (but not environmental costs yet). The water price has to be also approved by the price regulator of Catalunya. For instance in 2007, AGBAR paid some 34.4 million Euros for 110 hm^3 coming from the Ter, or some 3.2 million Euros for 10.4 hm^3 from the Llobregat (ATLL 2008).

An overtaking of ATLL by a private company would severely, and probably irreversibly, change the choreographies of power and control over the integral water cycle of the Metropolitan Region of Barcelona. It is interesting that the main preoccupation of politicians or even the media, if this announcement raised any major concern, had to do with the displacement of the control centre from Barcelona to Paris[825]. This shift of power control will even materialize at the architectonic level, with the alleged acquisition of the Torre AGBAR by Suez, currently owned by La Caixa[826], leaving aside much more important matters.

[825] Setmanari La Directa, 18 de Novembre de 2009, nº161, p.8,"Una empresa francesa gestionarà l'aigua del Ter i del Llobregat"
[826] Cerclefinance.com, 7/12/09, "Suez Environnement: vers le rachat de la tour AGBAR"

7 The Canal de Isabel II: a history of the public supply and the urbanization of water in Madrid

The development of public model of water supply in Madrid from mid 19th throughout the 20th century

This chapter provides the historical-geographical framework of the urbanization of water in Madrid from the creation of the Canal de Isabel II in 1851 until the beginning of the 21st century. The narrative will not only include the development of the physical infrastructure and the built environment to water Madrid, but also the institutional changes and the socio-demographic and urban triggers of such developments.

For the period 1851-1950 we will build our narrative on historical accounts and other documents. Among them, three main sources merit special citation: *Los primeros cien años del Canal de Isabel II* [The first one hundred years of the Canal de Isabel II] (Canal de Isabel II 1954), *El Agua en Madrid. Datos para la historia del Canal de Isabel II 1851-1930* [Water in Madrid. Data for the history of the Canal de Isabel II 1851-1930] (Rueda Laffond 1994), and, especially *Historia del Canal de Isabel II* [History of the Canal de Isabel II] (Martínez Vázquez de Parga 2001a). Regarding the first, it is important to mention that it was published by the Canal de Isabel II to celebrate the centenary of its foundation, and therefore published during the Franco's dictatorship (a photo of the '*Caudillo*' is included in the preface). The second book, published in 1994 is an accurate and complete account of the history of the Canal from its foundation until 1930. It uses yearbooks, reports and the Official Bulletin of the Canal issued by the Canal de Isabel II during that period. It is also based on the private archives of Joaquín Sánchez de Toca, who was the chief of the *Comisaria Regía* of the Canal de Isabel II between 1907 and 1909. Eventually, it draws also upon the Madrid Press of the time (for instance *La Energía Eléctrica, El Economista Hispano-Americano, El Financiero Hispano-Americano* or *Madrid Científico* among others). Eventually, the *Historia del Canal de Isabel II*, the third book and the most comprehensive, commemorates the 150th anniversary of the company. The author based her research on the technical and administrative documentation of the *Archivo*

Central del Canal de Isabel II [Central archives of the *Canal de Isabel II*]. Our notes have also been complemented by scientific literature, especially the *Revista de Obras Públicas* [Public Works Journal], a journal that has devoted several hundreds of pages, and some 177 pieces (according to a bibliometric study we performed) to the evolution of the infrastructure of the Canal de Isabel II during different periods:

- The pre-existent water supply technologies in Madrid (Cortinas Isidro et al. 1999) and the foundation of the Canal de Isabel II and the early works in the 19th century (Revista de Obras Públicas 1854a, Revista de Obras Públicas 1854b, Martí Font 1858a, Martí Font 1858b, Martí Font 1858c, Revista de Obras Públicas 1858, Gutiérrez Andrés and López-Camacho y Camacho 2004)
- The problematics and projects of early 20th century (Inchaurrandieta Páez 1902a, Inchaurrandieta Páez 1902b, Inchaurrandieta Páez 1902c, Maluquer y Salvador 1920, Bello Peyusan 1924, Pérez-Caballero 1925, Llorca Aquesolo and Monte Sáez 1984, Burgos Núñez 2005)
- For the mid 20th century (García Agustín 1966, García Agustín 1967)
- For the 1970s (García Agustín 1970, García Agustín 1971, Garcia Agustin 1972, García Agustín 1972, López de Berges y de los Santos, Emilio 1975)
- Or the more recent studies in the 1990s (López-Camacho y Camacho 1995, López-Camacho y Camacho and Iglesias Martín 2000) and early 21st century, especially celebrating the 150 anniversary of the CYII (Aguiló Alonso 2001, Bonet Correa 2001, De Castro and Aguiló Alonso 2001, González Reglero and Espinosa Romero 2001, Martínez Vázquez de Parga 2001b, Merchán Gabaldón 2004)

Finally, we have also used the results of the European Commission funded project WaterTime, concretely from the Madrid Case Study (Observatorio de los Servicios Públicos 2005). For the more recent history, we have consulted different digital Spanish and Madrid-based newspaper libraries, policy documents from the regional government, the *Confederación Hidrográfica del Tajo* [Tajo's Water Agency] and the *Canal de Isabel II*.

7.1 Urbanization and water metabolism in Madrid

The history of the water supply of Madrid and of the Canal de Isabel II is intrinsically related to the urbanization process of what is today one of the most important urban regions of Europe. Next, we are going to introduce and summarize the evolution of the urban process of the city of Madrid, and of the metropolitan region since the 19th century. We argue that presenting such urban changes is fundamental prior to tracing the evolution of the water supply in Madrid.

In the period 1850-1875 several processes triggered the definitive urban expansion of Madrid: the wall of Felipe II (map 7.1) was demolished and the *Ensanche* began to develop. When the *cerca fiscal* built by Felipe IV was demolished, Madrid occupied 770 ha, with a population around 280,000 (V.V.A.A. 2002). In 1860, the Plan of the *Ensanche* of the engineer Castro was implemented. It was inspired in the Cerdà *Eixample* of Barcelona, although less ambitious, because the urban growth of Madrid was set around 2,025 ha. The construction of the *Ensanche* lasted until 1930 and did not respect all initial plans, both due to changes in the urban norms and speculative processes.

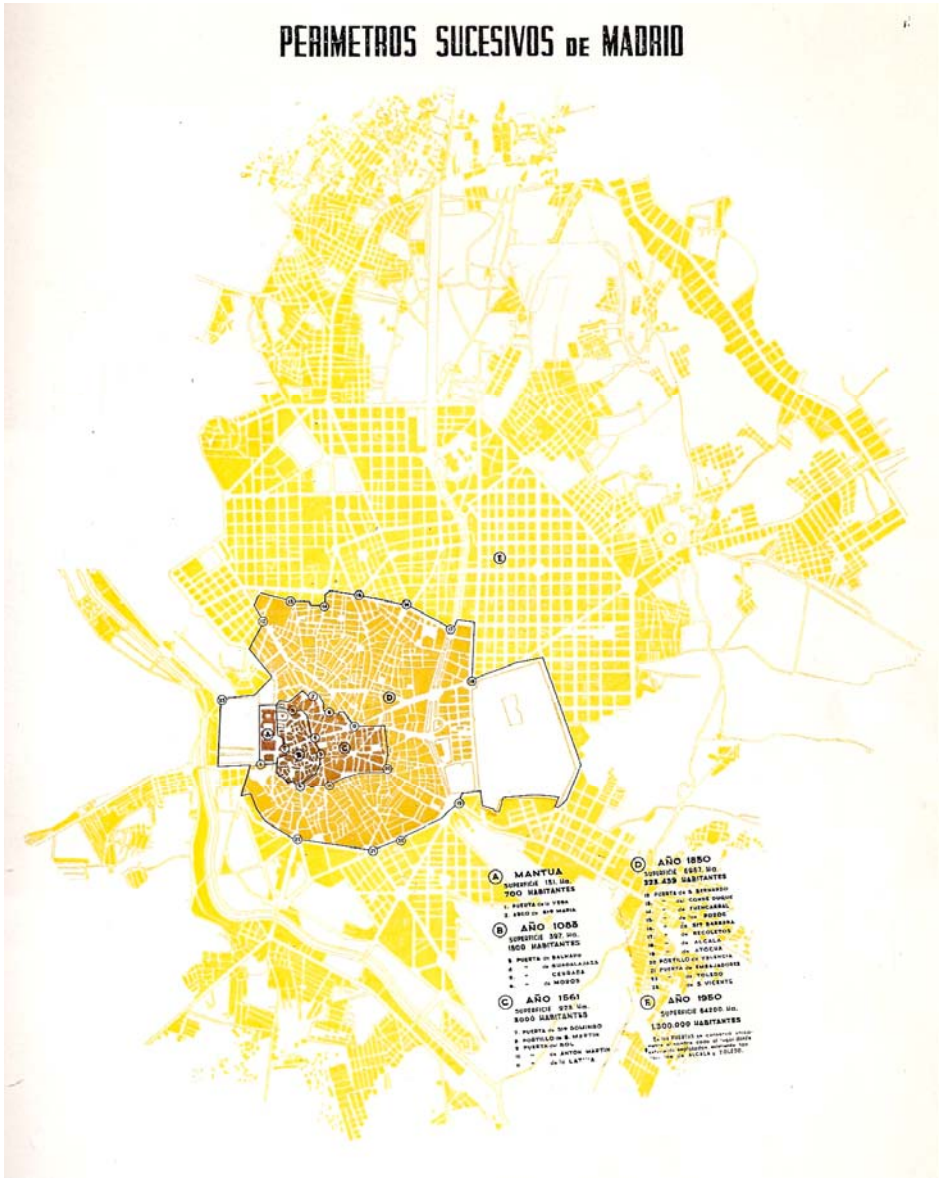
7.1.1 Urban growth in Madrid until the 1960s

In 1933 the *Plan de Extensión* followed. This Plan was inspired in the European Planning culture of the time: decentralized units with green spaces and agricultural land separating the nodes of growth (V.V.A.A. 2002). Some years later, in 1939, the idea of Regional Planning appeared again in the *Plan Regional de Madrid* [Regional Plan of Madrid]. The scope of the plan was all the area influenced by Madrid and was aimed to improve the condition of Madrid and the satellite cities and also create new urban developments close to nature. (Gea Ortigas 2002, V.V.A.A. 2002)

In 1946 the *Plan General de Ordenación Urbana de Madrid*, as known as *Plan Bidagor* was approved. In the following years Madrid annexed some adjacent

municipalities[827], growing from 6,800 to over 60,000 ha, and reaching a population over 1,500,000 people (V.V.A.A. 2002).

Map 7.1. Evolution of the city of Madrid, successive perimeters until 1950



Source: Canal de Isabel II (1954)
Legend: A. Mantua primitive Alcazar
B. 1083, conquest of Alfonso VI,
C. 1561, establishment of the Court in Madrid, by Felipe II,
D. 1850,
E. 1950, before the annexations

[827] Madrid annexes from 1948 to 1954 Aravaca, El Pardo, Fuencarral, Chamartín de la Rosa, Canillas, Canillejas, Hortaleza, Barajas, Vicálvaro, Vallecas, Villaverde, Carabanchel Alto and Carabanchel Bajo.

By mid 1950s the *Plan Bidagor* was overwhelmed by the dramatic spatial and population growth of Madrid. In 1956 the *Ley del Suelo*[828] was enacted. Because of the meager economic resources by the municipalities to lead housing development, urban growth was promoted by the owners of the plots of land. Credit lacked and there were no private promoters. The solution was to grant landowners with the right to urbanize with their own money and to hand out some of the land to the municipality for local equipments. The law also established the revision of urban plans every 15 years.

Parallel to the enactment of the *Ley del Suelo*, in 1957 the *Plan de Urgencia Social para Madrid* [Social urgency plan for Madrid] was launched. This urgency plans sought to stop the proliferation of *poblados* [slum villages] around the capital with the construction of some 85,000 homes. This process implied the creation of entire neighborhoods making up what was called *Gran Madrid*[829]. By that time, most of the population (87%) of what is currently known as the *Comunidad de Madrid*, lived in the city of Madrid (Naredo and García Zaldívar 2008) while barely a 6 percent of the population had their main home in the metropolitan area (as we can observe in table 7.1).

Table 7.1. Spatial distribution of population, urbanized land and households, in percentage (%), 1956.

1956	Population	Households	Urbanized surf.	
			Residential	Others
City of Madrid	87,3	85,6	57,4	56,7
Metropolitan area	5,7	6,6	16,8	19,9
Rest of the CAM	7	7,8	25,8	23,4

Source: own elaboration from Naredo and García Zaldívar (2008)

7.1.2 The urban explosion of Madrid in the second half of the 20th century

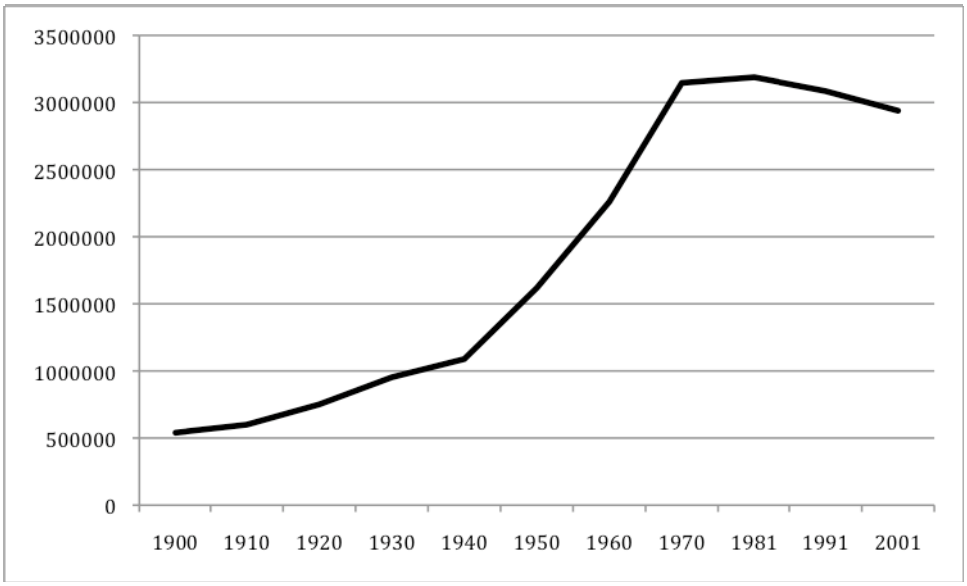
The 1960s are the most relevant period of population growth, with more than a million people coming to Madrid (figure 7.1). To respond to such changing reality, in 1963 the *Plan General de Ordenación Urbana del Área Metropolitana de Madrid* [General Plan of Urban Planning in the Metropolitan Area of Madrid] was approved. The term "Metropolitan Area of Madrid" was born out of such plan, which focused

[828] *Ley del Suelo y Ordenación Urbana de 14 de mayo de 1956*

[829] This process implied the construction of entire neighborhoods of social housing: San Blas, Moratalaz, Entrevías or Palomeras.

on the decentralization of growth in favor of adjacent municipalities[830]. The plan envisaged to transform Madrid from an "attracting locus" to a "propulsion locus". The urban fabric was to be articulated by means of a a concentric motorway network, proposed in the Project of the *Red Arterial de Madrid* of 1967. The M-30 (1974) became the first urban motorway of Spain.

Figure 7.1. Evolution of the population of Madrid. 1900-1991



Source: Own elaboration with data from Instituto Nacional de Estadística

After the arrival of democracy, one of the urban priorities of Madrid was to renew the General Plan of 1963, in order to advance not in quantitative but in qualitative terms. The *Plan General* [General Plan] of 1985 was thus the first urban plan of Madrid in the democratic period. It foresaw to transform and consolidate the city of Madrid, providing more services, taking into account the environment, protecting and caring for the architectural heritage, and renewing the degraded industrial areas.

By the 1980s, the population of the Metropolitan Area stabilized and the city of Madrid even lost people (figure 7.1), mainly due to the lack of affordable homes, but also to the search of better living conditions beyond the city. The main objective was to transform and consolidate the existing Madrid. The plan also envisaged to extend the city next to urbanized land, in order to prevent some people to be expelled (some 200,000 new homes were planned). However, as Eduardo Leira (V.V.A.A. 2002) recalls, Madrid continued to lose population, because the new homes were

[830] Municipalities such as Alcorcón, Móstoles, Leganés or Getafe dramatically increased both their population and the urbanizad land.

unaffordable. In the 1980s almost 30 percent of the population lived in the metropolitan area (table 7.2)

Table 7.2. Spatial distribution of population, urbanized land and households, in percentage (%), 1980.

1980	Population	Households	Urbanized surf.	
			Residential	Others
City of Madrid	67,4	64	25,3	30,4
Metropolitan area	28,4	27,8	35	42,1
Rest of the CAM	4,2	8,2	39,7	27,5

Source: own elaboration from Naredo and García Zaldívar (2008)

While the plan of 1985 intended to provide a qualitative change for urban Madrid instead of proposing a massive growth of the city, the rationale seem to change in 1997 with the new *Plan General*. This plan argued that the former Plan had restricted too much the development of urban land and there was an unfulfilled demand of homes. This plan reactivated growth of urban Madrid and sought to convert Madrid in one of the most important European capitals. It was aimed at solving existing social problems and redressing some urban imbalances. The "environment" became a key element in a plan that wanted to provide solutions to the problems of affordable housing, mobility issues, environmental problems, urban degradation in historic areas or ageing and obsolete industrial areas (V.V.A.A. 2002). This plan foresaw that all the land not strictly protected in environmental terms be subjected to development.

In the same line, in 2001 the *Ley del Suelo* was enacted [831]. As Calvo López et al (2007), this Act is known as the "*ley del todo urbanizable*" ("everything to be urbanized" act). In turn, this regional law was slightly modified in 2005 but maintained its basic tenets.

In table 7.3 we present the main legal changes and key moments in the urban history of Madrid.

[831] *Ley 9/2001, de 17 de Julio de 2001, del Suelo, de la Comunidad de Madrid*, based in the Spanish *Ley del Suelo*: *Ley 6/1998, de 13 de abril, sobre Régimen del Suelo y Valoraciones.* It was modified by the *Ley 2/2005, de 12 de Abril.*

Table 7.3. Key moments in modern urban history of the city of Madrid.

1854	The *cerca fiscal* built by Felipe IV is demolished. By then Madrid occupied 770 ha, with a population around 280,000
1860	*Plan de Ensanche de Castro*: plans to develop the city over 2,025 hectares
1933	*Plan de Extensión*
1939	*Plan Regional de Madrid*
1946	*Plan General de Ordenación Urbana de Madrid* (Plan Bidagor)
1956	*Ley del Suelo y Ordenación Urbana* de 14 de mayo de 1956.
1957	*Plan de Urgencia Social para Madrid*
1963	*Plan General de Ordenación Urbana del Área Metropolitana de Madrid*
1967	Project of *Red Arterial de Madrid*
1976	*Ley del Suelo de 1976*
1985	*Plan General de 1985*
1997	*Plan General de 1997*
2001	*Ley 9/2001, de 17 de Julio de 2001, del Suelo, de la Comunidad de Madrid*
2005	*Ley 2/2005, de 12 de Abril*, modifying the Ley 9/2001

Source: adapted from V.V.A.A. (2002) and Calvo López et al. (2007)

To understand how urbanization has evolved in the region of Madrid, it is essential to refer to the *Estudio sobre la ocupación de suelo, aplicado a la Comunidad de Madrid* [Study of the land occupation, applied to the case of the Comunidad de Madrid] coordinated by José Manuel Naredo (Naredo and García Zaldívar 2008). This contribution traces changes in land use patterns in Madrid for the period 1956-2005 through complex GIS analyses, comparing the information obtained from the aerial photographs of 1956, 1980 and 2005. During the period studied population increased 2.6 times, while urban land grew by a factor of 6 (table 7.4).

In figure 7.2 the evolution of the land occupied by each category can be appraised better. Residential uses are by large the most important land-consuming category in absolute terms. The rate of urbanization for residential purposes has more than doubled population growth in the last 50 years. This is explained by the change of urban model, from compact to diffuse. Table 7.4 (and figure 7.2) shows the square meters urbanized per capita. Hence, land endowment per capita has increased twofold (table 7.5). The diffuse conurbation model in Madrid produces important changes in the metabolism of the urban fabric, in terms of materials, energy, land use and, obviously, water.

Table 7.4. Land urbanized by categories (in ha), evolution 1956-2005.

	1956	1980	2005	Ratio 05/56 (%)
Residential	13,135	47,002	69,733	5.3
Industrial	1,136	9,233	16,879	14.9
Sport and green zones	2,259	3,939	7,446	3.3
Infrastructures	6,621	11,690	22,930	3.5
Quarries	183	8,492	13,635	74.5
Waste sites	227	2,916	2,574	11.3
Land to be urbanized[832]	14	5,478	17,704	1,264.6
Water reservoirs	2,381	5,839	5,984	2.5
TOTAL urbanized	25,956	94,589	156,885	6.0
Population	2,325,028	4,803,152	5,964,143	2.6

Source: own elaboration from Naredo and García Zaldívar (2008)

Table 7.5. Land-use intensity. Surface occupied (square meters) by inhabitant, 1956-2005.

	1956	1980	2005	Ratio 05/56
Residential	56,5	97,6	116,9	2,1
Industrial	4,9	19,2	28,3	5,8
Sport and green zones	9,7	8,2	12,5	1,3
Infrastructures	28,5	24,3	38,4	1,3
Quarries	0,8	17,7	22,9	28,6
Waste sites	1	6,1	4,3	4,3
Land to be urbanized	0,1	11,4	29,7	297,0
Water reservoirs	10,2	12,2	10	1,0
Total	111,7	196,7	263	2,4

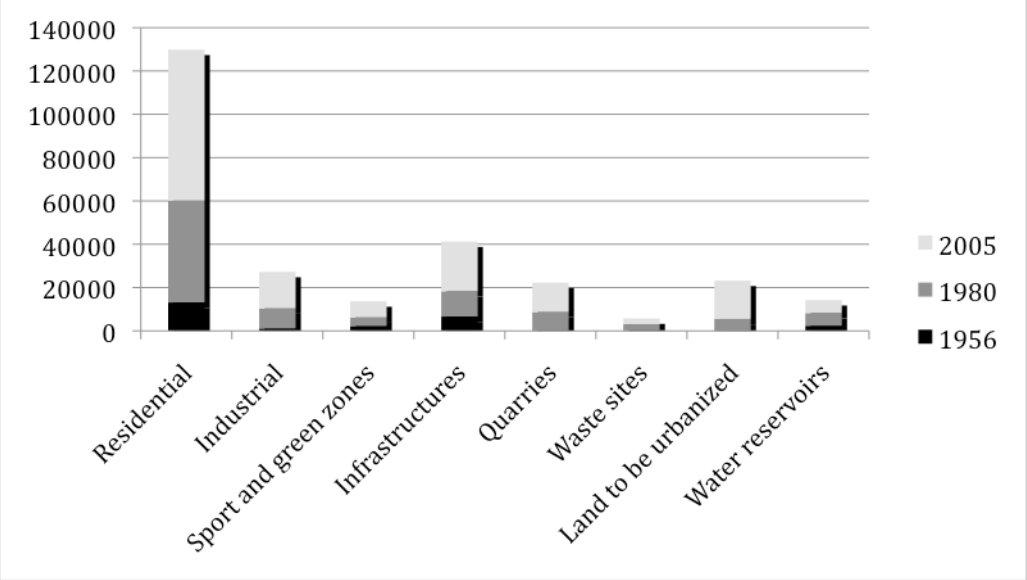
Source: own elaboration from Naredo and García Zaldívar (2008)

Another explanation for Madrid's intense urban growth is that housing, especially since the late 1990s and until recently, has been seen as a never-ending opportunity to make profits. In that sense, as the authors of the study remark, based on data from the *Instituto Nacional de Estadística* [Spanish Statistics Service], in 2001 Madrid had some 600,000 secondary and empty homes[833]. On the other hand, data revealed that there were some 1.9 million occupied homes.

[832] This category includes the land prepared to be urbanized and also in the case of 2005 the lands affected by the process of urbanization.
[833] This meant more than the total housing stock of 1950

This disparity between urbanization trends and population growth could respond partially to the general decrease in Spain of household size[834] since the 1990s. The triggers of this change of model are multiple, but most of them may be traced back to institutional changes promoting private property (*Decreto Boyer*[835]), and the most recent trend to invest in real estate. In addition, the change has also affected in how urbanization takes place; Naredo and García Zaldívar (2008) emphasize the importance of "singular housing development projects" ("*operaciones*"). Calvo López et al. (2007) pointed at the liberalization of the land market as one of the triggering factors. The same authors mention the high borrowing capacity of Spanish[836] families until recently.

Figure 7.2. Urbanized land in Madrid (hectares), period 1956-2005.



Source: Own elaboration from Naredo and García Zaldívar (2008)

Moreover, these authors signal that "land urbanization" is one of the key sources of local financing in Spain; municipal treasuries are in fragile situation in Spain due to the increasing duties the municipalities have to carry out and the poor financing received by the State and the Autonomous Communities. In the case of Madrid, legislation determines that 10 percent of the surface to be urbanized will be handed

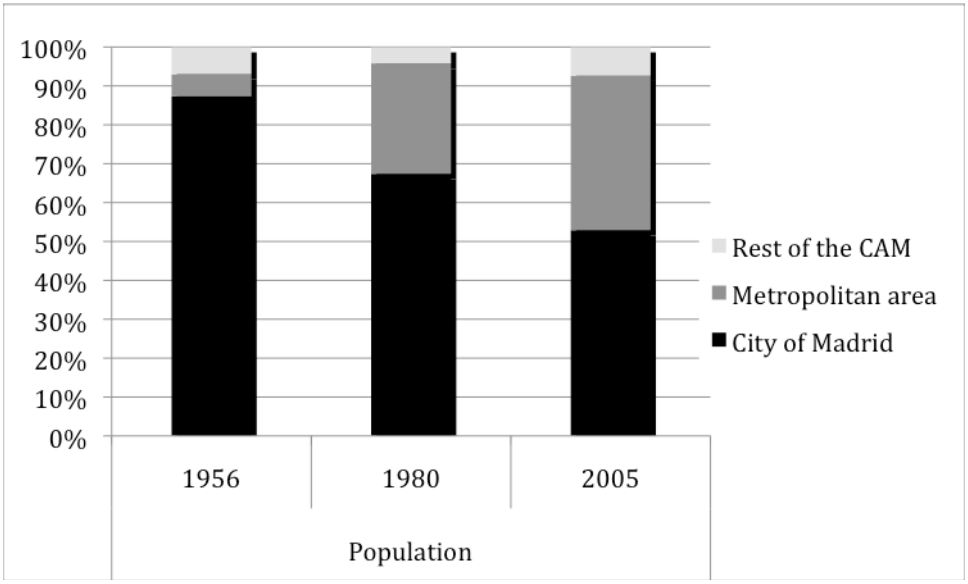
[834] According to the Instituto Nacional de Estadística (www.ine.es), between 1991 and 2001, household size was reduced from 3.2 to 2.9 people per household. While population grew 5%, households soared by 20%.

[835] *Real Decreto-Ley 2/1985, de 30 de abril*. Its main objective was to stimulate private consumption and investment, to promote employment and to give a boost to the building sector.

[836] The factors contributing to such high creditworthiness are: the low interest rates, high supply of mortgages, the increasing available income, the familiar assets (that determines the solvency) and the aforementioned fiscal incentives (*Decreto Boyer*).

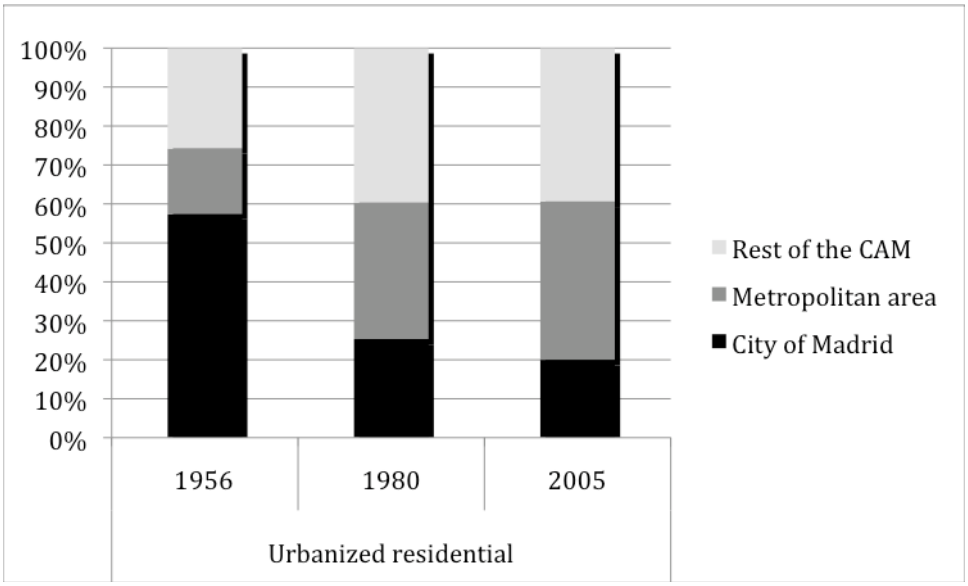
out to the town council on top of land for urban equipments. To complete the picture, the town council also receives the *Impuesto sobre Bienes Inmuebles*[837] [tax on urban properties].

Figure 7.3. Distribution of population 1956-1980-2005 in the CAM.



Source: own elaboration from Naredo and García Zaldívar (2008)

Figure 7.4. Distribution of urbanized land (right) 1956-1980-2005 in the CAM.



Source: own elaboration from Naredo and García Zaldívar (2008)

As it can be observed in figures 7.3 and 7.4, most of the population in 1956 was located in the city of Madrid, and neither the rest of the Metropolitan area nor the

[837] *Ley 51/2002. de 21 de diciembre, de reforma de la Ley 39/1988, de 28 de diciembre, Reguladora de las Haciendas Locales.*

rest of the CAM (non-metropolitan zone) provided an important share. However, due to the relevance of second homes, these zones already represented more than 40 percent of the urbanized residential land of the CAM. In 1980 the situation was however quite different as the Metropolitan Area had grown both in population and extension gaining importance in both shares. The non-metropolitan zone had lost importance in population, but had gained prominence in the share of urbanized land due to the continuous increase of second homes. Finally, the period 1980-2005 knew an important population growth in the non-metropolitan zone; in this area the number of households also increased, reflecting a conversion of secondary to primary residence. At the same time the city of Madrid not only lost population in relative terms (table 7.6 and figure 7.3) but also in absolute terms (figure 7.1).

Naredo and García Zaldívar (2008:61) succinctly summarize the general urban change the region of Madrid has undergone since the mid 20th century to the dawn of the 21st century:

> "from a rural environment and low modified nature, with some urban islands connected by means of a faint road network, to a metropolitan sea, with rural islands or nature to be protected, connected by a dense and frequented road network", our translation

7.1.3 Suburbanization in Madrid

Nowadays the Madrid region is a sprawled region (García Palomares and Gutiérrez Puebla 2007), in part due to its weak spatial planning framework (López de Lucio 2003, European Environment Agency (EEA) 2006). In 2005 the European Environment Agency considered the Madrid Region as one of the EU hotspots in urban development (European Environment Agency (EEA) 2005) with an extraordinary growth of urbanized land in the 1990s. Plata Rocha et al. (2009) contend that during the 1990s the strong urban growth has been accompanied by an important decrease of agricultural lands.

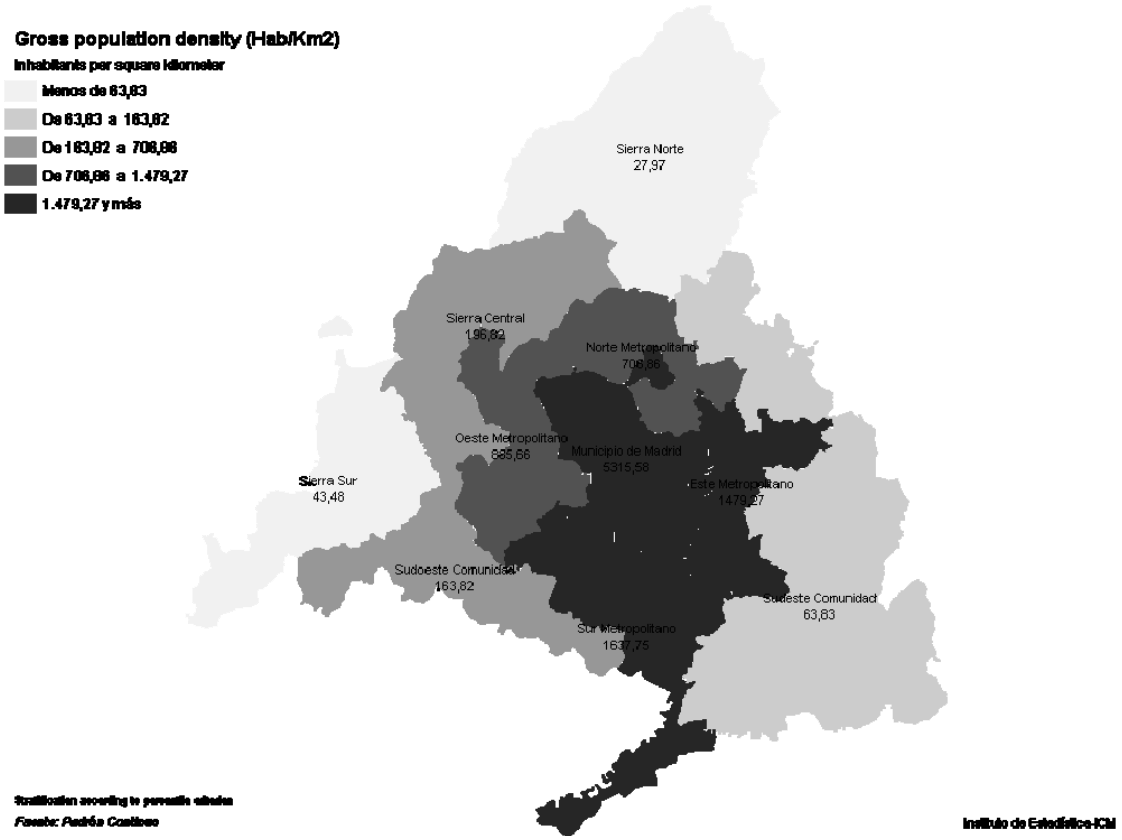
Table 7.6. Spatial distribution of population, urbanized land and households, in percentage (%). 2005.

2005	Population	Households	Urbanized surf.	
			Residential	Others
City of Madrid	52,9	53,6	20	25,8
Metropolitan area	39,7	35	40,6	49,3
Rest of the CAM	7,4	11,4	39,4	24,9

Source: adapted from Naredo and García Zaldívar (2008)

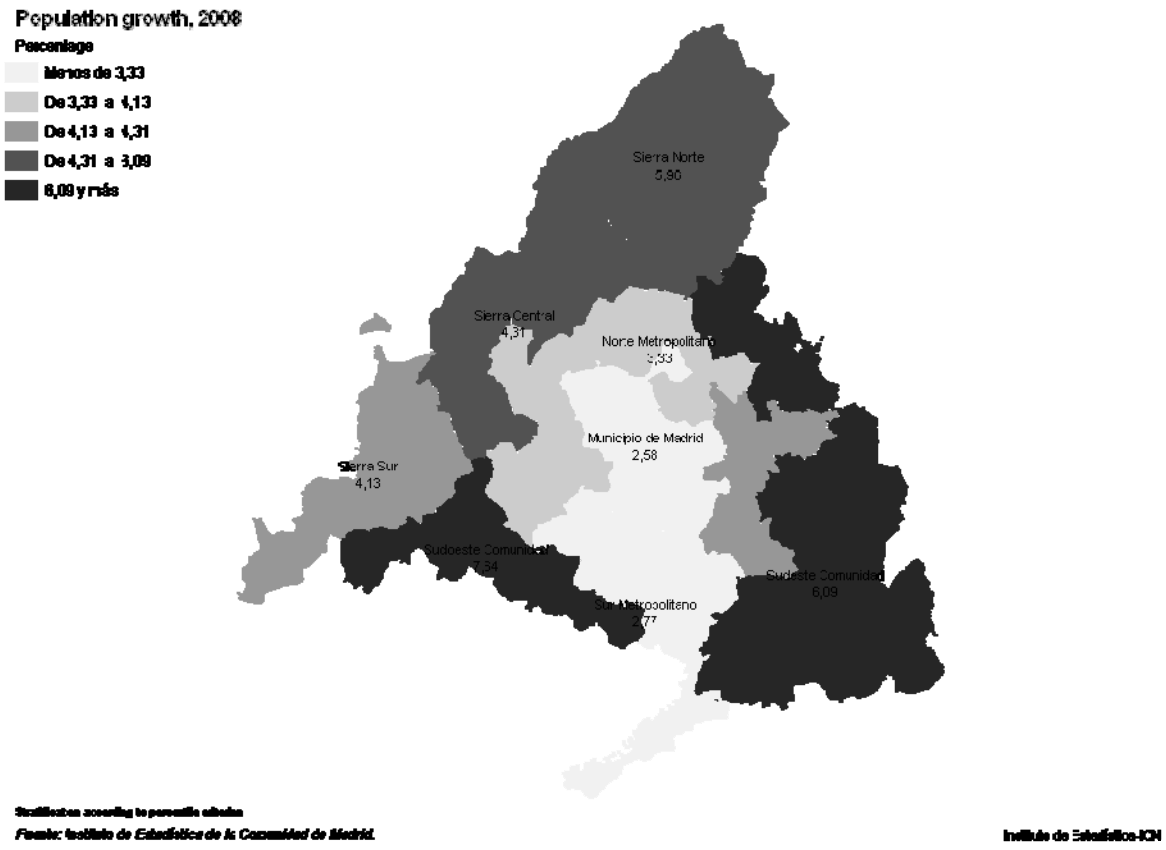
Several socio-economic and interlinked factors have shaped Madrid's urbanization process in the recent years (European Environment Agency (EEA) 2006). Among them, we could highlight the demand for first and secondary homes. According to López de Lucio (2003) some 513,000 new houses were built during the 1990s, while population only increased by 240,000 people. A favorable economic situation, combined with the political economic (*Ley Boyer*) setting of Spain and low interest mortgages across Europe triggered such growth. The constructions of large transport infrastructures in the region, especially motorways, have also fuelled the urbanization process and decentralization of Madrid region. According to maps 7.2 and 7.3, which show how the different areas of the Madrid region were growing in 2008, as well as their population density, we can see that the fringes of the metropolitan areas are the sectors with the highest population growth rates, while metropolitan Madrid lags clearly behind such figures.

Map 7.2. Gross population density (people per km^2), year 2008



Source: Instituto de Estadística de Madrid and Canal de Isabel II

Map 7.3. Population growth (%) in the CAM, 2008



Source: Instituto de Estadística de Madrid and Canal de Isabel II

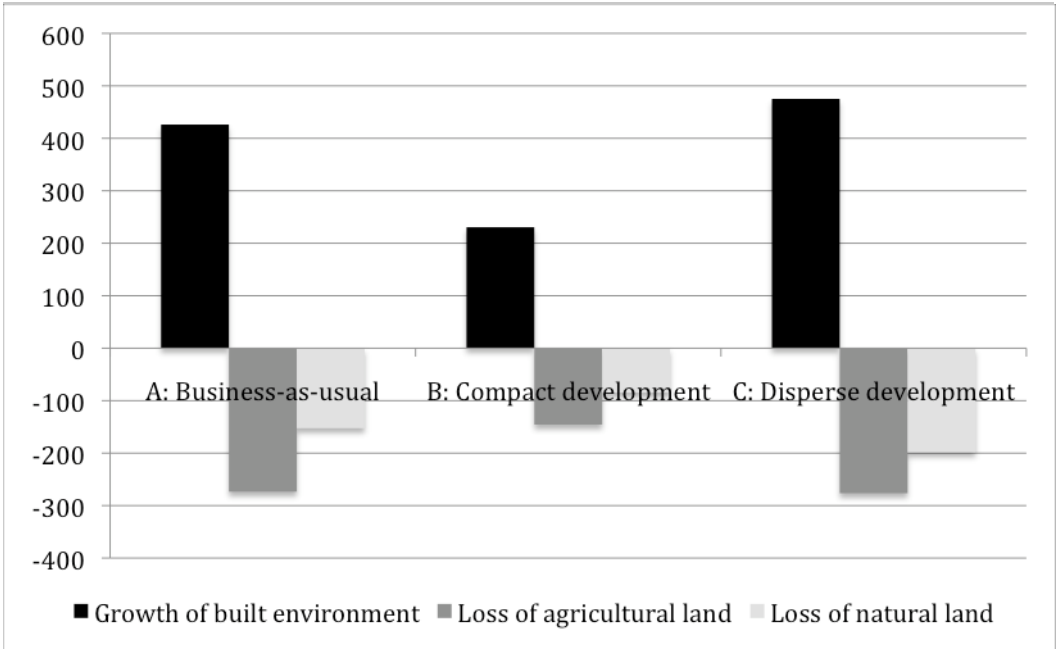
The report *Urban Sprawl in Europe: the ignored challenge* (European Environment Agency (EEA) 2006) presents three different scenarios for the future urban development of Madrid (p.24):

- Business-as-usual: This scenario represents a continuation of very rapid economic growth with low to moderate population growth. The scenario extrapolates the same characteristics and trends identified in the 10-year period 1990-2000.
- Compact development: This is an environmental scenario, and is based on an assumption of a 40 percent decrease in demand for urban land as compared with the 'business-as-usual' scenario. In this case a more compact development style prevails, representing a departure for current trends. It is probably the least realistic scenario of the three identified.
- Disperse development: This is a market-led development scenario with greater environmental impacts than the 'business-as-usual' scenario. The

scenario is based on more rapid population growth than the business-as-usual case, and assumes a 10 percent increase in demand for urban land compared to the 'business-as-usual' scenario. Growth is mainly concentrated in a number of peripheral nodes and the city moves towards a sprawled development style.

In figure 7.5 we present the hypothetical evolution of the built environment and loss of natural and agricultural lands for three scenarios described above for 2020.

Figure 7.5. Scenarios of Madrid Urban development for 2020, in square kilometers.



Source: adapted from European Environment Agency (EEA) (2006:24) and Kasanko et al. (2006)

The report states that "urban sprawl is profoundly modifying Madrid in an unsustainable way, and it is clear that the sustainable development of the Madrid region can only be attained by the compact development scenario provided spatial regulation measures are implemented in the short to medium term" (European Environment Agency (EEA) 2006: 24). Thus, this report seems to go in the opposite direction of the Madrid urban planning politics. In May 2007, days before the regional elections, Esperanza Aguirre, by then prime minister of Madrid, announced a "town-planning revolution" [838] in Madrid should she become reelected. In her words, "we should not do the same urban planning done in the decades of the 1950s,

[838] Speech of Esperanza Aguiree, Foro ABC May 2007 in ABC, Martes 8 de Mayo 2007, p.10, "Aguirre anuncia un nuevo urbanismo que pondrá fin a las viviendas altas por ley", Gonzalo Zanza / El Mundo.es, 7/5/2007, "Aguirre limitará a cuatro plantas los nuevos edificios residenciales", our translation

1960s or 1970s" which was "*apelotonado* and dehumanized". The prime minister of Madrid argued that she believed in "a country of owners not having to live in large concrete buildings of 13 or 14 floors in periphery *páramos*"

This revolution would be based on the limitation of urban densities in the new developments and would bring about a disconnection with the former urban planning model, being closer to that of Germany, Belgium, Holland or United Kingdom.

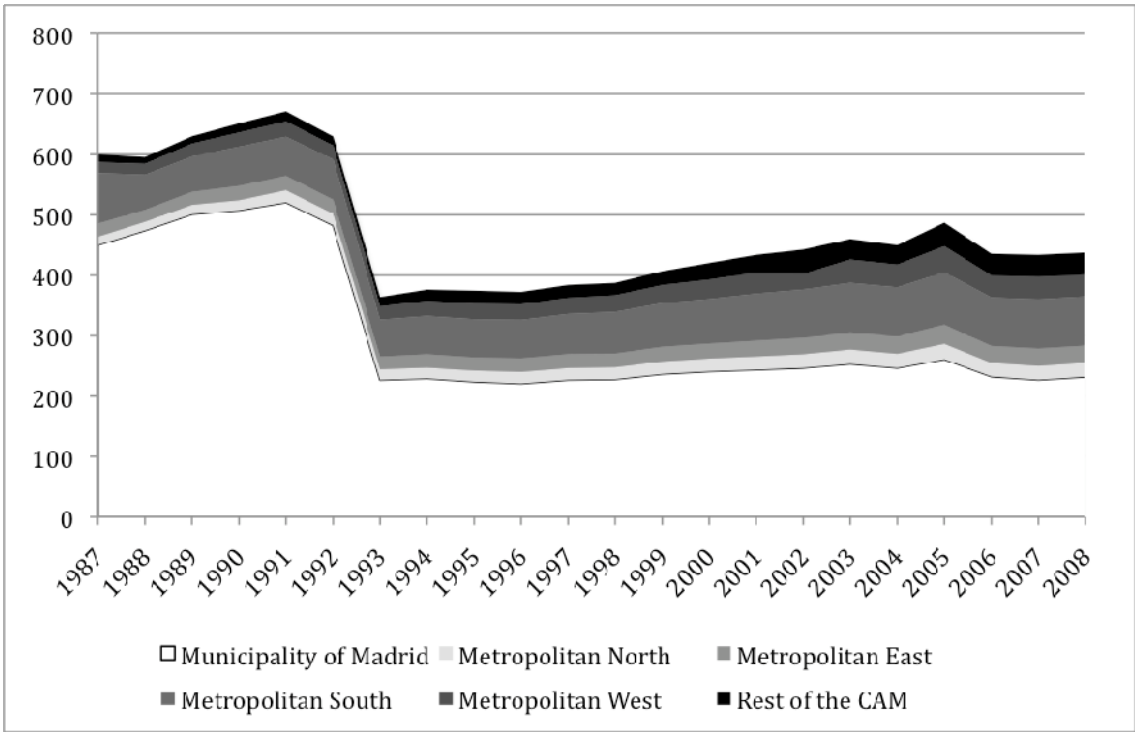
The *madrileños* "do not have to live neither in a different way [than the aforementioned out countries] nor in a matchbox" but "they want to live in less dense and wider cities, with more open spaces and green zones, with the sun going through their windows every morning". Eventually, Esperanza Aguirre won the elections of May 2007.

7.1.4 The water metabolism of Madrid

Water metabolism of Madrid has keep pace with the increase of population. Although we do not have access to the evolution of water consumption year by year, by the different sectors, data from monographic studies on the *Canal de Isabel II* (Canal de Isabel II 1954, Rueda Laffond 1994, Martínez Vázquez de Parga 2001a, Martínez Vázquez de Parga 2001b) or from the press confirm such trends. However, from mid 1980s, and in parallel to the administrative reconfiguration of the firm, data on the water consumption or extraction has been more easily available.

Water consumption increased in part due to the economic recovery of industry of 1987 (figure 7.6). After the drought of 1992, consumption in the Region of Madrid never recovered its former levels. From an interview we carried out in 2009 to a high responsible of the *Canal de Isabel II*, it seems that the organism in charge of water supply did not know the exact reason of such change. However, some hypotheses were raised, such as the effect of saving campaigns or the more likely permanent effect of drought on the citizens (most of them seem to have the same consumption routines even when the water crisis was over). Accepting those hypotheses, we also suggest that changes in the demography of the region may contribute to explain such fluctuations in water consumption patterns. The changing patterns in industry in the region may contribute as well to the explanation.

Figure 7.6. Evolution of total water consumption (water billed) in the different urban areas of the Metropolitan Region, in hm^3 per year, 1987-2008.



Source: own elaboration from data of the Instituto de Estadística de Madrid and Canal de Isabel II

Despite the general decrease of water consumption in the Madrid region, it is important to question whether this really means a real decrease in water use or it is more about a shift of the extraction site of water. The concept of virtual water (Allan 1998) is used by Naredo et al. (2008) to show how Madrid increasingly uses more water of this type despite decreasing its consumption of local/regional resources. As we can see in the table 7.7, the water footprint[839] of Madrid has increased some 43 percent from 1984 to 2005, from 1,169 to 1,667 m^3 per capita and year. In other words, while in 2005 the consumption per capita (including all uses) was 523 lpcd, the water footprint of each *madrileño* exceeded 4.500 lpcd[840].

[839] The concept "water footprint" (Chapagain et al. 2006, Hoekstra and Chapagain 2007) wants to emulate the "ecological footprint" (Wackernagel and Rees 1996, Wackernagel and Rees 1997), which quantifies the surface needed to sustain a given population in terms of energy, emission and materials. The water footprint concept has a direct connection with the assessment of virtual water flows (Allan 1998)

[840] This large water footprint is made up of the water used to grow the food and to produce the goods and the fuel the citizens of Madrid consume.

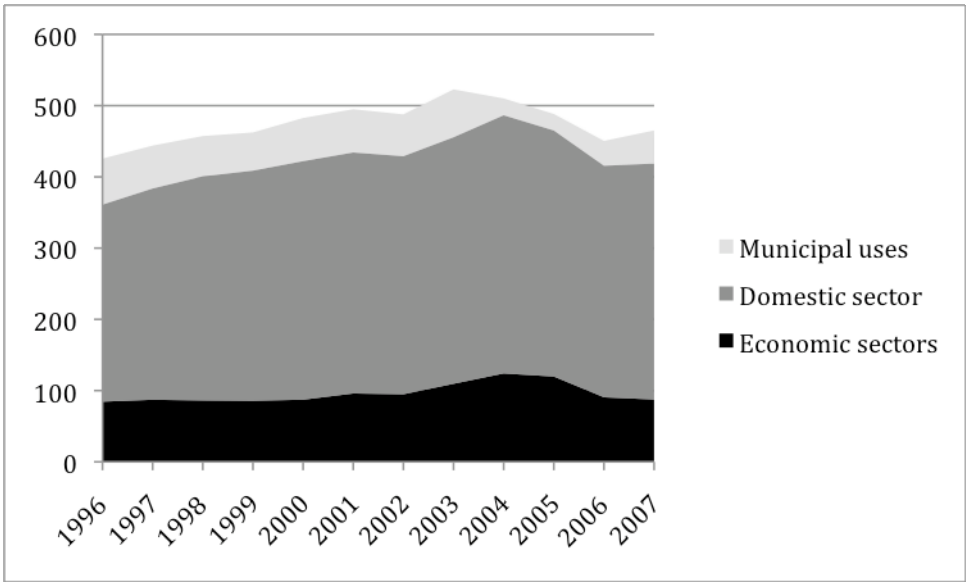
Table 7.7. Evolution of water consumption in the CAM, virtual flows of water and total water footprint, 1984-2005

	Water consumed from the CAM (m^3 per year//lpcd)	Net importation of virtual water (m^3 per year//lpcd)	Water footprint (m^3 per year//lpcd)
1984	261/715	908/2,487	1,169/3,203
2005	191/523	1,476/4,044	1,667/4,567
Ratio 2005/1984	0.73	1.63	1.43

Source: Naredo et al. (2008)

It is also important to ask how and where this water is consumed, because the geography of water consumption in Madrid is uneven, as it is for Barcelona. First of all, we have to mention that most of the water billed by the *Canal de Isabel II* in Madrid goes to keep household metabolism as we can observe in figure 7.7. A smaller share, around 20 percent goes to the industrial and commercial sector [economic sectors], and the remainder to public uses. Note that these uses, including street cleansing and public parks watering are the first uses to suffer the consequences of a drought since they are rapidly banned when the situation worsens (level 1).

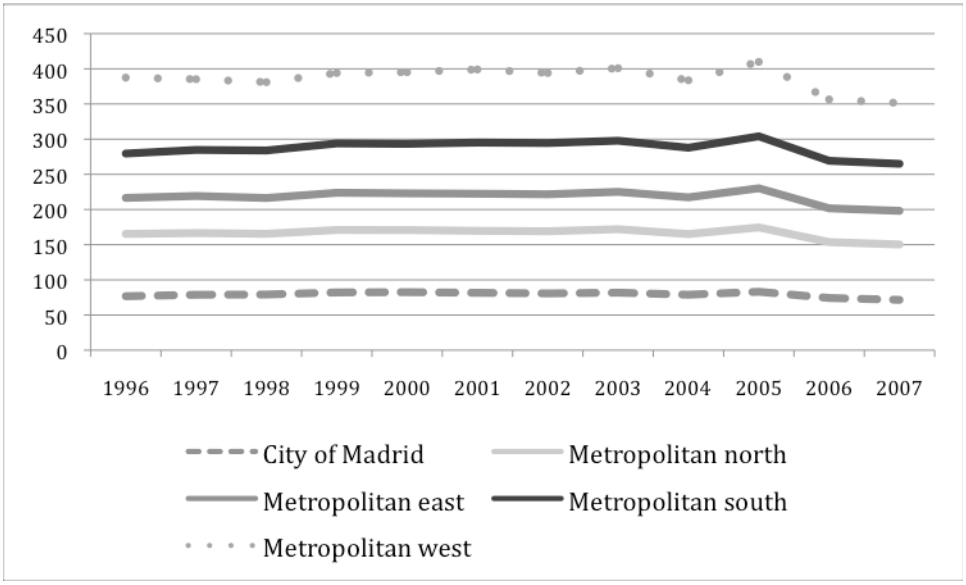
Figure 7.7. Water billed by the Canal de Isabel II by sectors in the CAM, in hm^3, 1996-2007



Source: Instituto de Estadística de Madrid and Instituto Nacional de Estadística

Domestic water consumption is by large the most important component of the water resources supplied by the *Canal de Isabel II* in the Autonomous Region of Madrid (CAM) (figure 7.7). However, this consumption is by no means spatially homogenous but differs importantly across the region of Madrid (figure 7.8).

Figure 7.8. Evolution of the consumption per capita in different zones of Metropolitan Madrid, in liters per capita and day (lpcd), 1996-2007



Source: own elaboration with data from the Instituto de Estadística de Madrid and Canal de Isabel II

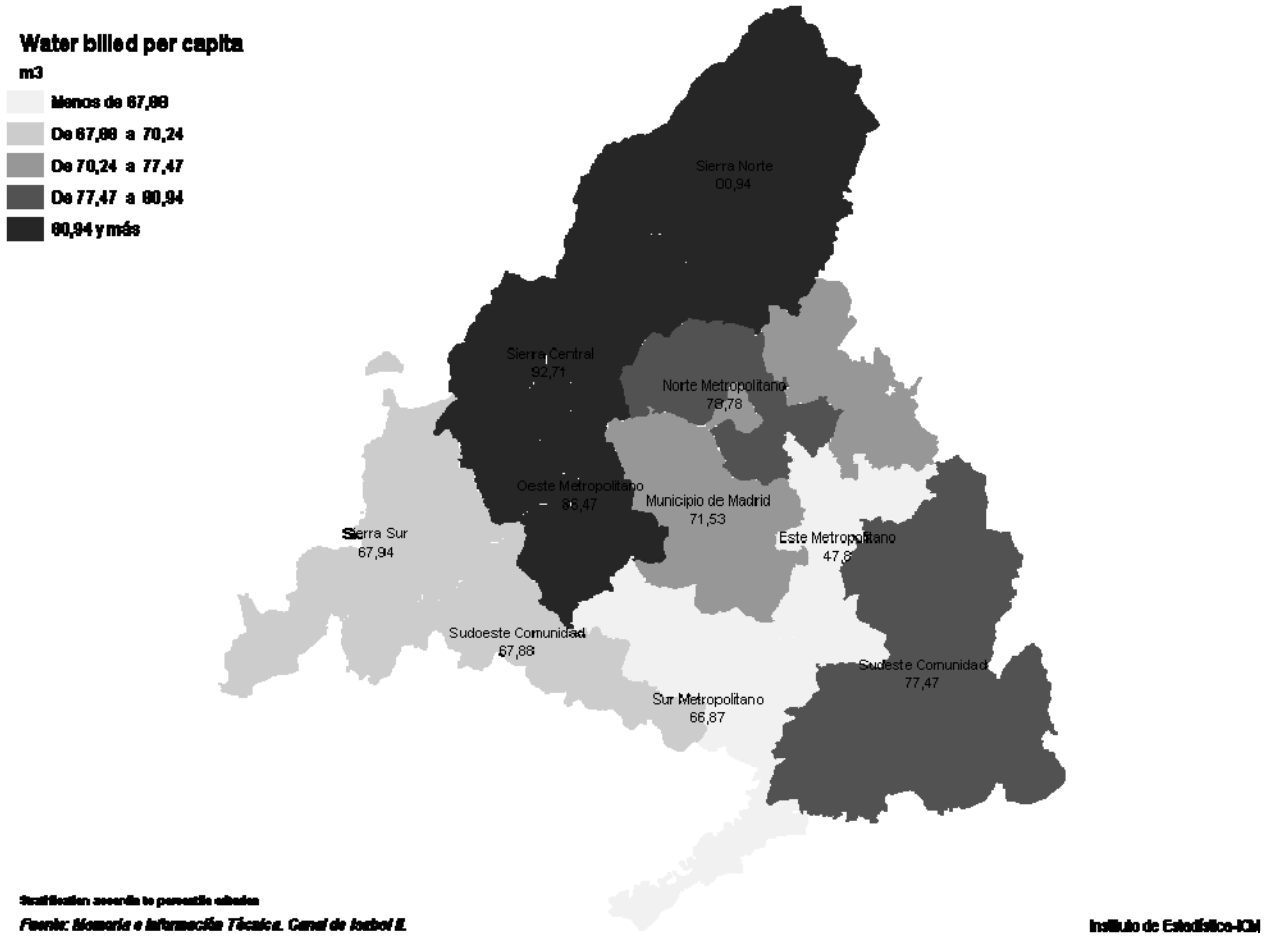
The Metropolitan East and South of the region are below average water consumptions per capita (including all uses) of the CAM, around 195 lpcd in 2007[841], while the Metropolitan West has rates of consumption per capita much higher than the other areas (figure 7.17). Beyond the metropolitan level, we find consumption rates per capita even higher, especially in the north of the Community (map 7.4).

In 2004, there were over 350,000 detached and semidetached homes in the region of Madrid according to the *Instituto Nacional de Estadística*. Most of them are used as primary residences (200,000) while the remainder is used as secondary homes, many of them in the Sierra[842]. As Cubillo González and Ibáñez Carranza (2005 [2003]) remark in the *Manual de Gestión del Abastecimiento* detached and semidetached houses (*viviendas unifamiliares* in Spanish) observe domestic consumptions per capita notably higher than flats (*viviendas plurifamiliares* in Spanish). Thus according to the CYII drought handbook (Cubillo González and Ibáñez Carranza 2005 [2003]), while the average water allowance for a flat was around 400 liters per day, the average allowance for a house was almost 200 liters higher. Although detached and semidetached houses only represented around 20 percent of the

[841] Instituto de Estadística de Madrid
[842] Abc.es, Sábado 27 de Mayo de 2006, "En la región hay 350,000 viviendas unifamiliares"

domestic consumption in 2004, their effect on water metabolism is important and can become even more important if the low-density model prospers in the region.

Map 7.4. Water billed (m^3) per capita in the region of Madrid, 2007



Source: Instituto de Estadística de Madrid and Canal de Isabel II

7.2 Pre-modern Madrid: water supply before the creation of the Canal de Isabel II

Before tracing the history of the *Canal de Isabel II* (CYII), it is essential to go further back in history to understand how pre-modern Madrid was watered and how urban and socio-demographic patterns prompted the urbanization of the water supply beyond the city of Madrid into its hinterlands.

Madrid's geology[843] conditioned early water supply systems. These were the so-called *viajes del agua* (Cortinas Isidro et al. 1999), started by the Arabs, and supplying Madrid until the foundation of the CYII.

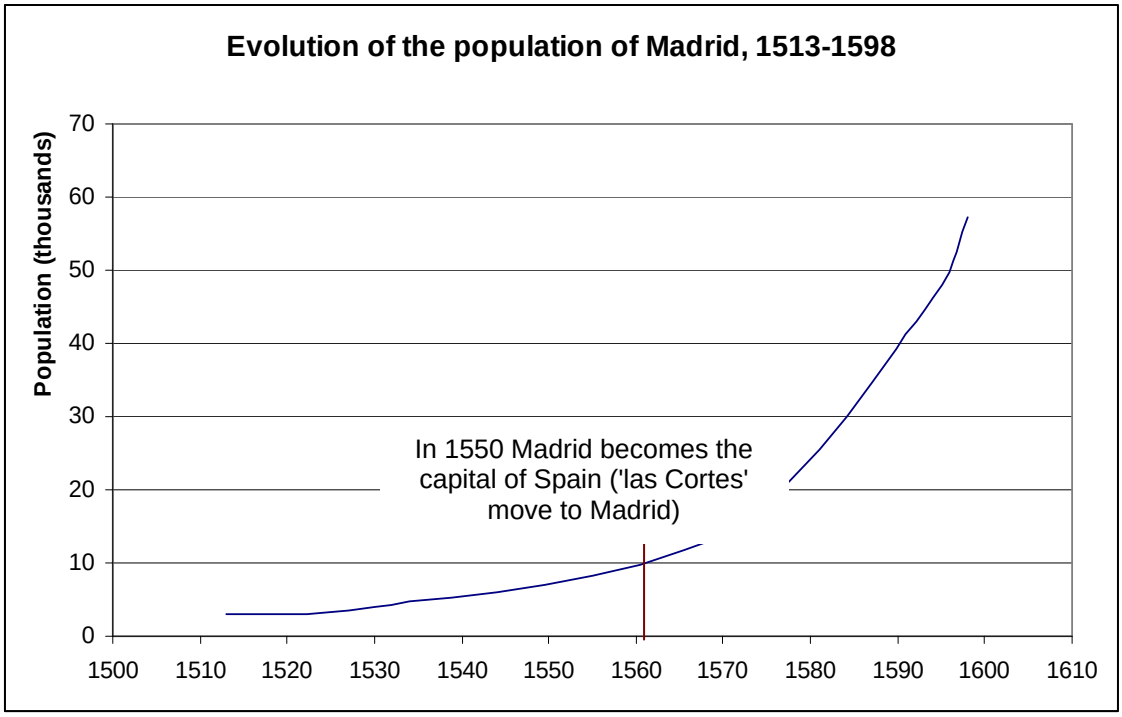
7.2.1 Physical and Social scarcity of water in the 16th and 17th centuries

In 1561 the Court was definitely established in Madrid by Felipe II, thus unleashing different dynamics of concentration of activities in the city and beginning a period of exponential growth of the population. To grasp the importance and the magnitude of this decision in demographic terms we can look at figure 7.9 which shows the evolution of the Madrid's population during the 16th century: in the second quarter of the 16th century the population remained fairly stable but when the Court was established population rocketed.

Before the reign of Felipe II (1556 -1598) water availability was not a real concern as it was plentiful given the population living in Madrid. However, the definitive establishment of the Courts in Madrid propelled dramatically population growth, contributing thus to the creation of a 'Social Scarcity' of water and producing also sanitation problems. It also entailed a massive deforestation of the surrounding areas which in turn changed the conditions of moisture of the soil and dried most of the nearby springs (Canal de Isabel II 1954). This second phenomenon contributed to what we call 'Physical Scarcity' of the resource, as the availability of water decreased. Consequently, both interlinked processes led to the need to deepen the wells and install water wheels to lift the water by the end of the 16th century.

[843] Pliocene base forming debris deposits from the weathering of the granitic massif of the Sierra de Guadarrama. These deposits alternate permeable silica sand with impermeable clay sands. This permits the formation of water deposits without lateral continuity.

Figure 7.9. Evolution of the population of Madrid 1513-1598



Source: Adapted from Canal de Isabel II (1954)

The situation was so critical that in 1601 the Court left Madrid. Five years later, Felipe III decided to move the Court back to Madrid and to carry out a Plan to improve the urban conditions including a plan to opening, construction and restoration of the *viajes de agua*, e.g. Alto Abroñigal (1613), Bajo Abroñigal (1619) and Castellana (1621), By that time, the flow of water was measured in *Reales de Agua*, or *Rel fontanero*[844].

Once Madrid was already hosting the Court, during the reign of Felipe III (1598-1621), water was diverted from the Amaniel spring to the Alcázar (the residence of the Kings in Madrid) and to the municipality. The so-called *viajes del agua*, i.e. ducts excavated on the ground (1.9*0.7 meters) to filter and conduct water, were also built. These *viajes* received the water from other tributary ducts and finally conducted it to the fountains. Among the most important 'viajes' in the city of Madrid quoted by Canal de Isabel II (1954), we could mention:

- *Alcubilla*, built in 1599, with a length of 25,923 meters and a capacity of 70,600 liters per day it supplied 16 public fountains.

[844] 1 real = 37.557 cm^3/s

- *Alto Albroñigal*, finished in 1614, with a length of 15,120 meters and a flow of 346,000 liters per day supplying 6 fountains.
- *Bajo Albroñigal*, built in 1619, with a length of 8,980 meters and a capacity of 1,354,800 liters per day supplying 30 fountains.
- *Castellana*, constructed in 1621, with a length of 17,880 meters and a flow of 380,000 liters per day, supplying 11 fountains.

7.2.2 The role of the *aguador*, water vendor, in the city of Madrid

In total, there were 11 *viajes* that supplied the city with 3,600 cubic meters per day[845]. In addition, some important buildings, such as the General Hospital, *'Las Salesas'* or *'Las Descalzas Reales'* had their own *viaje*. Until mid 17th century, household water supply was carried out by the neighbors or by contracted servers, who obtained the water from the fountains distributed across the city. However, with the soaring of the population and the increase of the number of fountains rose the figure of the *aguador*, i.e. water vendors who delivered water to the homes at a stipulated price rate. Actually, the role of the *aguador* was not merely that of a water vendor, but also they acted as firemen too or rescuers in case of floods, among other tasks. This prompted the 'industrialization' of the fountains or the enactment of some council acts to regulate the new activities and to make compatible the new 'business' and the right of the citizens to obtain water form the fountains. Two different taps were installed in each fountain: one for the citizens and the other one for the water vendors. By the mid 19th century, there were 77 public fountains in Madrid with 128 taps to fill the barrels of the more than 950 *aguadores*, with a turnover of 2,150 m^3 per day[846] (Canal de Isabel II 1954). As we can see, the *aguador*, the water vendor, of Madrid, performed a key role in the distribution of water in the city. Note however, that with the foundation of the *Canal de Isabel II* they would lose their *raison d'être* and only kept working as water vendors, to bring water to the highest flats of the city, where the system's pressure was not sufficient to make the water available, and to provide water to the people still reluctant to drink water from the

[845] It is important to mention that by the mid 19th century the flow divertid by the *viajes* fell below 2,000 cubic meters per day due to leakages and subsidences.
[846] Meaning 663.40 'reales fontaneros de dotación', the oficial unity used by that time

Lozoya river. Eventually, by 1912, with the start up of the first *central elevadora* [lifting station] the role of the water vendors would completely disappear.

7.2.3 Proposals to water Madrid in the 18th and 19th centuries

During the 18th and early 19th century, the situation concerning water supply in Madrid was not easy. In response to that unresolved issue several projects were drafted (see table 7.8). There was a proposal in the 18th century to transfer water from the Jarama river to the Manzanares (Observatorio de los Servicios Públicos 2005) but it was never initiated. By the end of 1760s there was a proposal raised by Jorge Sicre to capture water from the Jarama River, two kilometers downstream the mouth of the Lozoya River, and to conduct the water through the Albroñigal stream until the Castellana fountain. This proposal was raised at a time of important health concerns (mainly regarding typhoid fever) and water needs for agriculture. However, these projects were never carried out due to high costs. Other projects were drafted by Don Juan Villanueva (1786), Don Mariano Vallejo (1819) or the engineer Coqueret (1822) although none of which was carried out either.

In 1808 a Royal Decree envisaging the transfer of water from the Jarama river to Madrid (Observatorio de los Servicios Públicos 2005) was enacted, but it also failed. The worsening of the situation led in 1828 to the publication of the study *Observaciones sobre el abastecimiento de aguas de Madrid y el modo de aumentarlas*[847] [Observation on water supply in Madrid and the way to increase it], done by Francisco Barra. The report simply stated that Madrid could not satisfy its water needs solely with groundwater.

In 1829, the Spanish crown, by means of a Real order[848], urged the Madrid Town Council to search for new sources of water without delay and to draft a project to exploit some streams with the purpose to obtain drinking water for the city. Both the management and the ownership would remain in public hands. As it happened in Barcelona with the various attempts to municipalize the service, in Madrid some stakeholders saw this as a direct attack on their freedom to make business with water, a "commodity to be bought and sold as the rest of commodities" (Rueda Laffond

[847] Barra, Franciso Xavier. 1828. "Observaciones sobre el abstecimiento de aguas de Madrid y el modo de aumentarlas", quoted by Observatorio de los Servicios Públicos (2005) and Martínez Vázquez de Parga (2001a)
[848] *Real orden de 8 de marzo de 1829*

1994). The response to this petition came in 1830 with a plan that foresaw the construction of three aqueducts to divert water from the Guadalix and Manzanares rivers. This plan dismissed the possibility to bring water from the Lozoya and to build a navigable channel. Eventually, the project was approved, even though it was never carried out due to lack of progress (Rueda Laffond 1994) and the high economic costs (Observatorio de los Servicios Públicos 2005). None of these projects were finally materialized and in 1840 the situation was so critical that even the capital status of Madrid was put at risk. Engineers Llorca Aquesolo and Monte Sáez (1984) quoted F. Caballero (1840)[849] that warned about the political and demographic consequences of the lack of extra flows of water for Madrid:

> "…o Madrid logra traer un caudal considerable de agua que la eleve a pueblo ameno y fabril, o pierde su importanciua política y se despuebla; tal es mi convicción"

The arrival of moderate political forces in the Spanish government supposed a breakdown in the governance of water resources in Madrid. In 1844 the *Comisión Especial de Traída de Aguas* [Special Commission to bring water] was created. It considered the Lozoya river as the optimal source of drinking water for Madrid (Observatorio de los Servicios Públicos 2005). In 1846 a project was drafted and subsequently approved by the Spanish government to bring water to Madrid through a unique channel from the Lozoya River. Subsequently, on the 30th of May 1846 the supply of water to Madrid was put up for auction. The private company *La Aurora* eventually was awarded to bring to Madrid 32,450 daily cubic meters (500 *reales* of water) that would be bought by the town council of Madrid. However, on the 19th of August 1847 the contract to the company *La Aurora* was terminated, and the works were interrupted. Besides, and due to the lack of municipal funds, the sewage network suffered a halt too. Simultaneously, in 1846 the *Sociedad Anónima para el Aumento de Aguas a Madrid* [Public Limited Company for the Increase of Water in Madrid] was created with the aim to open new *viajes* to increase the water supply in Madrid. Water pumps would be used to lift the water and ensure the proper pressure. Unfortunately, there is little information about this project.

By 1848, Madrid had some 200,000 people, and its water supply was basically reliant upon aquifers, emerging to the surface through natural springs, man-made wells, water wheels, and especially through the aforementioned *viajes*. Surface water

[849] Caballero, F. 1840. "Noticias topográfico-estadísticas sobre la administración de Madrid"

from the Manzanares river was also used, but mainly to water the orchards and the vegetable gardens next to the river, and to lesser extent for cattle, for people and animal bathing, to drain excrements, and to wash the cloths and leathers, among other uses. By that time, the *viajes* supplied Madrid with 2,000 cubic meters daily that were delivered to the homes by the *aguadores*, meaning an allowance of just 10 liters per capita per day. The average price of the cubic meters was of 2.50 pesetas, even though in periods of extreme scarcity it soared up to 30 pesetas (Canal de Isabel II 1954).

In table 7.8 we summarize the main proposals of water supply in Madrid before the *Canal de Isabel II.*

Table 7.8. Summary of the different proposal of water supply to the city of Madrid from the 18th to the mid 19th century

Period	Proposal
18th century	Proposal of water transfer from the Jarama to the Manzanares. It was never developed.
Late 18th century	Proposal of bringing water from the Jarama by J. Sicre
1808	Royal Decree to bring water from the Jarama river to Madrid. It was never carried out.
1829	Real Order to bring water to Madrid
1830	Project considering the Guadalix and Manzanares rivers. It was never carried out
1844	Creation of the Comisión Especial de Traída de Aguas
1846	Madrid Town Council opens a tender for the supply of water from the Lozoya river. The private company La Aurora won the tender
1846	Creation of the company Sociedad Anónima para el Aumento de Aguas a Madrid [Public Limited Company for the Increase of Water in Madrid]
1847	The contract of La Aurora is cancelled
1849	The project is awarded to the Conde de Retamoso and Manuel Marliani
1850	Royal Decree authorizing the firm La Aurora to resume the works.

Source: elaborated from Canal de Isabel II (1954), Rueda Laffond (1994), Martínez Vázquez de Parga, (2001a) and Observatorio de los Servicios Públicos (2005).

7.3 The road to Modernity: the foundation of the CYII

By mid 19th century, Madrid was watered with a 16th century system. Despite the expansion of the *viajes*, an exhaustion of the sources was clearly visible, as many studies of the time show (Llorca Aquesolo and Monte Sáez 1984). The insufficient allowance per capita altogether with population increases and the exhaustion of traditional sources prompted definitively the modernization of the supply. Health concerns, due to periodic epidemics and the proliferation of infectious diseases were critical to trigger such modernization (Rueda Laffond 1994).

At the dawn of the 19th century, underground water was exhausted and the indiscriminate deforestation of the hinterland contributed to the dropping of water flow (Martínez Vázquez de Parga 2001a). Madrid water supply was to be rethought and other measures than the *viajes del agua* were to be considered.

7.3.1 From private failure to public undertaking

After the failure of the private project to supply water to Madrid by the private company *La Aurora*, on the 10th of March 1848, the Ministry of Commerce, Instruction and Public Works, headed by Don Juan Bravo Murillo, who latter would become the chief of the government, decided to face the problem of water supply directly from the Central State Government. In order to do so he designated a commission to examine all projects presented to the moment, and to carry out the flow metering and the study of the quality of water from the Lozoya River, as well as to set out the necessary building procedures.

Therefore, the *Canal de Isabel II* can be traced back to 1848 and 1849 when the Ministry of Commerce and Public Works revised different proposals to bring water. By means of the *Real Orden* of 1848, engineers Juan Rafo and Juan de Ribera were put in charge to study the projects presented to water Madrid. They finally decided to bring water to the capital by gravity, and not by lifting systems. The Guadarrama, Manzanares and Guadalix rivers were ruled out because of their fluctuations in the water flow; instead, they pointed towards the Lozoya river as the preferred alternative. After studying the projected needs of Madrid for the next 70 years and the quantity of water to withdraw, they designed a water system with 55 kilometers

of lagged pipes and a dam, the *Pontón de Oliva*, with a maximum flow of 70,000 *reales* and a minimum required of 20,000 (Martínez Vázquez de Parga 2001a). A very important feature of the project was the consideration of the importance of distribution and storage systems within Madrid to guarantee enough pressure to the homes.

The large amount of water promised in the project would theoretically ensure water supply in Madrid for a long time and also would open up the possibility to industrialize the area. By that time, a city such as New York, which had rethought the supply network, as Madrid was doing, had the equivalent capacity of 30,000 *reales fonanteros* (less than half of the maximum capacity Madrid would have) (Martínez Vázquez de Parga 2001a). The network was suggested to be managed by the town council, while the works should be executed by the State; the costs would be covered by the selling of water and also by the avoided expenses of water vendors.

In 1849 the proposal received the approval of the *Junta Consultiva de Caminos* [Board of Civil Engineering] and the *Director General de Obras Públicas* [General Director of Public Works]. However, there was an important disagreement between the two bodies; while the former argued that the town council should carry out the works, the latter preferred a private company.

The chief of the Council of Ministers, Juan Bravo Murillo, satisfied with the proposal, sent it to the Queen Isabel II, who definitely gave the approval, and asked the Ministry of Governance to decide who should execute it. Several national and international firms presented proposals. On the other hand, the town council intended to collect the necessary capital for such project but eventually had to renounce due to the high costs of the works and budgetary constraints.

The project was definitely awarded to the Conde de Retamoro and to Manuel Marliani, with a proposal that promised to bring at least 25,000 *reales fontaneros* from the Lozoya (Martínez Vázquez de Parga 2001a). They would have to build a ditch with a maximum capacity of 40,000 *reales fontaneros*, which would be covered when flowing across the municipalities. Finally the conditions also considered implementing a household distribution system. And all this was to be completed within three years. In turn, proponents would be awarded with a concession for 99 years, would be the owners of the built infrastructure and would have the right to

take 3,000 *reales* of water. The enterprise was declared of public interest and was granted a year to present the final project.

The firm *La Aurora*, which had obtained a concession in 1846 (latterly cancelled), claimed then its right to resume the works it had already begun; it was authorized to do so by means of the Royal Decree of 7th August 1850. However, neither the Conde de Retamoso and Manuel Marliani, nor the company La Aurora achieved their objectives. While the former one did not present the project by the deadline established, the latter only managed to bring to Madrid a small quantity of the water promised.

After several failed attempts to put in charge the town council or a concessionary private firm, Juan Bravo de Murillo decided to present his own project to water Madrid. Hence, repeated private failures lead the Spanish Government to take on the implementation of the project by means of the *Real Decreto* of 18th June 1851[850]. In this legal document, Juan Bravo Murillo, explains to the Queen the problem of water shortage of Madrid and subsequently sets out a plan to build a channel to divert water from the Lozoya river. This channel would be named '*Canal de Isabel II'* after the Queen of Spain, Isabel II. The cost of the works, up to 20 millions pesetas, would come mainly from the State and from the town council as well as by the contributions of voluntary subscribers (the Queen among them). As the result of this peculiar choreography of powers, the State would hold the ownership, even though the interests of both the municipality and the private subscribers would be protected by means of a *Sindicato Mixto* scheme.

The Canal de Isabel II was then created in 1851 as a state-owned company with the duty to manage and exploit the drinking water supply coming from the Lozoya. As we have already mentioned, the need to ensure a regular and ample allowance of water for the urban population, instead of relying on the public fountains or on the water vendors, paved the way to the creation of such company (Rueda Laffond 1994).

To pay the infrastructure, the Government enacted the Royal Decree of 18th June 1851 allowing the Ministry of Finance and Treasury to grant a credit of 2 million

[850] *Real Decreto disponiendo que se proceda a la ejecución de las obras necesarias para abastecer de aguas a Madrid por medio de un canal derivado del río Lozoya, que se denominará Canal de Isabel II*

reales for that purpose. In addition, there was a call to the citizens of Madrid to become voluntary subscribers[851] of the CYII. Despite that Queen Isabel II subscribed 4 million *reales*, this initiative did not succeed. An English citizen, William Waring, proposed to buy the remainder shares, some 5,500 *reales fontaneros*, and in turn to obtain the concession of household distribution and retail of water, plus de construction of the network. That concession would have to last 30 years, would limit in 10,000 *reales fontaneros* the maximum flow of water to Madrid and would turn the town council in no more than a mere consumer with no rights over the water flow. Surprisingly as it could be, the Management Board (*Consejo de Administración*) approved the proposal; nonetheless, the subscription was finally cancelled and re-opened for subscribers due to problems with the money order in London. In the case the English operation had been accepted it would have meant an important turning point in the fate of the *Canal de Isabel II* and the management of water supply in Madrid. As a result of the lack of subscribers, the Real Decree of 23rd May 1852 ruled that the Public Treasury would take care of the subscriptions that remained to be covered.

The early construction of the CYII was a complicated project: 70 kilometers of network through a terrain of different nature and topography, and hydraulic works of large dimensions. Constructions began on the 11th of August 1851 with the *Pontón de Oliva* dam in the Lozoya River. This took seven years to finish due to several problems faced during the execution of the works[852]. The workforce was composed by 1,500 convicts and 200 paid workers, plus 400 animals and 4 steam machines (Canal de Isabel II 1954). Leakage problems forced to build the dam of *Navalejos*, 6 kilometers upstream.

To store the water coming from the Lozoya a water deposit in the city of Madrid needed to be built. On the 30th November 1853 a Royal Decree approved the project for the first water deposit. 1853 brought about important advances in the works, which lead to think that Madrid could start receiving water from the Lozoya from 1854. Nonetheless, the important political changes in 1854 with the irruption of the *Partido Progresista*, and shortages of capital, raw materials and workforce, plus the technical problems of the execution of the works and the health problems (e.g. a

[851] Share to be refunded either by the entitlement to possess a given quantity of water (in reales of water) or in cash with a 6% annual interest rate.
[852] See Martínez Vázquez de Parga (2001a) for a detailed description of the problems

cholera epidemic affecting the workers), hindered these plans and threatened seriously the viability of the project. The lack of funds stopped the works, notwithstanding the relentless search for such capital by the *Canal de Isabel II.*

In order to collect the capital to develop the distribution network in Madrid, and by means of the Law of 19th June 1855, the Ministry of Public Works issued bonds of the CYII for 50 million reales, with an annual interest rate of 8 percent. Moreover, the Government directly provided 15 million reales (Martínez Vázquez de Parga 2001a). Those bonds appealed some private investors, i.e. distinguished individuals from the political, financial and renter spheres, who saw a shelter for their capital after the economic crisis of 1848, directed some flows of capital to the venture. With 65 million reales the works were expected to be resumed and completed.

The allowance of water per capita in Madrid was set in 90 liters per day (lpcd) plus 20 lpcd for public fountains, an overall figure higher than other European cities such as Paris or London. Besides the *Pontón de Oliva* dam and the water tank, the distribution and sewage network project in Madrid, started in 1856, became the other cornerstone of the CYII project. The projected length of the network was around 100 kilometers, with a flow of 1 m^3/s, well above the needs of the population, and with the aim to permit the expansion of Madrid in the future.

Finally, on the 24th June of 1858, and after several years of works and large amounts of money spent, the inauguration of the arrival of water from the Lozoya river to Madrid took place. Water began to fill the first water deposit (*Campo de Guadiana*), which a capacity of 58,000 m^3, a quantity of water enough to cover the demand of Madrid for two days. The beginning of the distribution was symbolized by the arrival of water to the *San Bernardo* fountain. In the next paragraph, in Spanish, one can apprehend the critical change that the arrival of the flow of water from the Madrid meant[853]:

> "Aquel chorro, salido a borbotones, era agua del Río Lozoya, traído desde la sierra a Madrid, con artificios adecuados, a lo largo de una canal de muchas leguas. Y aquel agua, nacida en el día de San Juan Bautista, como si en celebración del santo hubiera querido ser agua de bautizo para un Madrid Nuevo, llegaría pronto a todas sus calles, a todas sus casas y a todos sus pisos. Desaparecerían con ello, por innecesarios, los servicios aguadores, que con la albardilla al hombro y sobre ella la cuba subían a llenar

[853] We maintain the Spanish version as translation could change the real meaning of the words.

las panzudas tinajas de las cocinas" (Canal de Isabel II 1954:30)

Despite the early criticisms, most of the newspapers expressed their joy (Martínez Vázquez de Parga 2001a): *La Iberia, El Diario Español, La Época, La Crónica* (it coined the phrase "un río puesto en pie"), *La Esperanza, El Parlamento, el León Español*. Only two journals, *La Discusión* and *El Occidente* raised some criticisms toward the project for different reasons.

New techno-natures were dramatically created, by means of new artifacts (dams) that colonized the hinterland of Madrid to bring about spectacular changes in the city. The author of the history of the CYII, Rosario Martínez Vázquez de Parga (2001a:108-109) captures in the following excerpt the domestication of the river and the control over nature:

> "el Lozoya había sido domado y conducido a la capital, que podría con él calmar su sed y crecer sin la pesadilla de las epidemias"

Elsewhere, the *Revista de Obras Públicas*, which had published several reports on the early works (Revista de Obras Públicas 1854a, Revista de Obras Públicas 1854b, Martí Font 1858a, Martí Font 1858b, Martí Font 1858c, Revista de Obras Públicas 1858, Revista de Obras Públicas 1858), emphasized the improvements that the arrival of water from the Lozoya to Madrid would bring about. This was a radical change for the inhabitations of the city:

> "Madrid sabe que en esa obra está su progreso; sabe que podrá elevarse por ella al nivel de las mejores capitals del extranjero, fertilizando los yermos campos de sus cercanías, ensanchando la población, hoy comprimida en su desarrollo, limpiando sus calles y permitiendo sustituir el actual inmundo y nocivo sistema de limpieza por un sistema más perfecto y conveniente. Belleza, extension, salubridad: he aquí lo que deberá Madrid al Canal de Isabel II; preciosos dones que justifican el júbilo y el entusiasmo que hoy ha manifestado" [854]

Modernity in Madrid did not spring solely from the foundation of the *Canal de Isabel II* (CYII). The Canal was embedded in the modernization of the urban services from the second decade of the 19th century: transport, lighting, food supply, etc. (Rueda Laffond 1994). However, its relevance relies on its uniqueness, as this public

[854] Special issue of the *Revista de Obras Públicas*, 24th june 1858, by Víctor Martí, Eduardo Saavedra, Práxedes Mateo Sagasta, Ángel Mayo y Gabriel Rodríguez. Quoted in Martínez Vázquez de Parga (2001a:109)

service was never rented out and managed by a private initiative in contrast to the other services.

7.3.2 The development of the infrastructure: the CYII between 1851 and 1865

Since the foundation of the CYII until 1865 important efforts were carried out to develop further the infrastructure to water Madrid. Such was the amount of works and efforts materialized during that period that the authors of the report to celebrate the centenary of the CYII (Canal de Isabel II 1954) baptized this époque as the "*heroica*" [heroic]. The amount of money spent, some 53 million pesetas, was quite astounding, and served to finance, among others of lesser importance, the following projects:

- The dam of the *Pontón de Oliva* in the Lozoya river (70 meters of width and 27 of total height), with a total storage capacity of 3 hm^3
- The intake dam of *Navalejos*, 6 kilometers upstream the *Pontón de Oliva* in the Lozoya river.
- The channel *Antiguo* [Ancient] with a total length of 77 kilometers and a maximum capacity to conduct some 81,000 m^3 per day
- The first water deposit in Madrid, with a capacity of 58,000 m^3
- The early distribution system in Madrid, with 90 kilometers of pipes: two main distribution pipes[855], with a third one traversing them
- The sewerage system with a total of 73 kilometers of pipes
- The construction of three irrigation ditches, *Canalillos*, with a length of 17 kilometers aimed to channel the surplus water of the city to the orchards and vegetable gardens of the surrounding area.

Once the CYII water system was built it covered six times the demand of water of Madrid. During that short period of time, Madrid increased its population from 200,000 to 270,000 people. The arrival of water has changed the landscape of the city and also its demography:

[855] The first pipe was located underneath the calle de San Bernardo, Plaza de Santo Domingo, Costanilla de los Ángeles, calle de las Fuentes , Ciudad Rodrigo, Plaza Mayor, Calle Toledo and Fuentenecilla. Regarding the second pipe, it flowed Veneta the strees of Fuencarral, Montera, Puerta del Sol, Carretas and Atocha del Amor de Dios

> "inundan las calles mil abundantísimos surtidores que templan los abrasados días de la canícula, y humedecen y purifican la antes seca atmósfera; se limpian y sanean las cloacas; reinan comodidad y aseo en nuestras viviendas; y quizá pronto se cubran los áridos y tristes contornos que ciñen a Madrid, de verdure y de sombre, sin punto se emprenden las obras de riego, y se dan a la tierra los 167,000 metros cúbicos ¡todo un río! que hoy, después de recorrer catorce leguas a través de montes y valles, llegan al Campo de Guardias para verterse inútilmente en el Manzanares"[856]

As Rueda Laffond (1994) reports, in 1865 the first Service Ordinances [know in Spanish as *Reglamento de Servicio*] were enacted. They established the length of the contracts and regulated how water was to be measured, contemplating both a rudimentary form of metering (*caño libre*) and bulk retail of water (*aforo*), as well as the determination of cost. According to the ordinances, cost would not depend on consumption but would be linked to the cost of rent paid by the consumer, following social equity concerns

7.3.3 The expansion of the CYII during the second half of the 19th century and the failure of the second attempt of privatization and change of ownership

With time, the number of customers continued to increase and the existing water deposit storing the water coming from the Lozoya began to be insufficient. As a consequence, a project to build a second deposit with a capacity of 180,000 m^3 was drafted. The infrastructure was expected to be managed by the *Sindicato Mixto*, described before, which in turn would be led by the State. However, this organization was never set up and in 1866 a private society, *La Lozoyana*, was created instead, expecting to become the future tenant of the infrastructure. The economic crisis Spain was undergoing at that time, nonetheless, frustrated such shift in the ownership, as *La Lozoyana* went bankrupt. Day by day, the economic situation of the CYII worsened, interrupting the works of the second deposit and slowing down the construction of irrigation ditches. As a result, in 1867 a Royal Decree stated the dissolution of the Administration Board. The CYII lost its condition of firm and became a Publics Works Office [Dirección de Obras Públicas] belonging to the

[856] Morer, José, *Discursos leídos ante la Real Academia de Ciencias Exactas, Física y Naturales en la recepción de*..[contestación de José Echegaray], Madrid, 1867, pp.45-46 quoted by Martínez Vázquez de Parga (2001a:176)

Ministry of Public Works and Highways [Ministerio de Fomento], and therefore becoming dependent on the budgets constraints of the aforementioned organism.

According to Rueda Laffond (1994) this period was characterized by a sharp plunge of the investments in relation to the amount of money spent in the former period. This decrease notwithstanding, the amount of money deployed (18 million pesetas) was still important (Canal de Isabel II 1954). This money was directed to carry out maintenance duties, the expansion of both the distribution (covering the *Barrio de Salamanca*) and the sewage networks and the creation of a network of irrigation ditches. The project to supply water to the "*Ensanche*"[857] was also drawn.

Along these lines, a second dam was projected 22 kilometers upstream the *Pontón de Oliva* dam, still in the Lozoya river. That dam, named *El Villar*, would constitute the "proper" dam for Madrid and would serve to store melted snow and to guarantee the supply of Madrid during summer. To face possible drought episodes, the chief engineer of the CYII estimated that the dam would need to have at least a volume of 20 hm^3. Thanks to its design, *El Villar* dam would set a precedent in the subsequent vault dams. The final project envisaged a dam with a storage capacity of 22 hm^3. Works began in 1869 and they were carried out at a steady pace. However, in 1873 an unforeseen event took place: the dam had modified the behavior of the Lozoya. Floods occurred that in turn caused episodes of water turbidity in Madrid. To solve this problem, some drainage channels were planned. In 1882, and despite the problems, *El Villar* dam (the first gravity dam built in Europe, thirty years before the next), was completed with 45.50 meters of height, 40.40 meters of width and a total length of 10 kilometers along the Lozoya. A smaller dam, named *La Parra*, was built two kilometers' upstream the *Navalejos* diversion dam.

[857] The *"Ensanche"* was a urban plan to rationalize the urbanization of Madrid. Ensanche means "widening" in Spanish. It is used to name the development areas of Spanish cities around the end of the 19th century, when the demographic explosion and the Industrial Revolution prompted the tearing down of the old city wall and the construction of neighborhoods in the outskirts of the city under grid plans. In general, the Ensanches were inhibited by the bourgeosie, appealed by the better living conditions.
In Spain, *Ensanches* date back to late 19th Century, in the midst of the Spanish Industrial Revolution. Population growth and new industrial activities demanding more land triggered the urbanization of the agricultural lands of the outskirts and the fall of the city walls. In addition such radical change in urban planning was aimed to improve sanitary conditions of the old city and to permit the implementation of modern transport systems, such as the train.
Apart from Madrid and Barcelona, *Ensanches* were developed in San Sebastián, Pamplona, Valencia, León, Bilbao, or in other industrial cities of Catalunya such as Terrassa, Sabadell or Vilanova i la Geltrú.

The second deposit was definitively finished in 1879. It had, with a capacity of storage of 183,000 m^3, thrice the capacity of the first deposit. In addition, a third water deposit was envisaged to guarantee water during episodes of muddiness. With a volume of 450,000 m^3, it would become the bigger covered water deposit in Europe by that time and would be located next to the first and second, partially buried underground. In 1894 the first deposit was closed permanently due to leakage problems. Thus, the works of the third one were urged since Madrid only relied upon the 180,000 m^3 of stored water of the second deposit.

Consumption was high and controls lacked. This situation contrasts with that of Barcelona, were consumption was said to be too low. Even though metering was introduced in 1893, most of the people had a non metered connection. In addition, thanks to a concession granted in 1876, the town council consumed as much water as it pleased.

The deteriorating service (increase in turbidity conditions or "muddy waters", drops of water pressure, lack of a distribution artery in the new *Ensanche*) resulted in 1880s in the need to open a tender for the exploitation of the Canal de Isabel II[858]. This proposal, however, as Martínez Vázquez de Parga (2001a) notes, was never implemented.

1896 was a critical year regarding water supply. *El Villar* dam run out of water by the month of May and the CYII could not succeed to convince people to consume less water. Again, the situation was the total opposite to Barcelona, where the authorities encouraged citizens to consume more water. The precarious situation of the system was made obvious, and the CYII, depending on the Ministry of Public Works had barely any money to undertake action, as, for instance, the construction of the aforementioned third water deposit. Again in 1899 a very severe drought happened, unleashing general complaints regarding low pressure, bad taste, hot water during summer months, etc. Measures to lower consumption were tried to be implemented but did not succeed due to the lack of pricing and generalized metering schemes (Inchaurrandieta Páez 1902a, Inchaurrandieta Páez 1902b). Along these

[858] The Article 55 of the Ley de Presupuestos de 1893-1894 set the conditions for a tender to exploit de Canal de Isabel II. Similarly, the article 38 of the Ley de Presupuestos de 1895-96 proposed such tender. (Martínez Vázquez de Parga, Rosario 2001a)

lines, and to avoid the turbidity problems, a new dam was built next to *La Parra* stream.

At the end of the 19th century, the engineer chief of the CYII, Rogelio Inchaurrandieta (1902a, 1902b, 1902c), wrote some conclusions and proposals[859] regarding the situation of water supply in Madrid:

- Impossibility to complete the works needed with the meager budgets available
- Need of important works to increase water storage
- Need of improvement in the network
- Low income creation out of the selling of water
- Need to increase water pricing and generalize metering to control consumption

After these ideas, we recall that the need of metering and proper pricing mechanisms is not a feature of the 21st century, but it was common in early 20th century debates as well.

Along these lines, at the regulatory level it is noteworthy to mention that during the late 19th century (since mid 1860s) and early 20th century, five different Service Ordinances were enacted, among them, on in 1903, which entailed the most important changes in the water governance framework of Madrid. *Caño libre con verificador*, a rudimentary form of metering, was made compulsory for new urban concessions, even though there were some exceptions where bulk water retail was permitted. In addition, it was agreed to charge according to the consumption and not to the rent paid by customers. From then on, a decreasing-block pricing structure was implemented[860]. The introduction of metering intended to increase the income of the *Canal de Isabel II* and to rationalize management (Rueda Laffond 1994).

These improvements notwithstanding, by the end of the 19th century three main water problems still awaited solutions (Rueda Laffond 1994): the need to increase

[859] Martínez Vázquez de Parga (2001a) quotes three other documents that complement Incharraundieta's arguments: "Forma en que debe hacerse la explotación del Canal", "Reglamento de servicion técnico" and "Reglamento de concesiones"

[860] The first 10 hectoliters were charged at 0.03 pesetas each hectoliter; the next 10 at 0.02 and the remainder at 0.01 (Rueda Laffond 1994).

the supply in some parts of the city, health issues, and the improvement of the infrastructure.

First and foremost, there was the need to increase supply of water in order to satisfy the demand of the north and east *Ensanche*[861]. The shortage of supplies was an issue of increasing concern. Rueda Laffond (1994) reports that by 1903 there were estimations that 200,000 people of Madrid suffered total lack of water or faulty supplies.

At the turn of the century, public health issues were a central matter in urban water management. In this case the doubtful quality of the Lozoya water unleashed several hygienist campaigns and desire of public authorities to improve quality. Special emphasis was put upon the control and management of suspended clay particles by means of the proposal to build new dams. Other actions to improve quality focused on improving leakage management.

The water scarce period of 1896-1899 forced the drafting of a preliminary plan (approved in 1900) to expand supply. This plan included the construction of new water deposits, lifting machines to ensure proper pressure (especially in north *Ensanche*), and also the development of an alternative distribution network. While this project was drafted and approved, a new aqueduct, the *Canal Transversal*, was proposed in 1899 and finally approved in 1902.

Despite these efforts, as Rueda Laffond (1994) highlights, other issues remained to be solved. Such was the case of the seasonality of the water flow in the Lozoya River, For instance, as the author reports, while the average flow of the Lozoya was around 3,700 m^3/s in 1902, a year latter it dropped to 1,919 m^3/s, and during some days it fell to 58 m^3/s.

7.3.4 The conflict of water in Madrid: management, ownership, incipient diversification and the creation of *Hidráulica de Santillana*

Between 1898 and 1911 not only urban conditions in Madrid and network developments had progressed. The governance of water supply had also changed dramatically. A first and foremost example of these changes was the creation of the

[861] The zones with highest shortages were: Cuatro Caminos, Guindalera, Prosperidad, Plaza de Toros, Vallehermoso, Chamberí and part of the Buenavista Ensanche.

Hidráulica Santillana (Rueda Laffond 1994), which broke the monopoly of water supply the *Canal de Isabel II* had in the city of Madrid.

The creation of the *Hidráulica de Santilla* by the Marquis of Santillana, a representative of the old nobility, represented the attempt to unify water supply and energy production and distribution by means of hydraulic infrastructures located in the northwest of the province of Madrid.

Despite being constituted as a Public Limited Company in 1905, the general project of Santillana was already born in 1902, and could be traced back to some other projects drafted in the late 19th century. In general terms, the plan included water supply, sanitation and regulation of the Manzanares river by means of a big reservoir (and some other smaller reservoirs along the Guadalix and Guadarrama), the creation of new channels for the supply, and the construction of a new hydroelectric plants, with 20,000 Hp of power. Other smaller projects began to operate before the completion of the general project. Thus already in 1902 hydroelectricity was produced and distributed in Madrid for the first time.

The need of capital to implement these general projects led to the creation of the Public Limited Company (Plc) in 1905. This conversion permitted a higher degree of access to capital markets and indebtedness to generate more dynamism. The first steps taken by the new company were aimed to extend its presence in the energy business in Madrid. Thus, a year later, in 1906, *Hidráulica de Santillana* bought two new plants and expanded the number of clients. In 1907 the company made several petitions to extend its networks to other production and consumption centers.

Electricity production and distribution was just half of the project of the Marquis as we have mentioned. The other half was water supply to the city of Madrid. Regarding the latter, a complex legal and political process was initiated in 1904 with the successive approval of some projects to bring water to Madrid although in small quantities. Nonetheless, in 1907 a major change occurred with the authorization to supply the parts of the city that were not properly served by the *Canal de Isabel II*. In response to this, the Canal presented an extraordinary plan that triggered the halting of the works by the *Hidráulica de Santillana*. In turn, this led the Marquis of Santillana to present several allegations to the projects by the *Canal de Isabel II* (the *Canal Transversal*, the production of energy by means of the waterfall, and the expansion of the distribution network of water). It is important to mention that the

Marquis of Santillana had since 1900 a concession to draw 3 m^3/s from the Manzanares River to produce electricity and to supply part of the city of Madrid, concretely the "upper neighborhoods". In 1908 the new dam *Presa del Grajal*, developed by *Hidráulica de Santillana* in the Manzanares river was inaugurated together with the diversion channels to Madrid and a hydroelectric plant in *el Pardo*. Eventually, in 1911 the procedures to bring water from the Manzanares river to some northern neighborhoods of Madrid were started, and a year later works also began in the districts of *Congreso* and *Buenavista*.

In parallel to this conflict, the *Canal de Isabel II*, underwent an organizational reconfiguration and recovered its status as company. Despite still being owned by the State, it was transformed into an industrial company [*Sociedad Industrial*] with more independence and a board of managers at the top. This change was accompanied by the frustrated attempt of the CYII to diversify its activities by entering into the public lightening sector. Again, we can draw some parallelisms and differences with the Barcelona case: while in the early 20th century both companies sought diversification strategies, it was SGAB the one that could proceed with such processes while the Canal failed to do so.

7.3.5 Modernity, urbanization and water from the Lozoya

The operation of the Canal de Isabel II and the arrival of water from the Lozoya since mid 19th century implied deep changes in urban life. First, consumption patterns clearly reflected the turning point in water supply that supposed the constitution of the Canal de Isabel II. According to Rueda Laffond (1994), consumption per capita soared dramatically from the barely 7 litres in 1858 to the astonishing figure of 221 lpcd in 1905.

Urbanization processes were also tightly linked to the arrival of water. Thus, the rupture of the historical urban limits of the city, with the *Ensanche* project was coetaneous with to the arrival of water from the Lozoya (Rueda Laffond 1994). By early 20th century, the population of Madrid reached some 600,000 people (Canal de Isabel II 1954).

Despite the seemingly good results, Rueda Laffond (1994) interestingly challenges the alleged improvements that the foundation of CYII brought about in health and

demographic terms. This author argues that, although one of the main objectives of bringing more water to the city of Madrid was to improve the health of its citizens, this was never achieved. The author attributes the important growth of population after the beginning of the operation of the *Canal de Isabel II* to immigration flows from the countryside. In overall terms the author argues that, during the 19th century, Madrid presented traditional demographic patterns: a negative natural increase of population, a high infant mortality rate and a high disparity in the differential of mortality. Nonetheless, we can identify four different stages in population trends in Madrid throughout the 19th century:

- From 1808 to 1845 stagnation or even decline
- From 1845 to 1860, clear increase of the population
- From 1860 to 1869, stagnation came back
- From 1869 until the end of the century populations increased again

Some authors interpreted Madrid's urban model of the first half of the 19th century as one typical from an "Imperial City" (Ringrose 1983) or a "Parasite City" (Bairoch 1985) quoted in De Long and Shliefer (1993), a consumptive city without an established productive sector, i.e. centers of neither urban industry nor commerce but instead the residence of bureaucrats and landlords. However, as Rueda Laffond (1994) says, the picture of second half 19th century Madrid is quite different. During this period, Madrid began to be seen as the "Capital of Capital" opening its borders to the circulation of increasing flows of capital and basing its activity in rent seeking. The *Ensanche* embodied these rent seeking trends, trying to achieve the principles of hygiene, economy and beauty, with the building business and the road network rationalization. The latter actions were clearly pointing towards the circulation and accumulation of capital in the built environment. At the dawn of the 20th century, several projects of sanitation, urban regeneration and modernization of the city were undertaken. Rueda Laffond (1994) mentions the following: the regeneration of the old quarter (1892), the reform and extension of the sewage network (1908), the construction of a new Necropolis (1907), the reform of the cleaning service (1910-14), the channeling, regulation and cleaning-up of the Manzanares river (from 1910 onwards) and the construction of new slaughterhouses and markets (1908-1918).

7.4 CYII in the first half of the 20th century: conflict, ownership, electricity and the growth of the city

After decades of negative natural growth (despite the increase of population due to migrations from the rural villages) characterized by high mortality rates and epidemics, population stabilized between 1902 and 1920 to give place to a phase characterized by positive natural growth and the end of the epidemic episodes[862] that recurrently affected Madrid (Rueda Laffond 1994). Besides the reversal of this demographic trend, migration from the countryside to the city progressed fast, especially from the regions of *Castilla-León*, *Castilla-La Mancha* and Andalusia. As a consequence, and especially due to the ceaseless flow of immigrants, population almost doubled from 1900 to 1930, from around 540,000 to some 900,000 people. In turn this promoted uneven patterns of growth of the city, with some districts experiencing a dramatic development. According to Rueda Laffond (1994), the question of the urbanization and sanitation of Madrid's outer districts was central to the technical, political and medical spheres. Until 1918, this urban area with very precarious urban services lacked of a road system and a systematic planning project.

Despite dramatic population growth, water allowances kept pace with the increase of population. Thus, by 1919, the journal *Madrid Científico*[863] considered that only Rome had a higher allowance of water per capita (1000 lpcd). Madrid's allowance, up to 218 lpcd, was above that of Paris (216), London (159), Berlin (80), Brussels (75) or Vienna (75). Thus, the allowance per capita did not decrease with the dramatic soaring of population but, actually, increased, from 171 lpcd in 1910 to 234 in 1930. This enlargement of the quantity of water supplied went hand in hand with an improvement of the quality of the resource. In addition, from 1907 onwards, sanitary controls were established permanently. Another element that widely contributed to the amelioration of water quality was the inauguration of the first wastewater treatment plant. The dramatic decrease of water borne health problems, such as typhus, reflected this betterment of the quality of supplied water.

[862] One of the last important outbreaks was the flu of 1918
[863] *Madrid Científico*, "El Abastecimiento de agua a Madrid", 1919, p.238

Regarding economic issues, the annual balance between income and expenditure always showed positive numbers. This allowed covering the maintenance costs, the general expenditures of management and the interests out of the debt.

Despite water in Madrid was cheaper than in Barcelona or Bilbao, the aspect that contributed to the positive balance between income and expenditure was the generalization of metering. In April 1903, as we have previously mentioned, an Ordinance prescribed the cancellation of all the "*caño libre*" contracts and the generalization of the metering for all the domestic users. In July 1908, this was further extended to include the public sector activities. Progressively all the contracts, even those of industries, should be based on metering (just a few conserved the "*caño libre*" supply).

The *Canal de Isabel II* also entered the electricity production market, as we will see next. However, the revenues obtained out of this sector just represented about 8.8 percent of total income in 1913-1920 and dropped to 6 percent for the period 1920-1929.

7.4.1 The administrative reconfiguration of the Canal and the plan of works of 1908

As we have already mentioned, the apparition of the competitor *Hidráulica de Santillana* triggered changes in the administrative setting of water in Madrid and concretely in the *Canal de Isabel II*.

To understand better the evolution of this reconfiguration it is important to mention that in 1905, a Royal Decree was enacted appointing a commission headed by the Director of Public Works. The commission was split into a technical commission that drafted a plan of works to improve service, and an administrative commission that considered and studied different options to manage the *Canal de Isabel II*: leasing the management, municipalization and state direct management (from the Ministry of Development) (Rueda Laffond 1994). Leasing was considered onerous and unwise due to the unique characteristics of the water service, and also insecure due to the financial requirements of the potential dealer. On the other hand, municipalization was an option that in Europe had been endorsed by different coalitions of actors. In early 20th century Madrid, electricity supply, transportation, food supply or even public housing were already solely driven by private initiative.

Besides, those duties under the jurisdiction of the municipality used to be delegated by means of concession, leases, etc. This general debate regarding municipalization of the urban services set up the backdrop against which municipalization of the water services would advance[864]. Even though improvements in the efficiency were not reckoned, municipalization was envisaged as a solution that would improve the autonomy of the town council and therefore a betterment of local interests. Actually, municipalization was pictured as a strategy to obtain political control of the supply under a monopolistic regime, where any other competitor could not participate (in clear reference to other private firms such as the *Hidráulica de Santillana*). Municipalization was dismissed due to the alleged difficulties the Town Council of Madrid would face to purchase and manage the Canal because of its chronic budgetary deficit and also to the legal vacuum regarding the procedures to municipalize the service. Eventually direct management by the State was argued to lead to likely delays in the development of the works and improvements urgently needed by the *Canal de Isabel II.*

Instead, the commission strongly recommended a reform in the organization and the creation of a Management Special Board, similar to those existing before the takeover by the Ministry of Public Works, consisting of Town Council delegates, representatives of the local institutions (Owners Association, Chamber of Commerce, Industrialists, Spanish Society of Hygiene [*Sociedad Española de Higiene*]), the former subscribers and three representatives appointed by the Government. This change would entail also the restoration of the independent budget of the *Canal de Isabel II*, in such a way that the annual profits could be reverted in the improvement, conservation and expansion of the system. Therefore, the CYII ceased to depend on the Ministry of Public Works and was configured as an enterprise led by a Management Board, composed by members of the government, the town council and representatives of other stakeholders affected by the decisions of the *Canal de Isabel II*. By means of a Royal Decree, in 1907 (8th February), and the Regulation of 15th February 1907, the definitive Board was established, and was headed by a *'Comisario Regio'* [Royal Commissioner] directly elected by the government. The attributions of the Board were the following (Rueda Laffond 1994):

[864] The interest to universalize the supply, to clarify the legal status of the service or to make progress in the works to guarantee the continuity of the supply were some of the reasons that grounded such claim.

- The administrative control of the entity
- The drafting of new projects and works
- The proposal to the government of alternatives to supply Madrid
- The proposal to float loans

On the other hand, the jurisdiction of the Government included the authorization of:

- The new *'Reglamento orgánico'* of the *Canal de Isabel II*
- Setting the tariffs
- Project planning
- The management of the annual budget
- The development of all projects with a cost in excess of 50,000 pesetas

In addition to these duties, the Government had jurisdiction to revoke or defer the decisions taken by the Board without its authorization as well as to point out the Director Engineer of the Works.

Since July 1907 the new configuration of the Canal Isabel II was strongly publicized: an enterprise searching for profitability aimed to ensure and improve a public service by means of the incomes generated in its operations. In 1907, the new director, Ramón de Aguinaga, advanced the plan of works for the CYII. This plan comprised the extension of the number of reservoirs as well as the increase of their capacity, the renewal of the old channels, the culmination of the third water tank, the rearrangement of the distribution network in three different sections (150 new km), the extension or improvement of the water supply in zones lacking of the service or poorly served (*Ensanche* and *Extraradio*), and the service diversification out of the operation of the hydroelectric waterfall. It also included the construction of the *Canal Transversal*, to connect *El Villar* dam with the *Canal de Isabel II* network but avoiding the troublesome spot of *El Villar-La Parra* dams, where it was thought that leakages and turbidity phenomena occurred. The *Canal Transversal* was designed to conduct all the water regulated in the upstream dams. Along the channel, two water tanks would regulate the flow. Between them a hydroelectric power plant would be located. On the 26th June 1911 the Canal Transversal began its operation allowing a maximum flow of 8 m^3/s.

To exemplify such important change it is interesting to point out that while the consumption by that time was 140,000 daily m^3 it was expected to reach 300,000 m^3 within three years. In turn, income was expected to reach 7.5 million pesetas, as a result of the increase in consumption and the production of electricity by means of the waterfall[865] mentioned above. By 1914 an additional income of 5 million pesetas was expected from the generalization of metering ('*concesiones otorgadas por contador'*) and the extension and normalization of the supply in the zones lacking or having a poor service to the moment.

Another active front the firm faced was the regulation of the legal situation of the subscribers who had opted to be awarded with water instead of capital interests as the repayment of the debt. We recall that this debt was contracted during the early years of the CYII when big money was needed to develop the works. Those repayments in water, at first temporal and limited, had become permanent and unlimited. The Spanish Water Act (*Ley de Aguas*), in force since 1879, forbade such appropriation by individuals. Eventually, the length of the repayments was fixed in 99 years since the year of the contract; therefore, these kinds of arrangements were to be terminated in the 1960s.

7.4.2 The creation of the *Cooperativa Eléctrica*

To trace the evolution of electricity supply in Madrid provides us with a good picture of the process of modernization (combining different urban, economic, technologic and business components) that underwent by the capital during the first third of the 20th century.

As Rueda Laffond (1994) succinctly accounts, thermoelectric producers dominated electricity supply in Madrid before 1909-1910. Concretely, The Electricity Supply Company for Spain, and the *Compañía General Madrileña de Electricidad*, which latterly were associated to the *Compañía Madrileña del Alumbrado y Calefacción por Gas*, build up with French capital. Besides, due to the expected margins of benefits by the end of the 19th century, other companies also intervened –such was the case of the *Sociedad del Mediodía*, *Fábrica del Norte* or *Electricidad de Chamberí*. Despite this proliferation, the *Compañía Madrileña de Alumbrado y*

[865] The waterfall, with a height of 130 meters, and a flow of 4 cubic meters per second of water, was expected to produce a gross power of 6933 HP (almost 5170 KWh)

Calefacción por Gas had the monopoly regarding public lightening; therefore, the smaller companies basically focused on household supply or public lightening in some neighborhoods.

In 1912, however, with the arrival to Madrid of hydroelectric energy, the picture of the supply changed dramatically. Two entities supplied this energy in an oligopoly that would last throughout the 20th century: *Hidroeléctrica Española* –created in 1907 –and *Unión Eléctrica Madrileña* –created in 1912. These two companies, entirely of Spanish capital, ended the monopoly of the thermoelectric suppliers. Actually, these disappeared outcompeted by the lower prices of hydroelectric energy. Thus, we can observe an important transition in the nature of the electricity suppliers (from thermoelectric to hydroelectric) and in the nature of capital (from foreign capital to national capital).

Against this tacit oligopoly (with delimited areas of supply for each company) held by the hydroelectric companies and the construction of the Canal Transversal (which included a waterfall able to produce electricity) the conflict between the *Canal de Isabel II* and the other companies broke off. Both companies and *Hidráulica de Santillana* opposed the intentions of the Canal to produce and commercialize electricity for the citizens of Madrid. On the other hand, the citizenry complained about the introduction of electricity metering and the expensive tariffs. These complaints coalesced with those of other economic stakeholders –such as the *Círculo de la Unión Mercantil* or the *Cámaras de Comercio e Indústria* –and articulated the support towards the project of the *Canal de Isabel II.*

The Head of the Board in 1907-1909, Joaquín Sánchez de Toca, strongly backed the production and commercialization of electricity by the *Canal de Isabel II*, under the rationale that it would signify a 'socialization' of the urban services (though this decision corresponded to the town council).

A Cooperative of consumption was proposed to distribute and commercialize the electricity produced by the *Canal de Isabel II* with the aim to supply energy at a lower cost than the other companies. However, with the destitution of the Head of Board of the *Canal de Isabel II* in 1909, the initiative of providing energy to the Cooperative suffered a halt. Despite these impediments, the *Cooperativa Eléctrica de Madrid* was constituted on the 29th July of 1909. Many energy providers offered energy to the Cooperative, among them the *Hidroeléctrica Española*. Subsequently,

an agreement with the town council of Madrid, pointing towards the municipalization of the service, was reached: the Town council promised to reduce the taxes to the supply of electricity by the Cooperative, whereas the Cooperative would create a distribution network in the whole municipality, to maintain the electricity at low prices and to revert the distribution network within 50 years (minimum). In addition, the Cooperative expected to be in charge of the public lightening by 1914.

In June 1910, the *Cooperativa* merged with *Electra*, a company created by *Hidroeléctrica Española* to supply electricity in Madrid, under the name of *Cooperativa Electra Madrid*. The new board of this company was controlled by *Banca Aldama* and *Banco de Vizcaya*, while the former *Cooperativa Eléctrica de Madrid* had just three representatives. This merger prompted a general drop in the tariffs of all the other providers. However, the change of the former *Cooperativa* into an industrial firm responding to the interests of the elites entailed the lost of the initial philosophy of what the *Cooperativa* wanted to be, and from 1909 onwards the *Canal de Isabel II* no longer endorsed this project. However, by 1913 the Canal began to produce electricity from the *Canal Transversal*. The energy produced would cover the pumping to the "upper deposit", and the remainder energy would be sold for public lighting purposes although industry was also seen as a potential customer.

Regarding water supply, the CYII wanted the *Hidráulica de Santillana* to build a regulatory water deposit as a previous condition to buy its water. Due to the refusal of the *Hidráulica*, the CYII decided to supply itself the "upper neighborhoods" (Salamanca, Chamberí, Lozoya and Cuatro Caminos) by means of the construction of the "upper water deposit" (with a capacity of 1,500 m^3), operative since 1912.

By 1914 most of the works proposed by the director of the CYII were culminated thus overcoming the turbidity and low-pressure problems. In addition, the CYII had its own electricity supply, and revenues had risen considerably. Taking advantage of this optimistic backdrop, a plan to expand the system was presented, envisaging the creation of the *Puentes Viejas* dam, as well as new conductions channels to avoid pollution issues, the culmination of the third water deposit, the construction of a new parallel channel connecting Torrelaguna with Madrid, and finally the continuation of the distribution network works.

Due to the dramatic increase of consumption (it more than doubled in 20 years time), it was foreseen that the Lozoya would be able to satisfy the thirst of Madrid during less than 15 years. After that, more water had to be captured in the upper Jarama and Sorbe water basins: the plan of expansion of the CYII system contemplated to build one dam in each river.

7.4.3 The expansion of the infrastructure: from 1910 to 1930

Apart from the increase of consumption, one of the main issues regarding water supply in Madrid that the *Canal de Isabel II* had to face was the ageing of the early infrastructure and the existence of a single distribution network. One of the major impediments to design a general plan of works was the legal dispute between the *Canal de Isabel II* and the *Hidráulica de Santillana* that lasted until 1928.

Thus, despite financial, during the decade of 1910s two main projects were developed: the construction of the *Canal Transversal* and the construction of a hydroelectric plant. In addition to them, the Canal extended the supply to the Northern "*Ensanche*". However, the execution of the plan would have to face the economic crisis after World War I, which prompted the rise of prices of raw materials and the subsequent interruption of the works.

As we mentioned, the transversal channel was finished in 1911. In 1913 the construction of the *Central de Torrelaguna* [Torrelaguna hydroelectric plant] was finished, with an initial installed power capacity of 6,000 H.P (increased after to 9,000 HP). The energy produced was conducted to Madrid by means of a line 50 kilometers long, although part of the energy produced was used to lift the water (Canal de Isabel II 1954).

In 1916 the third water tank was finally completed, with a storage capacity of 463,500 m^3 (Martínez Vázquez de Parga 2001a). Economic austerity also affected the construction of the *Puentes Viejas* dam, forcing to divide its construction in two phases.

In 1918 Ramón de Aguinaga quit the direction of the CYIIL, with an important legacy:

- The production of electricity out of the waterfalls as an alternative source of revenues

- The need to construct a parallel channel to obtain a safer and better supply
- The reforestation of the Lozoya water basin to solve the problem of turbidity

By the decade of the 1920s, Madrid had reached 750,000 people[866], and a daily consumption of 210,000 m^3 of water flowing along the 233 kilometers of the CYII network. This network comprised 110 underground kilometers; other private networks in the city, mostly owned by the *Hidráulica de Santillana*, reached 61.6 kilometers. Almost all customers of the CYII, (over 14,000 by 1920), were metered (Martínez Vázquez de Parga 2001a).

In 1921, a new Plan of Works for the period 1922-1925 was drafted including the construction of the parallel channel, the fourth water deposit and the connection of channels and expansion of the distribution network along four independent paths. One of the main aspects of the financing plan was the selling of electricity. Moreover, other minor duties were to be performed such as the improvements on the existing water tanks, the termination of the *Puentes Viejas* dam, and the betterment of the old existing infrastructure. The CYII had to ask for a new credit to the *Banco de España* but it was turned down. The opposition by this central bank to finance the whole project would retard the execution of some works until the end of the 1920s (Rueda Laffond 1994).

Some signs showed that Madrid needed the aforementioned parallel channel. In the first place, a landslide on the 15th June 1920 blocked the main channel and important water restrictions were implemented while it was fixed (Martínez Vázquez de Parga 2001a). Along these lines, an outbreak of typhoid fever took place in Madrid; criticisms were addressed to the CYII, who was accused of supplying unpurified water. For instance, in 1924, the "*Viejo aqueducto*" [main channel] broke down due to increase in the flow of water required by the city (230,000 m^3 per day) (Canal de Isabel II 1954).

The drought of 1924, which in turn forced to apply a restriction plan, triggered further developments. Nevertheless, the construction of the parallel channel was brought into a halt due to the complaints raised by the marquis of Santillana, owner of *Hidráulica de Santillana*, the other water provider of Madrid. The State (by means of a commission) studied the complaints and the verdict was to proceed urgently

[866] According to the *Instituto Nacional de Estadística*, INE

with the plan of works[867], including the parallel channel that would have a length of 55 kilometers, from the upper water deposit of Torrelaguna to the future fourth deposit in Madrid. Due to the dramatic growth of population, it was also necessary to build an upper deposit next to the fourth deposit to supply the north of the city.

The dam *Presa de Puentes Viejas*, located in the Lozoya river, next to the *El Villar* dam was culminated in 1925, although in 1931 it was enlarged (Canal de Isabel II 1954).

In 1926 there was also a major change in the administrative structure of the *Canal de Isabel II*. Between 1926 and 1930 the Ministry of Public Works controlled directly the Canal, and the Law of 1907, contemplating the presence in the Board of representatives of the Town Council and other local stakeholders, was overruled.

In 1928, a new plan, with a budget of 100 million pesetas, enabled the construction of a new aqueduct from the *Canal Transversal* to the fourth deposit, the so-called *Nuevo Canal* or *Canal Alto*, being definitely put in motion in 1940, with a length of 54.5 kilometers, with a capacity to conduct 6 m^3/s (Canal de Isabel II 1954).

7.4.4 The Republic, the Spanish Civil War and the supply of water in Madrid

The changes within the *Canal de Isabel II* during the Spanish Republic and especially during the Spanish Civil War were not as radical as those of the Barcelona water company (collectivization as the main feature). First, during the Republic the *Canal de Isabel II* was renamed *"Canales de Lozoya"*.

Regarding the infrastructure, in 1933 the fourth deposit with a capacity of 180,000 cubic m^3, was finished (Canal de Isabel II 1954). The historian Martínez Vázquez de Parga (2001a) argues that while the technical management was correct, with the new dam (*Puentes Viejas*) in service, plenty of available water, and a new horizon for business with electricity production, there were several important problems regarding internal management. A change in the Management board, pointed out as essential, was prevented by the legislation, and only the extraordinary context of the war made possible the reconfiguration of the Board, allowing the participation of representatives of the workers[868]. Therefore, in December 1936 a new Board was

[867] Real orden de 10 de diciembre de 1925, Ministerio de Fomento
[868] Decree signed by Manuel de Azaña the 19th September 1936

appointed, including six representatives of the workers as Board members. The internal changes also implied a reduction in the number of civil servants.

Legal and economic issues also abounded and had to be faced, especially the lack of control of budgetary management. Revenues of the enterprise were not high (in 1935, 12 million pesetas), worsening in 1936 when some customers rejected to pay the bills; actually, it was alleged that the aristocracy and the bankers were involved in this movement in order to boycott the Republic. As a result of that situation maintenance costs could not be defrayed, and the economic situation of the firm worsened.

During 1936 the firm was also affected by the general strikes that swept Spain (Madrid included). In July 1936 the Civil War broke out and clearly affected the development and management of the water supply infrastructure. Tensions among the workers would arise, especially in the context of the strikes.

In what concerns supply during the Civil War, and although the storage system did not lack water several technical and tactical decisions were, taken[869] leading to a situation of shortages and water cut offs during nighttime. The technicians studied and discussed several options to draw water from the Jarama and Manzanares rivers. Eventually, it was agreed to use the concession of *Hidráulica de Santillana* from the Manzanares for street cleansing purposes, while *El Villar* water would be directed to households. It is important to recall that during the three-year period of the war the service was never suspended although the maintenance of the distribution network was focused only on specific damages and defense duties.

According to Martínez Vázquez de Parga (2001a) the major and most successful internal changes concern the improvement of the social and labor conditions of the workers, who received service and aid to form a mutual benefit society: pension, retirement pension, childcare, orphanhood, medical services, chemist, hospital assistance, etc. By that time very few enterprises offered that kind of benefits to their workers. It is important to mention the will to create an internal service of legal consultancy to fix some issues regarding properties and taxes. However, it was delayed some years as the Ministry in charge moved to Valencia due to the Civil War.

[869] The decisions forbid to transfer water from the Puentes Viejas dam to the El Villar dam.

Although after the war some of these social and labor improvements would be discarded, the change brought about during the Republic supposed a turning point towards modern and fairer working conditions.

7.5 Expanding the water footprint of Madrid beyond the Lozoya river

During the post-war years, Madrid experienced a dramatic population growth, triggered by migratory flows from the countryside as well as by the outstanding increase in birth rates. At the same time, the citizens were changing their hygienic habits, and almost all homes had a toilet. In addition, public uses, such as street cleansing and watering of public gardens, needed increasing quantities of water. All these urban changes, altogether with the increasing water requirements of the blossoming industry, led to an abruptly and dramatic increase of the demand of the resource.

7.5.1 The post-war period: water restrictions and the Plan of Works of 1947

Once the war ended, the *Canales de Lozoya* recovered its former name, *Canal de Isabel II*, and began to be exploited by an Army Delegation (*"Delegación Militar de Abastecimientos"*). Regarding internal reorganization, one of the most relevant decisions was to organize the CYII by departments each one headed by an engineer: dams/reservoirs, piping system, water deposits, ditches and new arteries, laboratories, and the Eastern Channel (*Canal del Este*).

As part of the reconstruction of Madrid, Martínez Vázquez de Parga (2001a) contends that the CYII initiated an important plan of works encompassing the construction of new arteries, the connection of the water tanks, and the reparation of the numerous damages caused by the war. In parallel, the Canal had to respond to the bourgeoning water demand of the population as well as to face the lack of pressure issues in the network and the reliability of supply. The Plan of Works of 1929 was resumed, with the completion of the *Canal Alto* as the main priority. This chanel was completed in 1941 while the connection between the third and fourth deposits did not become operational until 1952. With the *Canal Alto* running, 60,000 daily m^3 were added to the network. The attention could then be turned to the repairing of the old *Canal Antiguo* (renamed *Canal Bajo)* and also to the increasing problems of supply in southern Madrid due to the industrial developments of Legazpi and Villaverde. Getafe, Leganés, Carabanchel Alto and Puente de Valles relied on the Lozoya river

too. In addition, new developments were based on high-rise block apartments, with the subsequent problems of lack of pressure. As a response to the overloading of the main pipes in the city, the *Arteria baja*, the Eastern Channel (*Canal del Este*) was planned. With a length of 13 kilometers, and a section able to conduct 3.25 m^3/s (Canal de Isabel II 1954) it would flow between the Jarama and Manzanares rivers and supply the future fifth deposit (in Hortaleza) and the sixth (in Puente de Vallecas).

The fifth water deposit was planned to store around 81,000 m^3, with three compartments. On the other hand, the sixth deposit was expected to have a capacity over 130,000 m^3 (Canal de Isabel II 1954) The expansion of Madrid towards the north, reaching higher elevations, forced to consider the construction of the second elevated deposit in Plaza Castilla, next to the fourth deposit, with a capacity of 3,800 m^3. With a height of 40 meters, it was, according to Canal de Isabel II (1954), the most important of this type in the world during some time.

As Martínez Vázquez de Parga (2001a) contends, and despite shortages of all kinds (materials, capital, etc.), by early 1940 the *Canal Alto*, the urban arteries, the second elevated deposit, the first segment of the connection between the tanks as well as part of the *Eastern Channel* were developed.

The CYII, overwhelmed by the dramatic increase of petitions to connect to the network, decided to create in 1941 a Registry Office to control all the customers and thus to improve economic management and monitoring. Distribution problems, leakages, and the lack of pressure were a frequent issue. The days when Madrid had plenty of water were terminated. In 1945 Madrid suffered important water shortages as 1944 was a very dry year and the water tanks could not be filled for the next year. Thus, in April 1945, as Martínez Vázquez de Parga (2001a) says, Madrid demanded more than what the Lozoya could supply and a plan for restriction of uses was drafted and began to be applied the 1st June 1945. Furthermore, there was also the commitment to supply water to *Hidráulica de Santillana*, whose reservoirs had run out of water. To avoid health issues due to the low pressures and interrupted supply of water chlorination began to be applied. In December 1945 the restrictions were lifted. In total, some 25 hm^3 had been saved during the restriction period, with few consequences and without important damages to the network.

The shortages of 1945, together with turbidity issues, lack of pressure, insufficiency of the artery capacity, among other problems, obliged to think hard about the future of water supply in Madrid. To begin with, while the works of the Eastern Channel were being developed, it was considered necessary the construction of the Villahermoso artery in south Madrid. Most vital was the need to increase the storage capacity and to complete the works to connect the water tanks. The water scarcity of 1945 triggered the proposal to build a new dam upstream the *Puentes Viejas* dam, the *Riosequillo* dam, with a capacity of 50 hm^3 (Canal de Isabel II 1954). Martínez Vázquez de Parga (2001a) reports the enactment of an "*Orden*" by the Ministry of Public Works the 19th September 1946 laying down the Plan to improve the supply in 25 years time with an execution period of 10 years. The Plan of the Ministry included as a key feature the extraction of water from other basins as demand forecasting predicted that the Lozoya River would be insufficient to cover the demand of the growing population with large consumptions per capita. Concretely, to draw water from the Jarama and Sorbe rivers was planned, reaching the city through the *Canal Alto*. As Martínez Vázquez de Parga (2001a) notes, the proposal to draw water from these rivers had been raised already at the dawn of the 20th century by Ramon de Aguinaga.

In response, the CYII submitted the Plan of Works considering the improvement and expansion of water supply in the adjacent municipalities and also to the municipalities across which the network of the Canal flowed (Canal de Isabel II 1954). To summarize, the Plan of Works of 1947 considered the construction of the following:

- The *Riosequillo* dam (already started)
- The *Matallana* and *Los Ramos* dams, to be built by the State Administration
- The Jarama and Sorbe Channels
- The enlargement and improvement of the distribution network

The execution of the work was split into three periods: 1948-53, 54-57, and after 1957. The total budget was around 784 million of pesetas (Martínez Vázquez de Parga 2001a). In order to seek financial sources for the plan, the increase of tariffs of water was envisaged. It would also reorganize the current budgetary deficit and thus be able to pay the credits to complete the works.

According to Martínez Vázquez de Parga (2001a), existing tariffs by that time promoted high water consumption. Those pricing structures were the result of the strategies developed during the first period of the CYII, focused on public health and high consumption patterns. The Plan of 1947 was intended to change this situation by means of taxing the sumptuous household consumption as well as industrial consumptions as efforts made at the beginning of the 20th century to reduce consumption were in vain. The disparity in the priorities of the authorities must be noted here: while in early 20th century Barcelona water consumption was encouraged, in Madrid it was considered excessive. In that sense the regulations of 1903 that enacted the termination of free concessions had not came into force yet, and there were by 1947 some institutions (hospitals, hospices, etc.) receiving free water. Moreover, council town consumption, although it was somehow charged, could not be classified as revenue. The Decree of 7th November 1947 approved the aforementioned Plan of 1947 and also enacted a change in the price of water, 50 cents each cubic meter (the previous price was 0.21 pesetas). In turn, the increase of prices permitted the CYII to issue bonds to a maximum of 463.71 million pesetas in order to finance the works of the Plan. We see again that pricing issues were one of the main concerns of the water supplier by mid 20th century.

The years 1948 and 1949 were the worst hydrologic years for the Lozoya since the beginning of the 20th century and it was necessary to mandate again water restrictions, starting the 1st December 1948 and ending the 26th November 1949. During that period, water service was suspended 53 percent of the time, which resulted in a decrease in consumption of 42 percent (Martínez Vázquez de Parga 2001a). To overcome the scarcity episode, some emergency measures were taken, such as the provisional transfer of water from the Jarama River to the *Canal Bajo*. Regarding the works, urgent character was given to the definitive transfers from the Jarama and Sorbe Rivers. The completion of the Eastern Channel (*Canal del Este*) and of the new urban arteries was prioritized as well.

Drawing on the work of Martínez Vázquez de Parga (2001a), and establishing parallelisms with the Barcelona case study, we emphasize the fact that the droughts of 1944-45 and 1948-49 reinforced the idea of searching for water beyond conventional sources. In Madrid attention not only focused on the Lozoya, which provided a flow of 65 hm^3 per year, by means of the construction of new dams, but

had to consider water in other basins. The Plan of 1947 established the year 1960 as the deadline to implement the *Canal del Jarama*. According to the forecasts of the time, by then Madrid would have almost 2 million people with a water allowance per capita of around 300 lpcd, meaning all the available water flow from the Lozoya river. Even with the *Riosequillo* dam finished, the Lozoya system could only guarantee an allowance of 250 lpcd for a population of 1.6 million people.

In 1914 Ramón de Aguinaga had already suggested to capture water from the Jarama and Sorbe rivers. More than thirty years later, in 1947, this proposal was pursued. We also recall that in the 18th century proposals to bring water from the Jarama, for instance, were raised. By initiative of the CYII a Commission consisting of members of the CYII, the *Delegación de Servicios Hidráulicos del Tajo*[870] [Tajo Water Services delegation] and the *Dirección General de Obras Públicas* was created, with the aim to study the maximum use of water resources from the Jarama and Sorbe basins, prioritizing urban supply over agricultural use. The Commission's report remarked the compatibility between uses provided that the existing *Real Acequia del Jarama* [Jarama Royal Ditch] was supplied with the surplus water; it also emphasized the need to grant the management *of El Vado* dam to the CYII. On the one hand, the *Canal del Jarama* project was drafted contemplating the seizure of most of the water stored in *El Vado* dam for urban purposes. The latter dam was being built by the State for the irrigation of the *Real Acequia del Jarama* and finished in 1954 with a capacity of 56 hm^3. The Plan included the development of the *Canal del Sorbe*, which would bring water from that river (at Pozo de los Ramos level) to the Canal del Jarama and subsequently to the Torrelaguna water tank.

As a result, a decree ruled that Madrid could rely upon the whole Lozoya's flow of water and a partial availability of the flow of the Jarama (from the source to the *El Vado* dam) and Sorbe rivers (from the source to the *Pozo de los Ramos* site, where a dam with a capacity of 100 hm^3 was due for construction). The decree also stipulated that the surplus flow of water that Madrid did not need would be regulated by the future Bonaval dam and would be used for the irrigation of the Jarama Royal Ditch. On the other hand, the surplus water of the Sorbe not used for Madrid would be used for Alcalá de Henares, Torrejón and other municipalities through which the Sorbe

[870] It was not until 1953 that the *Delegación de Servicios Hidráulicos del Tajo* became a *Confederación Hidrográfica* [Water Agency]

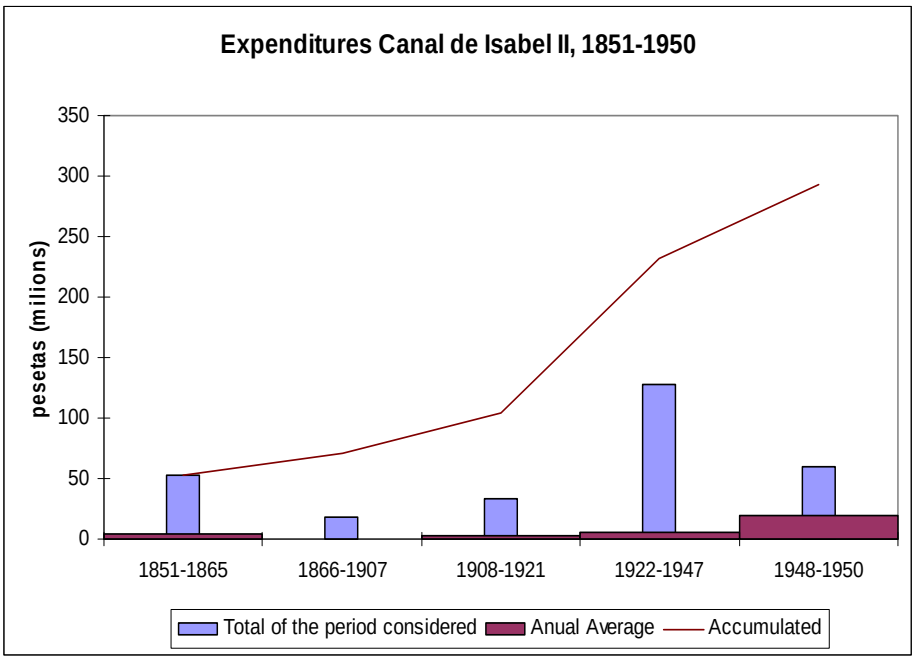
flowed and also for irrigation purposes. Eventually the decree also contemplated that the benefit obtained from hydroelectricity production from the water supply system would go to CYII. The decree unleashed the complaints of *Hidráulica de Santillana*[871]arguing that the flows from the Jarama and Sorbe would be used for the supply of the "*barrios altos*" of Madrid, where *Hidráulica de Santillana* had an exclusive monopoly. However a subsequent legal sentence[872] backed the decree and supposed an important blow for the interests of *Hidráulica de Santillana*. .

According to the decree, the CYII drafted a plan for the usage of the Lozoya, Jarama and Sorbe basins taking into accounts the population and allowance forecasts of the time. Until 1970, the Lozoya and Jarama rivers would guarantee the supply; the waters from the Sorbe, combined with the former two rivers would increase the guarantee until 1980s. From then onwards, the CYII would have to face the dilemma to search for more resources in the Tajo river (by means of a channel 226 km long) or to build a large dam to totally regulate the Lozoya. The latter proposal (already raised in 1940) would consider the construction of a huge dam, *El Atazar*, downstream the Villar dam with a foreseen capacity of 363 hm^3 (Martínez Vázquez de Parga 2001a).

Once arrived at this point it is interesting to note the big money invested in the infrastructure of the *Canal de Isabel II* during the first 100 years. In figure 7.10 we can observe how the expenditures were distributed among the periods of time. We observe how between the years 1922-1947 the most important part of the budget was spent. However, if figures per year are considered, the period 1948-50 clearly stands out above the rest.

[871] *Hidráulica de Santillana* raised an administrative contentious proceeding to impede the transfer or at least to obtain the licence to supply other parts of the city with that water.
[872] Sentence of 22nd March 1957, quoted by Martínez Vázquez de Parga (2001a)

Figure 7.10. Expenditures of the *Canal de Isabel II*, 1851-1950

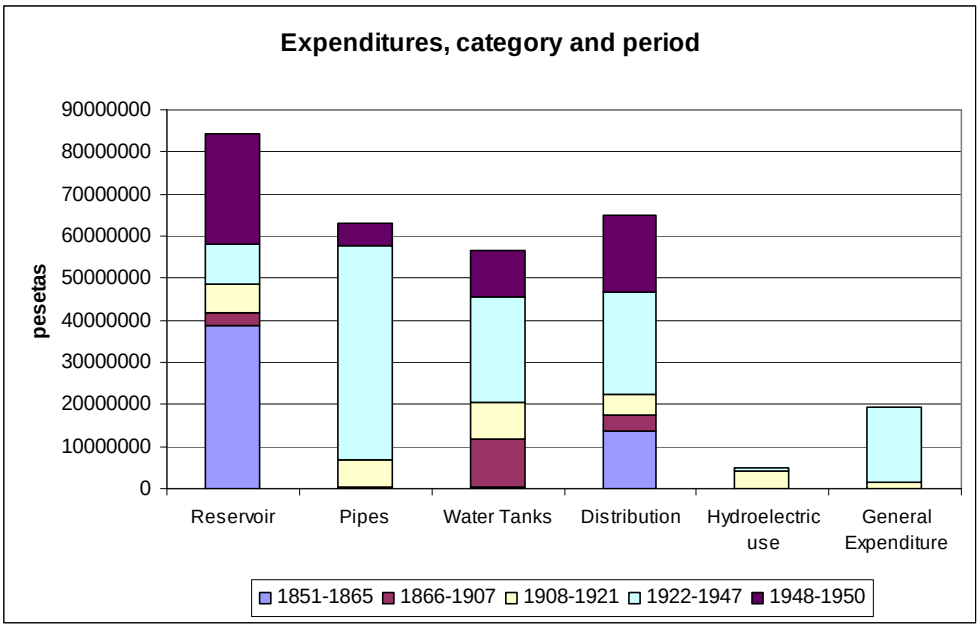


Source: adapted from Canal de Isabel II (1954)

In figure 7.11 we can observe the expenditures were distributed between the different categories for the period 1851-1951. The main share of the budget was directed towards the construction of the dams and reservoirs. However, water deposits, pipes/channels/aqueducts and the distribution network within the city also represented and important share of the total.

To be even more accurate, we can observe how the different categories of infrastructures received money depending on the period considered. For instance, we can realize how most of the expenditure in dams took place in the beginning of the *Canal de Isabel II*, and also during the period 1948-50 when new dams were built. Contrarily, we observe how the piping system to bring water from the dams to the city was mainly developed during the period 1922-47.

Figure 7.11. Expenditures of the *Canal de Isabel II*, by category and period. 1851-1950



Source: adapted from Canal de Isabel II (1954)

7.5.2 Keeping pace with the demographic explosion of 1960s

The population growth forecast of the *Plan General de Ordenación Urbana General* [Urban Development Plan] of 1941 was clearly exceeded during the 1950s. The city was undergoing a dramatic and chaotic expansion, with the blossoming of the dormitory towns around Madrid and the proliferation of new neighborhoods. The population grew from 1.5 million people in the 1950s to 2.3 million in the 1960s.

Departing from a forecasted population of 6 million by the year 2000 (with an assumed annual growth rate of 2.5 percent) the Metropolitan Area of Madrid General Urban Development Plan was drafted. This Plan was aimed to control the chaotic growth of the city of Madrid and neighboring[873]. The Plan focused the growth around two axes: the Henares axis, from Alcalá to Guadalajara to the North, and the Toledo-Aranjuez axis to the South.

Besides to the dramatic demographic growth, Martínez Vázquez de Parga (2001a) reports the important changes to the hygienic habits brought about with the generalization of toilets. In addition, electrical appliances using water proliferated in

[873] Alcobendas, Alcorcón, Boadilla del Monte, Coslada, Getafe, Leganés, Majadahonda, Paracuellos del Jarama, Pozuelo de Alarcón, Rivas-Vaciamadrid, Las Rozas, San Sebastián de los Reyes, Torrejón de Ardoz y Villaviciosa de Odón.

homes (e.g. use of washing machines). On the other hand, important amounts of water were used for street cleansing and public parks watering, and the industry required larger quantities of water for its activities. Another relevant fact was the expansion eight fold of the supplied area. All these factors contributed to a dramatic increase of demand, which rapidly overcame the available supply. Therefore, the operation of the *Riosequillo* dam and the transfer from the Jarama river notwithstanding, water did not suffice. The Plan of 1947 forecasting's were understated: more storage capacity was needed.

Due to the lack of compliance by the *Confederación Hidrográfica del Tajo* [Tajo River Water Agency] to draft the projects of dams in the Jarama (*Matallana* dam) and Sorbe (*Pozo de los Ramos*) before 1955, the Plan of Works of 1947 was definitely dismantled, and the CYII had to rethink the total regulation of the Lozoya instead. Thus, in 1961 the *Plan de Obras para el abastecimiento del Gran Madrid* [Plan of Works for Great Madrid] was put forward. The plan took for granted the demographic forecasts of the *Plan General de Ordenación Urbana del Área Metropolitana de Madrid* and was scheduled in 3 periods (1961, 1962-64 and 1965-67) at the end of which the total regulation of the Lozoya river by means of the construction of *El Atazar* dam would be completed. It also included the improvement of water conductions through the construction of the *Canal de El Atazar* [Atazar Channel]. The construction of the Eastern and Western belt channels was envisaged to avoid crossing the city and to facilitate the supply of the outskirts, especially the blossoming south, as well as improving the pressure issues. Eventually the Plan was slightly modified, with the construction of the *El Atazar* dam by the State, and renamed *Plan de Obras de Ampliación del Abastecimiento de Agua a Madrid* [Plan of Works to Expand Water Supply of Madrid].

By the early sixties, the water system of Madrid relied on five dams, out of which four in the Lozoya (*Riosequillo*, *Puentes Viejas*, *El Villar* and *El Pontón*, with a total capacity of 123 hm^3) while the other one was in the Jarama river (*El Vado*, with a capacity of 51 hm^3)[874]. Consumption was increasing steadily; from 1961 to 1962 it soared 6 percent, with an average consumption of 7.5 m^3/s, approaching rapidly 9 m^3/s, which was the average flow of the Lozoya. In front of this situation the

[874] Abc, 23 de Marzo de 1963, p.20-23, "Está asegurado el normal suministro", by Manuel Adrio

manager of the Canal recognized the subordination of Madrid's supply to climate variables: "We are at the mercy of rainfall patterns presented by nature"[875].

In addition to this problem, and due to high demand, both the *Canal Alto* and *Bajo* were in risk of exceeding their maximum capacity forcing the ensuing peril of breakdown of the system, especially in the *Canal Bajo*. To overcome such problem, several proposals were considered, including diverting water from the Lozoya in other points, lifting water from the Jarama or bringing water from the Manzanares river and using the utilities of *Hidráulica de Santillana*. The latter option plus the regulated flows from the Lozoya made up an average flow of around 10 m^3/s, higher than the former options. Still, it was considered insufficient to tackle the forecasted increase of demand in the near future.

As a result, in 1963 the *Plan Modificado de Obras de la Ampliación del Abastecimiento de agua a Madrid* [Modified Plan of Works to Expand the Water Supply of Madrid] was approved. It included the use of water from the *Santillana* dam in the Manzanares River. The same year, a raise of prices to help to finance the plan was also approved: the price increased 1 peseta per m^3 in downtown (doubling the price) and 1.5 pesetas per m^3 in the suburbs. The more urgent works (Martínez Vázquez de Parga 2001a) were related to the Canal de *El Atazar* and *El Atazar* dam, and also the transfer of water from the Manzanares or further urban water deposits and connections. The State also envisaged constructing another dam in the Jarama river, the *Matallana* dam.

During that period, the discontent of Madrid citizens with the water supply was soaring due the lack of pressure, the continuous breakdowns of the system, the lack of service in the new neighborhoods, and turbidity and water quality issues, especially of water coming from the Jarama river[876]. The journal *Abc*[877] echoed this concerns and denounced the dwindling quality and taste of water and also the peril of not being able to cope with Madrid's demand from the existing reservoirs in the Lozoya and Jarama. The root of the problem laid on the fact that Madrid urban growth was not accompanied by the construction of new reservoirs. Water from the

[875] Bielza Laguna, Álvaro, "Informe de la situación actual del abastecimiento de Madrid y los planes de obras del Canal de Isabel II", enero 1963, Archivo Central del Canal de Isabel II, Planes de obras, Caja 10. Quoted by Martínez Vázquez de Parga (2001a). Our translation

[876] The water from the Lozoya was of better quality than that of the Jarama, thanks to the multiple dam system of the former that permitted to solve water turbidity.

[877] Abc, 23 de Marzo de 1963, p.20-23, "Está asegurado el normal suministro", by Manuel Adrio

Jarama was being "wasted"[878] and lost to the Tajo river, and that is why the *Matallana* dam was justified.

Although the Plan would clearly improve the situation in the long term, some measures had to be implemented for the short and mid term. Among them: improvements in the network, as well as the transfer of water from the Manzanares River[879] and the construction of new urban water deposits, in order to solve lack of pressure.

A big issue was the leakages of the network[880], about 40 percent of the water delivered. While 10 percent of total losses were attributed to the conduction from the dams to Madrid, the remaining 30 percent leaked underneath the city. However, this percentage included non-metered free water, which was relevant by that time. Corrosion of the pipes was seen as the main trigger and a renewal of the system with cast-iron pipes urged. As the total updating of the system was unaffordable due to its high cost (around 180 millions of pesetas) it was decided to replace the more fragile parts.

The main trigger of social contestation, though, was the dramatic increase of prices, a very unpopular measure that unleashed angry protests. Martínez Vázquez de Parga (2001a) contends that the citizen did not realize that the price that had been historically paying had been a political price, and that it was not enough for the proper maintenance of the infrastructure.

On the other hand, great drought of 1964 forced restrictions. These did not generate important savings because the people stored water in their baths before the cut-offs. Here, we can note how the bath became not only a consumption device but also a storage technology to keep pace with the modern patterns of water consumption. Better results were attained for the restrictions of public uses. Restrictions did not cause losers everywhere; some citizens improved their situation regarding water supply, for instance those of Carabanchel. In 1965 restrictions were applied again, with the government requiring the population to curb their consumption, and using bans to prohibit both filling up the swimming pools and watering the garden

[878] idem
[879] Decree 7th September 1963 by means of which was approved the allocation of Manzanares water to urban uses. Thus, 12 out of the 46 hm^3 of the Manzanares were to be directed to urban uses, while the remainder was for electricity production.
[880] That is, the difference between bulk water from the reservoirs and metered water

(Martínez Vázquez de Parga 2001a). Thus drought signified a turning point in the outlook of water management in Madrid since the works to improve and increase the supply had to be accelerated.

In 1965 the CYII bought the shares of *Hidroeléctrica Española* and *Unión Eléctrica Madrileña* in *Hidráulica de Santillana*[881], to control 93 percent of capital. The problems of the water supply network of *Hidráulica*, representing a burden for these energy firms, combined with the mentioned sentence of 1957 that threatened the monopoly of the northern zone of Madrid[882], speeded the selling of the assets to the Canal.

The creation of the Metropolitan Area of Madrid worsened even more the situation as the supplied area (23 annexed municipalities) grew from 605 to 1,760 square kilometers (Martínez Vázquez de Parga 2001a). The CYII was already supplying seven of these municipalities and had to prepare to supply the remainder. In addition, the improving standards of living triggered and increase in consumption. To face the forecasted rise in population and consumption figures, another modification of the current water plan, the *Plan Reajustado al Modificado* was proposed. It included two new projects to increase the storage capacity of the system: the *Pinilla* dam in the Lozoya and the *El Vellón* in the Guadalix, together with the ensuing transportation channels. These projects replaced the Eastern and Western Channels as well as their water deposits.

In July 1965, a new minister of Public Works, Federico Silva Muñoz, was appointed (the former one had been removed from office because of the problems of the water supply in Madrid). Silva Muñoz enacted the Decree 2233/1965 of 15th July[883] that stated the urgency of the enlargement of the supply system and the removal of restrictions. This decree also authorized the competition of tenders as well as the direct awarding of minor projects and to speed up the procedures to avoid delays in the development of the works.

[881] Canal de Isabel II webpage: www.cyii.es. Last accessed 19th November 2009

[882] In addition water from the Manzanares tasted worse than that of the Lozoya. For that reason the Manzanares Waters were used for industrial activities, cooling systems, and to irrigate the big public Gardens of Madrid: *El Retiro*, *la Ciudad Universitaria*, *la Castellana*, *el paseo del Prado* and *el Jardin Botánico*.

[883] *Decreto 2233/1965, de 15 de julio, por el que se declaran de urgencia las obras del Plan de ampliación del abastecimiento de aguas de Madrid a efectos de expropiación forzosa y de contratación por concierto directo*

In order to meet the requirement of the increasing population by tripling the storage capacity in 5 years, the complete regulation of the Lozoya river as well as the search for new resources of water in the west of Madrid was considered again. Regarding the Lozoya regulation, it was agreed that the State would entirely pay for the *El Atazar* dam, but meanwhile the CYII[884] had to finance the construction of the *Pinilla* and *El Vellón* dams. The *Pinilla* dam, located in the Lozoya, would have capacity of 40 hm^3 and would be able to regulate 1 cubic m^3/s. On the other hand, *El Vellón* dam was located in the Guadalix and its capacity would be around 45 hm^3 (1.5 m^3/s). The schedules were met, and both dams, together with the Torrelaguna treatment plant were inaugurated in 1967. To increase the supply, it was considered as well the exploitation of groundwater at the intersection of the Lozoya and Jarama rivers, thus obtaining 1 m^3/s.

Eventually, and as a solution to distribution problems, a perimeter channel to the city was planned in order to allow water to flow in both directions. This would allow supplying the future city independently of location. However, the lack of credit limited the extension of the project. Thus, as population growth spots were mainly located in the west, the stretch prioritized by the perimeter channel was the Western part. A series of works including new deposits, to attend changes in demand, and pipes gave much more flexibility to the network and also add more supplies from different sources. After the urgent works of 1967, the network length increased from 2,037 in 1965 to 2,620 kilometers (Martínez Vázquez de Parga 2001a).

The 1960s also brought about a sharp improve in water quality thanks to the massive implementation of water treatment plants. Apart from the mentioned Torrelaguna treatment plant, the *Canal de Isabel II* built other plants [885] along the diversion points.

The search for further water resources was put on the table, with the focus on western Madrid. This was materialized in the *Plan AMSO, Abastecimiento de Madrid Solución Oeste* [Supply of Madrid, Western Solution], scheduled in three phases. In a first stage water would be drawn from the Alberche river. After, the Aulencia and Guadarrama rivers would be incorporated in the supply. Eventually, in

[885] *El Bodonal* (4 m^3/s), in the *Canal Bajo*, *Torrelaguna* (6 m^3/s) in the *Canal Alto*, *Santillana* (4m^3/s) and *El Atazar* (16m^3/s).

the long term the plan envisaged the construction of a belt channel along the southern side of Gredos. With those actions the CYII wanted to conduct more water to the city with higher pressure and better quality.

The first phase of the AMSO plan was urgently implemented, with the extraction of some 4 m^3/s from the *Picadas* dam in the Alberche (built in 1952) and the conduction of the flow through more than 50 kilometers to the point of connection with the CYII network. The project, paid equally by the CYII and the Ministry of Public Works, also included the construction of a treatment plant in Majadahonda, with a capacity of 3.8 m^3/s. Such project, taking only 500 days to complete (Martínez Vázquez de Parga 2001a), would increase its supply up to 120 hm^3 [886].

Despite the urgency of the AMSO plan, some experts prioritized the development of the "Eastern solution" over the "Western solution"[887] meaning the conclusion of *El Atazar* channel that was supposed to bring about the "definitive solution of the water problem of Madrid" as the city would have then an available flow of 18 m^3/s [888].

7.5.3 Planning for the mid-term: making the most of Madrid water basins

The North system[889] dams sufficed from the moment to ensure Madrid's water supply. However, once the urgent works of 1965-67 were completed, it was the time to face the mid-term projects to guarantee supply until the year 2000. Thus, the *Plan a Medio Plazo* [Mid-term Plan] was drafted and enacted in 1968. To finance such plan, which would be based solely on the economic resources of the CYII, an increase of the price of water to 5 pesetas per m^3 was authorized. The minister of Public works by the time stated: "I am in favor of economic self-sufficiency, because it is fair that water is paid by users"[890]. This increase of price was accompanied by the implementation of a two-block rate progressive pricing structure.

The philosophy of the Mid Term Plan basically aimed at making the most of Madrid Basins, both the already regulated and those that were not yet regulated. This meant

[886] ABC, Martes 18 de Julio de 1967, p.1, "El Jefe del Estado inauguró ayer diversas obras públicas con motivo del XXXI aniversario del Alzamiento Nacional"
[887] ABC, Miércoles 15 de Junio de 1966, p.93, "¿Será realmente la 'Solución oeste' una solución económica para el abastecimiento de aguas a Madrid?"
[888] idem
[889] 1) Pinilla, Riosequillo, Puentes Viajas and El Villar in the Lozoya river; 2) El Vado in the Jarama Rivers; 3) El Vellón in the Gudalix river; and 4) Santillanda in the Manzanares river.
[890] Fernández de la Mora, Gonzalo (Ministro de Obras Públicas*) Memoria 1951-69* (introducción), quoted by Martínez Vázquez de Parga (2001a). Our translation.

incorporating the flows to Madrid from the Lozoya, Jarama, Guadalix, Sorbe and Guadarrama rivers. The plan wanted to improve the distribution network, complete the belt channel, build new arteries, undertake the substitution of pipes as well as implement the water treatments to improve water quality. Again, urgency dominated the implementation of the water works: the Mid Term Plan was declared of urgency and by means of the Decrees 5th April 1968 and 8th May 1969, and a borrowing of up to 800 million pesetas was authorized.

In parallel, the second phase of the AMSO Plan was initiated with the transfer of the Guadarrama-Aulencia. The transfer from the Guadarrama was materialized by means of the *Las Nieves* diversion dam and tunnel 5 km long to the Aulencia river. In the Aulencia, water was stored in a reservoir with a capacity up to 124 hm^3 regulated by the *Valdemayor* dam. It was constructed a treatment plant as well as a conduction to Majadahonda, where it was linked with the North and the first phase of the West System.

The Eastern main artery and the "high-diameter" Majadahonda-Retamares arteries, belonging to the external belt channel were also developed. We recall that this belt was designed to solve the network pressure problems and to facilitate the expansion of the supply of those localities beyond the belt. From the belt channel several radial arteries sprang along the different roads of access to Madrid to supply the municipalities located along those roads.

While the second phase of the Western system was developed, the State was financing *El Atazar* dam in the Lozoya and the *Pozo de los Ramos* dam in the Sorbe. The construction of the former, ridden with technical and financial problems, was carried out by the *Confederación Hidrográfica del Tajo* [Tajo Water Agency], and financed by the State with the technical cooperation of the CYII. Once completed, it had a capacity of 426 hm^3, representing 73 percent of the storage capacity in the Lozoya basin, and up to 50 percent of the total supply to Madrid. With a cost of 6,000 million pesetas became a cornerstone of the water supply system of Madrid (Martínez Vázquez de Parga 2001a). On the other hand, the construction of the Pozo de los Ramos diversion dam and the *Canal del Sorbe* (to transfer the stored water to the *Canal del Jarama*) was completed in 1972. In 1969, when the *Canal de Isabel II* was already the main shareholder of *Hidráulica de Santillana*, the Santillana dam was finished in the Manzanares river with a storage capacity of 91 hm^3.

The expansion of the built infrastructure between 1965-1975 was really spectacular, as we can observe in table 7.9.

Table 7.9. Supply system in Madrid before 1965 and after 1975, with the works implemented in 10 years (1965-1975)

	Before 1965	After 1975	Period 1965-1975
Distribution network length (km)	2,038	3,382	1,334
Dams	6	9	3
Important conductions	5	9	4
Water tanks	6	6	0
Treatment Plants	-	6	6
Lifting plants	3	5	2

Source: adapted from Martínez Vázquez de Parga (2001a:307)

7.6 The reconfiguration of the water supply in Madrid

The water crises that triggered the development of the aforementioned projects also unleashed a deep change in the philosophy of the *Canal de Isabel II*. Since the foundation of the CYII, the company had focused mainly on the development of infrastructure, leaving the citizen/consumer aside. After the crisis, the attention turned to the service more than to the works. We argue that despite some signs of the change towards demand-side approaches on water management appeared in the 1950s and 1960s (especially related to pricing) it was from the 1970s onwards that the hydraulic paradigm lose some weight in favor of new management forms. The stabilization of water consumption was one of the priorities and this could only be achieved with non-infrastructural methods. Satisfying water demand, both in quality and quantity, became, as Martínez Vázquez de Parga (2001a) writes, the first concern together with the permanent monitoring of dams and related installations. This required an important organizational reform in 1975, which promoted non-engineering related posts such as administration, legal advice, and customer attention. Commercial management needed to be modernized and automated to monitor users and the system. Revenues increased importantly during these years due to the improvements in commercial management, the generalization of better metering systems and the increase of tariffs. However, economic deficit was still important. The monitoring system of consumption was also computerized and control was permanent. In addition, progress was made in managing the infrastructure with the development of mathematic models to balance supply and demand, automated cartography and remote control of the installations. This change in orientation notwithstanding, the search for new resources to keep pace with the future demands of municipalities not supplied by the CYII until the moment was constant.

This organizational change also was accompanied by a legal change: the historic concessions (*láminas de agua*) were definitely terminated, the ditches were expropriated and the installations of the CYII were legally registered.

In 1976, a decree of the Ministry of Hacienda[891] authorized the *Canal de Isabel II* to negotiate more borrowings with the Spanish saving banks and also with the *Banco de Crédito a la Construcción*. The maximum amount to borrow was 9,000 million pesetas for the periods 1976-1979, in order to undertake the necessary works to enlarge Madrid water supply system[892].

7.6.1 Reorganizing the Canal with the arrival of democracy

Within the end of the dictatorship and the arrival of democracy, the public administration was reorganized. With the aim to reduce public expenditure and to achieve efficacy and efficiency of public services, a Decree in 1976[893] authorized the Spanish Government to restructure some organizations. The *Canal de Isabel II* was one of those organisms that would undergo changes. We recall that the Canal was an autonomous organism depending on the Ministry of Public Works (Jiménez de Cisneros Cid 1987). Thus, by means of the Decree 1091/77[894], the CYII became a state-owned company of the Ministry of Public Works, servicing the whole province of Madrid, with full legal status (different than the state), own equity and autonomous management and full capacity to develop the works to achieve its duties.

The organizational change (economic independence from the Ministry of Public Works) forced the CYII to rethink its economic policy to operate as an enterprise. The economic policy of the CYII was based on the increase of tariffs; the user had to defray the expenditures, the "real" price of supply and sanitation services. In 1977 the CYII had to search for the first time in its history credit in the international market, concretely 50 million dollars (Martínez Vázquez de Parga 2001a). Thus, the CYII entered in the international flows of capital despite being a state-owned company.

In parallel to this organizational and legal change, in 1977 the *Plan de Saneamiento Integral de Madrid* [Integral Sanitation Plan for Madrid, PSIM] was enacted, affecting solely the city of Madrid. It included improvements of existing treatment plants and the construction of new ones and sewage collectors. Despite the Canal did

[891] Boletín Oficial del Estado, 14th June 1976
[892] La Vanguardia, Miércoles 5 de Mayo 1982, p.27, "El abastecimiento de agua, con graves limitaciones", José María Milagro
[893] *Real Decreto-Ley 18/1976, de 8 de octubre*
[894] *Real Decreto 1091/1977, de 1 de abril*

not bear any responsibility in that field, this plan required a close collaboration between this organism and the Madrid Town Council. Actually, it was in 1979 when the CYII assumed the duties of sewage treatment, and the construction, expansion and improvement of sanitation utilities. Still, this increase in the jurisdiction of the Canal do not applied to the city of Madrid.

To finance the works, a decree allowed the CYII to increase prices (Abia de Tierra 1983) and even include new costs (sewer system exploitation and wastewater treatment) in the bill.

At the early 1980s the economic situation was still precarious, and, as a result, the CYII decided against undertaking new works and only develop the more urgent such as the reforms in *El Vado* dam or the expansion of some treatment plants and development of new arteries, especially in Southern Madrid. However, as Martínez Vázquez de Parga (2001a) notes, supply was ahead of demand, which showed symptoms of stabilization in the late 1970s and early 1980s as happened in Barcelona. This common feature could probably be attributed to the economic downturn affecting especially industrial activity in both urban areas.

7.6.2 The creation of the Autonomous Community of Madrid and the reconfiguration of the Canal

At the beginning of the 1980s, the CYII managed 40 percent of the water resources and supplied 90 percent of the population (Martínez Vázquez de Parga 2001a) of the province of Madrid[895].

In 1981 the *Diputación de Madrid* [Provincial Council of Madrid] undertook a general study of the situation of water supply in the Madrid Autonomous Community (CAM). As Martínez Vázquez de Parga (2001a) summarizes, the report laid out the water problems the Community was facing and remarked the need for a new approach. Distribution networks had different kinds of faults. Sanitation was even more precarious; with the exception of Madrid, with its own Sanitation Plan (PSIM), the rest of municipalities hardly treated wastewater and river self-purification capacity was clearly exceeded.

[895] The remainder 10 percent was supplied by other organizations such as the *Consorcio para Abastecimiento y Saneamiento de la Sierra de Guadarrama* (CASRAMA), the *Mancomunidad del Sorbe*, or the *Fundación provincial para abastecimiento de agua potable*. Some municipalities were supplied by their own resources.

Madrid water needs had importantly transformed the territory and triggered a dramatic water imbalance. According to the study of the *Diputación* the province had been divided into four zones:

- A water production zone in the North;
- A conduction zone in the Centre, where rivers barely carried any water;
- A consumption zone in the Metropolitan area;
- A zone accepting the disposal of used and surplus water from the city.

Along the Spanish incipient road to democracy and to the *Estado de las Autonomías* [semi-federal state], established by the Constitution of 1978[896] , in 1983 the province of Madrid obtained the status of *Comunidad Autónoma*[897] and enacted its own *Estatuto de Autonomía*[898] [Regional Constitution of the Autonomous Community of Madrid, henceforth CAM]. The importance of such legal and administrative change regarding water lies in the fact that this *Estatuto*[899] established that the CAM holds the legal jurisdiction in water planning and granting of concessions of the waters integrally flowing through the Madrid region. The water policy would be led by the *Dirección General de Recursos Hidráulicos de la Consejería de Obras Públicas y Transportes de la Comunidad* [Water authority of the Regional Public Works and Transportation Ministry]. This organization emphasized the need to link water with land planning and to consider the integrity of the water cycle. Along these lines, a new water plan, the *Plan Integral del Agua en Madrid* [Integral Water Plan, PIAM] (Comunidad Autónoma de Madrid 1984), was envisaged to resolve the water use conflicts. It was inspired in some tenets as Martinez Vázquez de Parga (2001a) contends:

- Water as a public good, scarce and essential for the society
- Unity of the hydrologic cycle

[896] *Constitución Española. Aprobada por Las Cortes en sesiones plenarias del. Congreso de los Diputados y del Senado celebradas el 31 de octubre de 1978*
[897] Excepcionally Madrid became an Autnomous community by means of the article 144. The article 143 of the Spanish Constitution established that the provinces desiring to become and Autonomous Community had to have a historical regional identity; Madrid did not have such identity as a single province, but historically has been part of *Castilla-La Mancha*. However, due to reasons of national interest (art.144) the province of Madrid could become and Autonomous Community.
[898] *Ley Orgánica 3/1983, de 25 de febrero, de Estatuto de Autonomía de la Comunidad de Madrid*
[899] Article 26.8 of the *Estatuto de Autonomía de la Comunidad de Madrid*

- Interdependence between quality and quantity issues
- Tight connection between water and the environment

Thus, among the main objectives of the plan figured the improvement of collective welfare, the contribution to the regional development, and the improvement of environmental quality. The latter target did not have a precedent in the history of the water supply of water in Madrid, and signified a turning point in the perception of the aquatic ecosystems not only as sources of water and wastewater discharge receivers but also as active environmental agents to be taken into account.

The Plan needed a Regional Water Act to define the competences of each administration. On the 20th December 1984 the *Ley reguladora de Abastecimiento y Saneamiento de la Comunidad de Madrid*[900] [Supply and Sanitation Regulatory Law of the Autonomous Community of Madrid] was enacted. According to this law, water supply and sewers were municipal duties[901], while raw water supply (including withdrawal and treatment), as well as wastewater treatment (except in the case of Madrid), were a responsibility of the CAM by means of the CYII. We recall that for the case of Barcelona the legal responsibilities were slightly different, being the raw water supply first a metropolitan duty.

The budget of the PIAM was around 35,000 million pesetas for five years time for supply infrastructure, urban water infrastructure, wastewater treatment, and riverbank restoration. The PIAM also considered the establishment of an integrated tariff encompassing extraction, distribution, sanitation, and wastewater treatment.

In late 1984 the *Canal de Isabel II* took over the *Fundación provincial para abastecimiento de agua potable* and the CASRAMA (Observatorio de los Servicios Públicos 2005), therefore substantially increasing the supplied municipalities and becoming the supplier of most of the citizens of the CAM.

When the firm was handed to the Autonomous Community of Madrid, it was highly indebted[902]. The contract of the CYII with the state permitted to cover the deficits

[900] *Ley* 17/1984, de 20 de diciembre, *reguladora* del *abastecimiento y saneamiento* de aguas de la *Comunidad de Madrid*

[901] The municipalities according to the legislation could lease this function to third operador (be it private or public).

[902] ABC, Jueves 6 de Junio de 1985, p.41, Interview to Miguel Aguiló, consejero-delegado del CYII, "El Canal de Isabel II depurará el agua para reutilizarla en el abastecimiento", Isabel Montejano

accumulated by the organism (for instance in 1983 and 1984 some 2,400 million pesetas each year according to Martínez Vázquez de Parga (2001a)).

It is important to mention that when the CAM was created all the regulatory proceedings to devolve competences from the State to the CAM were put into motion. By means of the Royal Decree 1873/84[903], of competences and functions over waterworks and water supply, the transference of the CYII to the CAM was laid down. That transference was set in the context of the *Contrato-Programa* 1985-1988 that had the aim to improve the financial and economic situation, to stabilize accounts, and to prepare an investment plan. The contract granted the concession by the State of a subsidy to the CYII and established commercial, technical, financial, and cost reduction objectives for the period 1985-88. To achieve such objectives, Martínez Vázquez de Parga (2001a) argues that the plan a) granted the CYII financial and managerial autonomy, meaning that the firm would act according to business parameters; b) considered the internal reorganization of the firm to undertake the PIAM; c) established a new pricing policy of service cost recovery, based on equity and progressivity and self-sufficiency, with a variable and a fix part. With these actions the corporatization of the *Canal de Isabel II* was a reality.

We can note how by mid 1980s concepts such as "integral water management" or "water reutilization" were already widely used among water planners. Five years before the arrival of the Wastewater European Directive of 1991, one of the challenges and commitments of the 'new' *Canal de Isabel II* was to treat the entirety of wastewater in all the basins.

> "Water is used by the citizen. Afterwards we treat the wastewater, and then we can offer again for use. This is a very important challenge, we have to do it correctly to arrive to the complete recycling of this elemental good", Miguel Aguiló, consejero-delegado del Canal de Isabel II (1985)[904]

To do so the Wastewater Treatment Office was created. It would coordinate the construction of a large numbers of plants to treat wastewater, which was intended to improve ecosystem health. On the other hand, water treatment was stricter, with the use of chlorine dioxide and ozone and also new physical-chemical and biologic

[903] *Real Decreto 1873/1984*, de 26 de Septiembre, *sobre Traspaso de Funciones y Servicios de la administracion del Estado a la Comunidad de Madrid en materia de Obras Hidráulicas y aprovechamientos hidraulicos.*

[904] ABC, Jueves 6 de Junio de 1985, p.41, Interview to Miguel Aguiló, consejero-delegado del CYII, "El Canal de Isabel II depurará el agua para reutilizarla en el abastecimiento", Isabel Montejano

treatments. Regarding wastewater treatment, important progress was made in the 1980s and 1990s, with new water plants to comply with European legislation, which in turn propelled the doubling of the tariffs to pay the large investments (Observatorio de los Servicios Públicos 2005).

The *Plan Estratégico a largo plazo* [Strategic Long Term plan] included the investments to keep pace with the new geographic configuration of the demand and preserve the commercial profitability of the company (Martínez Vázquez de Parga 2001a). From the supply side of the equation, new reservoirs were included in the system, which had a capacity of storage around 1,000 hm^3, and a water allowance per capita in 1987 around 320 lpcd (Martínez Vázquez de Parga 2001a).

The internal reorganization of the Canal included the absorption of the raw water suppliers CASRMA [Consortium for the Supply and Wastewater Treatment in the Guadarrama Mountains] and *Fundación Provincial de Abastecimientos de Aguas Potables* [Regional Foundation for Drinkable Water Supply]. The geographic expansion of the water supply was astonishing: at the end of the PIAM, the *Canal de Isabel II* supplied 111 municipalities, or around 95 percent of the population of the CAM (Martínez Vázquez de Parga 2001a). It was not until 1989 that the *Canal de Isabel II* became the unique water supplier of the city of Madrid[905], once the company took over the water network of *Hidráulica de Santillana*, which supplied water to some 6,000 customers in parts of the *Chamberí* district.

7.6.3 Drought and water planning in the 1990s

At the beginning of the 1990s, the CYII focused on the total quality of the service. A new *Plan de Empresa*[906] [Firm Plan] was drafted for the period 1992-1996 with the aim to improve efficiency, productivity, savings, water quality, system reliability and social profitability. We will come back to this business reorganization when talking about the diversification strategies of the *Canal de Isabel II*, but let us firstly focus on the questions directly related to water supply in the region of Madrid at that time.

A crucial element to understand water politics and water policies in Madrid as well as in Barcelona has been the drought threat. In Madrid, and despite the magnitude of

[905] El País.es, 9/01/89, "El Canal absorbe a otra emprese que summistraba agua a Madrid", J.A.R
[906] See Canal de Isabel II. 1992. "Plan de Empresa 1992-1996". Archivo del Canal de Isabel II.

the public works to increase the water supply and to keep pace with population growth, the ghost of drought has loomed large in some periods (figure 7.12), unleashing water restrictions, for instance by the mid 20th century (those of 1948 or 1964). In 1978-1982, an important drought hit Spain, becoming one of the worst in the last centuries[907]. 1981 especially was the hardest year both in the province of Madrid[908] and in many other parts of Spain[909]. Despite the harshness of the drought of 1981, the *Canal de Isabel II* had by the beginning of that year some 480 hm^3 of water, which represented more than the water needed for a whole year in the city of Madrid and the remainder 40 municipalities supplied by the Canal[910]. It is interesting to compare this data with the one we have exposed for the drought periods of Barcelona, were the stored water was quite lower and security margins much tighter.

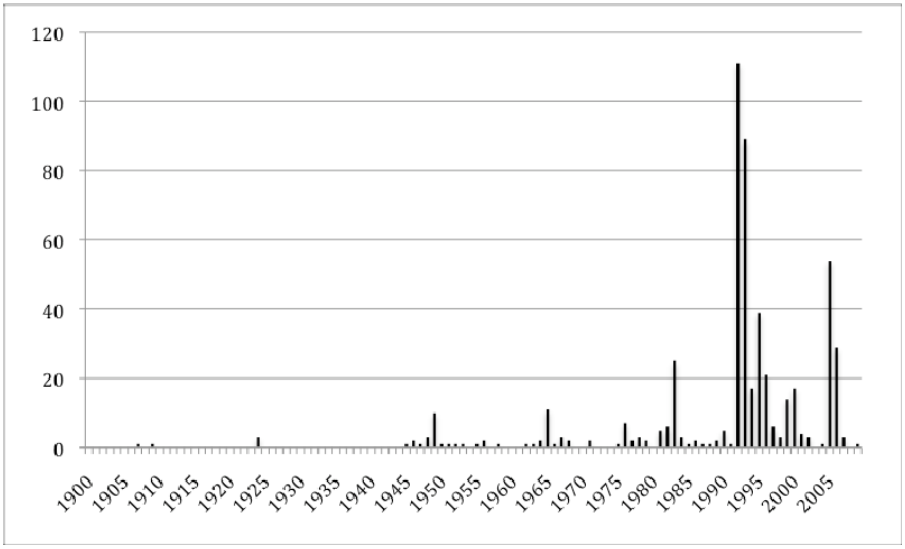
In 1990-1993 another drought hit the region. The drought of 1993 was so pervasive that the water system of Madrid entered into a phase of severe drought (phase 1). In turn this entailed some restrictions for public garden watering and street cleansing[911], but it could not impose restrictions on citizens because of the technical characteristics of the water networks. Instead, in 1993 the Canal announced penalizations for those who did not decrease consumption by 10 percent; this would be accompanied with educational campaigns to save water[912]. Water restrictions were seen by the opposition (the *Partido Popular*) more a result of the poor management of water by the regional socialist government[913] rather than to the drought itself. Some media, such as the journal *Abc* blamed the lack of forecasting of the Canal to be the root of the problem[914]. In an opinion article of this journal, the engineer Carlos Díaz-Guerra[915] qualified the water planning of the regional government a "botched job" guided by the "lack of prevision". Since the

[907] Abc, Domingo 3 de Enero de 1982, p.42, "1981 pasará a la Historia: La peor sequía en dos siglos"
[908] Abc, Viernes 4 de Diciembre de 1981, p.22, "Icona Trata de conseguir agua para salvar la ganadería"
[909] Abc, Domingo 18 de Enero de 1981, p.14, "Media España afectada por la sequía"
[910] El País, Miércoles 28 de Enero de 1981, "Fuertes pérdidas económicas en la agricultura y la ganadería de la provincia a causa de la sequía"
[911] Abc, Sábado 14 de Marzo de 1992, p.40, "Prohibido el riego de jardines y calles en doce municipios de la zona noroeste"
[912] Abc, Martes 6 de Abril de 1993, p.60-61, "La ineficacia del Canal de Isabel II le impide establecer restricciones por la sequía, Salvador Luna
[913] Abc, Miércoles 6 de Mayo de 1992, p.61, "Las restricciones de agua son consecuencia de la mala gestión de la Comunidad, según el PP"
[914] Abc, Martes 6 de Abril de 1993, p.60-61, "La ineficacia del Canal de Isabel II le impide establecer restricciones por la sequía, Salvador Luna
[915] Abc, Domingo 21 de Marzo de 1993, p.78, "El agua que necesita Madrid", by Carlos Díaz-Guerra

inauguration of the *Valmayor* dam in 1976, the journal denounced that just two small dams, *La Aceña* (in the province of Ávila) and *Los Morales* with a total capacity of 15 hm^3 were incorporated into the water system of the CYII[916]. The construction and buying of new wells contributed to relive the water scarcity of 92-93, with over 80 hm^3 (Martínez Vázquez de Parga 2001a).

In this context the CYII proposed to increase the supplies from the Alberche river by means of the interconnections of the existing systems to avoid water restrictions[917,918] and to make the most of the concession of 100 hm^3 the CYII had to draw from this river[919]. A "piping system ring", the M50, and the interconnection of the five existing systems and more emphasis on the search for new resources was also proposed (Martínez Vázquez de Parga 2001a). Some experts criticized such actions, arguing that Madrid water system did not need to increase conduction capacity, but instead the storage capacity and the use of groundwater to guarantee a supply of 19 m^3/s[920].

Figure 7.12. Bibliometrics analysis of the of the drought in Madrid in the Diario Abc, 1900-2008



[916] idem
[917] Abc, Jueves 14 de Enero de 1993, p.57, "Leguina espera no imponer restricciones con la construcción del trasvase del Alberche",
[918] Abc, Viernes 25 de Junio de 1993, p.59, "Tres turnos, de 8 horas cada uno, par alas obras del trasvase de Picada a Valmayor", by Ángeles del Pozo
[919] Abc, Martes 5 de Agosto de 1997, p.52, "La Confederación del Tajo considera como imprescindible el nuevo embalse del Sorbe, by J.L.S
[920] Abc, Domingo 21 de Marzo de 1993, p.78, "El agua que necesita Madrid", by Carlos Díaz-Guerra

Source: own elaboration from the digital newspaper library of the Diario Abc, 1891-2008

In that sense, in 1992 the Tajo Water Agency (*Confederación Hidráulica del Tajo*), with the *Proyecto de Directrices del Plan Hidrológico del Tajo*[921], revived old projects, such as the construction of a dam in the Jarama river (the *Matallana* dam, with 147 hm^3 of capacity), and another one in the Sorbe river (the *Pozo de los Ramos*). The idea to build the *Matallana* dam upstream the *El Vado* dam, already in the province of Guadalajara, could be traced back to the important drought of the 1960s[922], to a project in the 1950s[923] or even as soon as 1920[924].

The *Matallana* dam was subjected to Environmental Impact Assessment in 1993[925]. The disagreement between the Office for the Environment and the Office of Public Works paved the way to the emergence of an environmentalist platform that by means of a very active campaign succeeded in questioning the project (Martínez Vázquez de Parga 2001a), and finally it was paralyzed in 1995[926]. Though the CYII and the very CAM attempted to revive the project, the Spanish Government deemed that it was not necessary. Discrepancies around the necessities of water for Madrid were at the core of the discussion: while the Ministry stated that Madrid's water availability was guaranteed, the Canal argued that future growing demands made mandatory this project[927].

In 1995, the storage capacity of the region was around of 950 hm^3, thanks to the 14 dams and 4 diversion dams of the network. Moreover, there were 113 underground water extraction sites with an overall flow of 4.45 cubic meters per second. In addition there were 100 hm^3 from the Alberche river and other 100 hm^3 from the Sorbe. However, the average annual stored water dropped to 760 hm^3, and the availability could vary from 176 to 26 percent of the storage capacity. That fact proved that the reliability of the system was plunging (Martínez Vázquez de Parga 2001a). By then, the *Canal de Isabel II* had reached agreements with most of the

[921] June 1992. *Proyecto de Directrices del Plan Hidrológico del Tajo*
[922] Abc, 23 de Marzo de 1963, p.20-23, "Está asegurado el normal suministro", by Manuel Adrio
[923] Abc, Martes 6 de Abril de 1993, p.60-61, "La ineficacia del Canal de Isabel II le impide establecer restricciones por la sequía, Salvador Luna
[924] Abc, Viernes 24 de Febrero de 1995, p.59, "Espinar insiste en que la Comunidad seguirá adelante con su proyecto de la línea 10 sobre la Casa de Campo", by Ángeles del Pozo
[925] Abc, Miércoles 17 de Noviembre de 1993, p.68, "Aplazada tres meses la contratación de las obras del embalse de Matallana"
[926] Abc, Miércoles 22 de Febrero de 1995, p.55, "El Canal asegura que paralizar Matallana es una medida temporal", by V.R.
[927] Abc, Viernes 24 de Febrero de 1995, p.59, "Espinar insiste en que la Comunidad seguirá adelante con su proyecto de la línea 10 sobre la Casa de Campo", by Ángeles del Pozo

municipalities of Madrid and supplied almost all the population of the CAM and treated, together with the town council of Madrid, over 97 percent of the wastewater (Observatorio de los Servicios Públicos 2005).

Once the drought of the early 1990s was over it was the turn for the opposite risk: flooding[928] from snow meltdown. Some sectors denounced the "lack of foresight" of the regional government to carry out a project to connect the *El Vado* dam in the Jarama river with *El Atazar*, in the Lozoya. Such project would allegedly prevent flooding in the Jarama basin and increase the availability of water of the system[929]. Some experts argued that the regional government was not implementing such project because it wanted to put pressure on the Ministry of Public Works to carry out the *Matallana* reservoir. The same experts argued that this conduction would only cost some 2,500 million pesetas in front of the 14,000 million de dam would cost, and would be developed within a year providing some extra 100 hm^3 per year[930].

In 1997 the Tajo Water Agency deemed essential the construction of reservoir in the Sorbe river, the *Pozo de los Ramos* dam[931]. The project to build this dam was presented in 1992 together with that of the *Matallana* dam. However, as we mentioned the latter one was eventually rejected on the grounds of the environmental impact it would had. Despite Madrid had since 1954 a concession to draw water from the Sorbe river[932] it could actually just draw a much minor quantity of water through the *El Pozo de los Ramos* diversion dam (operative since 1972) and the conduction to the *El Vado* dam.

7.6.4 The drought of 2005 and the proposals to expand the water footprint of Madrid

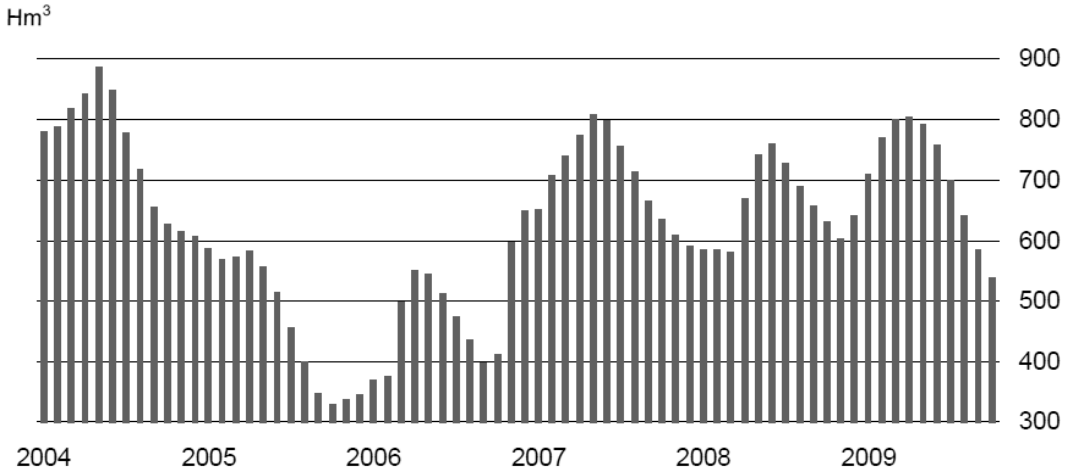
By the turn of the century, for the long term (20 years) the Canal had still in mind the regulation and obtaining of water from the upper Jarama and Sorbe basins by means

[928] Abc, Miércoles 10 de Abril de 1996, p.64-65,"Todo preparado para recibir los cientos de hectómetros cúbicos del deshielo", by Virginia Ródenas
[929] Abc 26 de Enero de 1996, p.61, "La imprevisión socialista obliga al Canal de Isabel II a tirar miles de litros de agua y a provocar inundaciones"/Idem, p.62, "Nueve delos 17 embalses de la region vierten a los ríos para dejar hueco al agua del deshielo", by Virginia Ródenas
[930] Abc, Domingo 28 de Enero de 1996, p.73, "La Comunidad pierde al día el agua equivalente al consumo de Madrid por no hacer una tubería", by Virginia Ródenas
[931] Abc, Martes 5 de Agosto de 1997, p.52, "La Confederación del Tajo considera como imprescindible el nuevo embalse del Sorbe" by J.L.S.
[932] idem

of the construction of dams. For the mid term, the upper course of the Alberche was the main objective[933]. We note that all these new resources were to be obtained beyond the Madrid region borders.

In 2005, another drought hit the region of Madrid, similarly to the rest of Spain (Barcelona included as we have seen in previous chapters). With restrictions looming large, Esperanza Aguirre, the conservative prime minister of Madrid by then, criticized the Spanish government and publicly asked where the 200 hm^3 promised by the Minister of the Environment were[934]. By September 2005 the storage system entered into the severe drought phase (figure 7.13). Subsequent bans on public gardens watering, swimming pools filling and street cleansing were drafted as well as urgent works and new water concessions from the Alberche river and Sorbe were asked to the Tajo Water Agency[935]. Taking into account the strategic groundwater resources and the water stored in the dams, Madrid only had water for a year if rains were not to happen in the following months[936].

Figure 7.13. Water stored in the *Canal de Isabel II* water system, period 2004-2009.



Source: Instituto de Estadística de Madrid

By the end of the year, Esperanza Aguirre had increased the demand for water from 200 to 450 additional hm3 of water to satisfy the needs of the region by 2016[937]. The

[933] Abc, Sábado 25 de Agosto de 2001, p. 36-37, "Hoy y mañana", by Canal de Isabel II
[934] Abc, Viernes 10 de Mayo de 2005, "La región deberá ahorrar un 10 por ciento de agua este verano para evitar restricciones"
[935] El Mundo.es, Jueves 29 de Septiembre de 2005, "Declaran la alerta 1 por sequía severa en la Comunidad de Madrid"
[936] Abc, Lunes 12 de Septiembre de 2005, p.29, "La región tiene garantizada agua sólo para un año si no llueve en abundancia"
[937] Abc, Viernes 25 de Noviembre de 2005, p.38, "Aguirre pide para la region 450 hectómetros cúbicos más de agua hasta 2016", Mariano Calleja

regional government presented a report on the water problems of the region that set a schedule for the incorporation of new flows of water in the system (table 7.10).

Table 7.10. Proposal by Esperanza Aguirre to solve the water problem in Madrid by 2016.

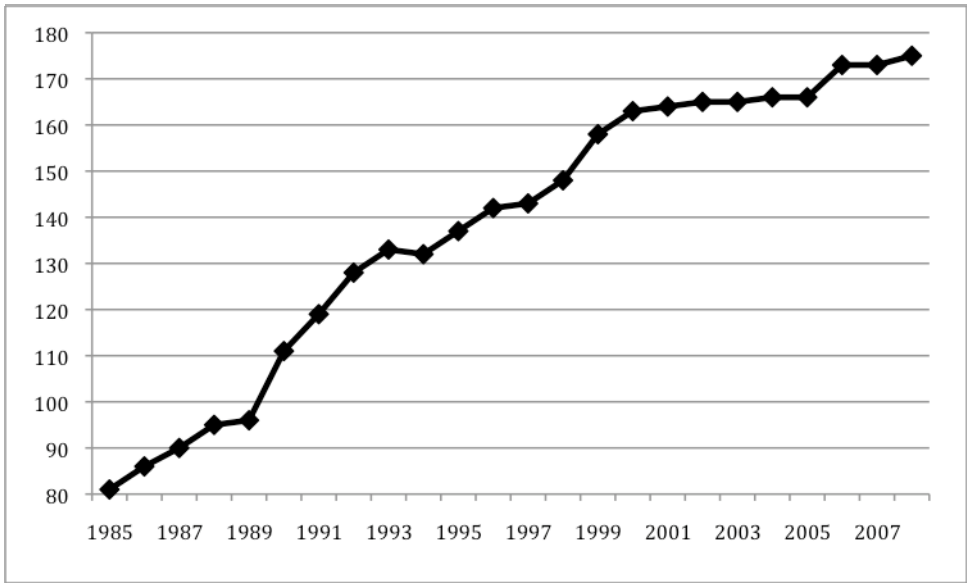
Short term	Mid term	Long term
Concession of additional 120 hm^3 from the Alberche river. Concession of 15 hm^3 from from the Sorbe river Concession of 30 hm^3 from the Guadarrama wells Concession of 45.5 hm^3 from the Tajo	Increase in 80 hm^3 the resources from the Jarama river Increase the resources from the Tajo in 20 hm^3	Increase in 90 hm^3 per year the concession from the Alberche river Increase in 60 hm^3 from the Tajo river

Source: adapted from Abc[938]

More than 150 years after the foundation of the modern water supply of the city of Madrid, the CAM state-owned firm *Canal de Isabel II* serves some 175 municipalities (figure 7.14) with a population over 6.3 million people[939]. From drawing little quantities of water from the Lozoya river the *Canal de Isabel II* has been incorporating resources from other rivers within and beyond the regional limits of the *Comunidad Autónoma de Madrid*. Similar to the expansion of the physical infrastructure, in the last decades the CYII has been expanding its activities beyond the water supply industry and also beyond the regional limits of the CAM.

[938] idem
[939] Data corresponding to the year 2006, *Instituto Nacional de Estadística*.

Figure 7.14. Number of municipalities supplied by the *Canal de Isabel II*, 1985-2008



Source: own elaboration from Instituto de Estadística de Madrid and Canal de Isabel II

The *Canal de Isabel II* obtains water from seven different rivers, all of them with sources in the *Sierra de Guadarrama*: Alberche, Guadarrama-Aulencia, Guadalix, Manzanares, Lozoya, Jarama and Sorbe (in the province of Guadalajara). The system has currently in operation 14 dams, with a capacity to regulate some 955 hm^3 in 6 of these rivers (table 7.11). It is important to mention that apart from these 14 dams owned and managed by the *Canal de Isabel II* to serve the urban population, there are 29 other dams in the CAM, owned either by the State (13) or by private entities (16). These are mainly aimed to regulate the river flow, for irrigation purposes or for hydroelectric production[940].

To complement the storage system and divert the stored water, there are four diversion dams (table 7.12) along the Lozoya, Guadalix, Sorbe and Guadarrama basins, as we can observe in map 7.5.

[940] *Confederación Hidrográfica del Tajo* webpage, www.chtajo.es, last accessed 31st December 2009

Table 7.11. Dams currently operative for the water supply in the CAM, 2009.

Dam	Basin	Operating since	Capacity (hm^3)
El Villar	Lozoya	1879	22,4
Puentes Viejas		1939	53
Riosequillo		1958	50
Pinilla		1967	38,1
El Atazar		1972	425
El Vado	Jarama	1960	55,7
Pedrezuela	Guadalix	1968	40,9
Manzanares el Real	Manzanares	1912/1971	91,2
Navacerrada		1969	11
Navalmedio	Guadarrama	1969	0,7
La Jarosa		1969	7,2
Valmayor		1976	134,4
Los Morales	Alberche	1988	2,3
La Aceña		1991	23,7

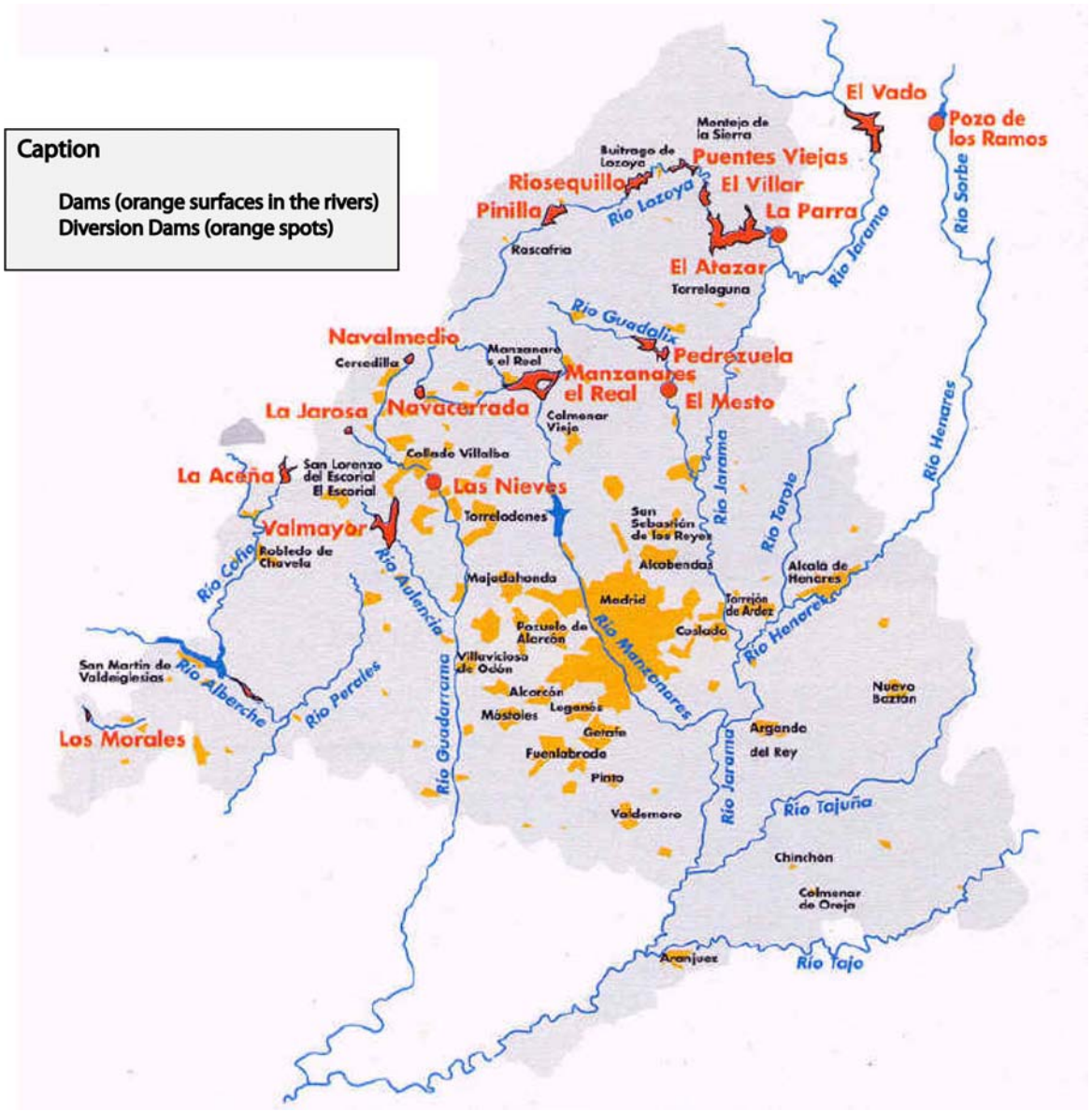
Source: own elaboration from Canal de Isabel II (www.cyii.es)

Table 7.12. Diversion dams currently operative for the water supply in the CAM, 2009.

Dam	Basin	Operating since
La Parra	Lozoya	1904
El Mesto	Guadalix	1906
Pozo de los Ramos	Sorbe	1972
Las Nieves	Guadarrama	1974

Source: own elaboration from Canal de Isabel II (www.cyii.es)

Map 7.5. Reservoir system of the *Canal de Isabel II*, year 2000

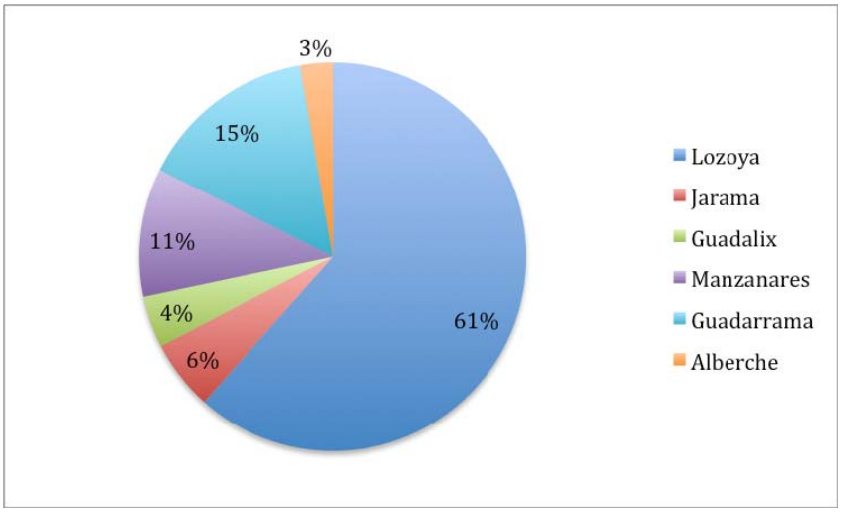


Source: adapted from Canal de Isabel II and Raúl Sanz (2001)[941]

Most of the surface water Madrid consumes comes from the Lozoya river (figure 7.16), the basin with a higher capacity of water storage (figure 7.15), with *El Atazar* dam providing almost half of the storage capacity of the CYII system (table 7.12). Historically, the Guadarrama and the Manzanares rivers are the second and third major suppliers. The Jarama and the Guadalix rivers provide a smaller share of the water resources. Eventually, the Alberche river was the latter one to have dams regulating the flow. In addition to these dams, the CYII has in operation some diversion dams along the Lozoya.

[941] http://www.iesleonardo.info/san/comenius/, last accessed 24th November 2009

Figure 7.15. Percentage of storage capacity of each basin in relation to the total storage capacity in the CAM, 2009.



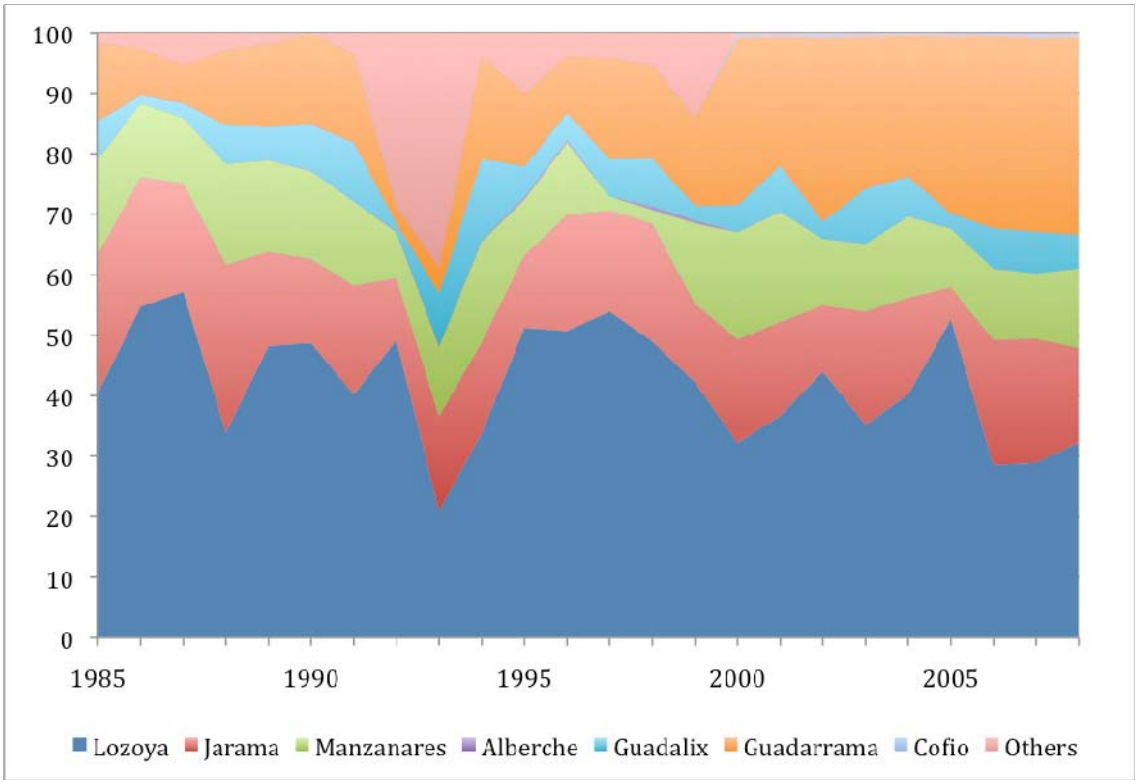
Source: adapted from Canal de Isabel II (www.cyii.es)

Although the Lozoya basin has by large the highest share of water storage capacity (figure 7.15), the Lozoya river currently provides a similar quantity of water than the Guadarrama basin (both around 32 percent, according to the *Instituto de Estadística de Madrid*) as we can observe in figure 7.16.

In 2004, the *Canal de Isabel II* forecasted that the CAM would experience serious supply problems from the year 2012, especially in the dry years. As a solution the manager of the CYII proposed to go beyond the Autonomous community borders to search for more water, especially in the Sorbe and Alberche rivers[942], as the Region rivers were already fully regulated. The quest for water has continued since then. By 2010 the CYII water system will add a new source of water: the Tajo river. Since the foundation of the CYII Madrid has been feed with water from the tributaries of the Tajo river, but never directly from this major river. By means of the construction of a treatment plant in Colmenar de Oreaja, a 33 kilometers long pipe and a water tank with a capacity of 22,000 m^3, some half million of people from the south of the region of Madrid[943] would receive over 60 hm^3 per year from this river[944].

[942] El Mundo.es, Martes 3 de Febrero 2004, "El Canal de Isabel II prevé problemas de abastecimiento de agua a partir del año 2012"
[943] The plant would serve the following municipalities: Aranjuez, Belmonte de Tajo, Ciempozuelos, Chinchón, Colmenar de Oreja, Getafe, Morata de Tajuña, Parla, Perales de Tajuña, Pinto, San Martín de la Vega, Titulcia, Valdelaguna, Valdemoro and Villaconejos.
[944] Press release Canal de Isabel II, 27th april 2009, "El Canal de Isabel II tomará agua del Tajo por primera vez en su historia"

Figure 7.16. Origin of the water consumed in the CAM by basins, 1985-2008, in percentage.

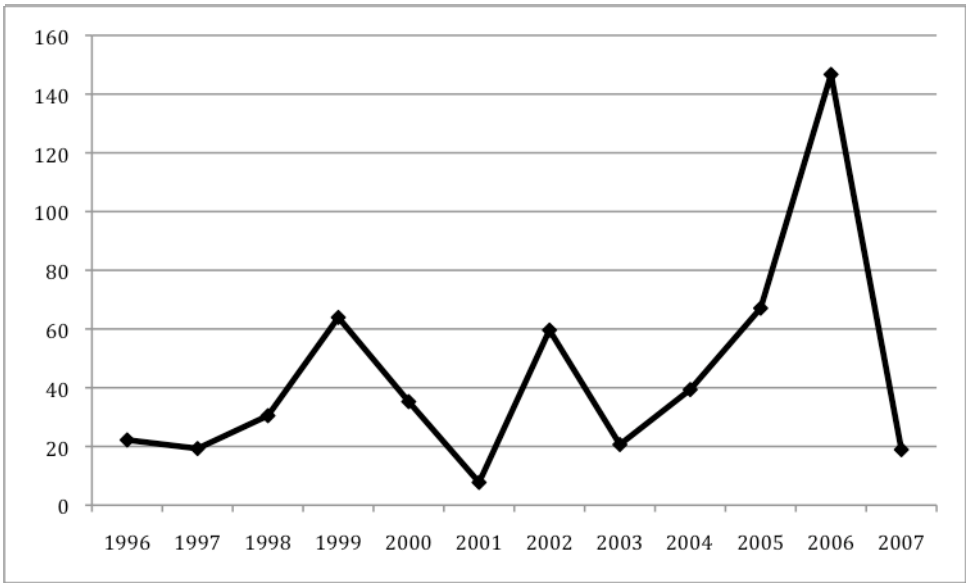


Source: own elaboration from Instituto de Estadística de Madrid and Canal de Isabel II

The *Canal de Isabel II* also uses groundwater from the tertiary detritic aquifer and limestone of Torrelaguna[945], where 81 stations are located. However, the large part of underground waters is left aside as strategic resources for periods of water scarcity or in cases of anomaly of the system. These periods of scarcity are calculated in one each four or five years, so the aquifer could be recharged in a sustainable manner. Figure 7.17 shows that during the drought of 2005-2006 over 140 hm^3 were extracted from the wells and aquifers, compared with the average extraction around 40 hm^3.

[945] Maximum capacity 85 hm^3 and 12 hm^3 respectively

Figure 7.17. Groundwater extraction by the CYII, in hm^3, 1996-2007.



Source: own elaboration from Instituto de Estadística de Madrid and Canal de Isabel II

Once water is stored and diverted from the rivers it has to be treated. In the CAM there are currently 12 treatment plants (table 7.13) with a capacity to process some 43 m^3/s, i.e. 3.75 hm^3 per day.

To store momentarily the water extracted from the dams and also the water that has been treated, the *Canal de Isabel II* system includes some 22 high-capacity water deposits (table 7.14), with a regulatory capacity of 2.6 hm^3, and around 240 smaller ones. Some 18 lifting stations complement the water tanks system and aid to bring water to the more elevated areas of the CAM.

To bring water to the citizens the CYII has a system of arteries and high-diameter pipes interconnected by a ring (table 7.15). Currently, another ring, the *Segundo Anillo de distribución de agua* [Second ring of water distribution], is being constructed. This *"M-50 del agua"*[946], with over 100 kilometers of piping system, will connect the main sites of supply and the main arteries supplying the growing metropolitan area[947]. To bring water to the citizens, the CYII had in 2008 over 14,440 kilometers, with water losses between 12.3 and 14.5 lpcd in 2006[948].

[946] The M-50 is one of the concentric motorways of Madrid. This piping system has adopted this name because it traces this road.
[947] Press release Canal de Isabel II, 22nd October 2009, "La Comunidad invertirá 61,6 millones en la *M-50 del agua* para mejorar el suministro en El Corredor"
[948] Source: Instituto de Estadística de Madrid and Canal de Isabel II (booklet Magnitudes del Canal, 2009)

Table 7.13. Treatment plants in the CAM, 2009.

	Treatment capacity		Year of foundation
	m^3 per day	m^3 per second	
Torrelaguana	520,000	6.0	1967
Majadohonda	330,000	3.8	1967
El Bodonal	345,000	4.0	1969
Navacerrada	86,000	1.0	1969
La Jarosa	130,000	1.5	1969
Santillana	345,000	4.0	1972
Colmenar	1380,000	16.0	1976
Valmayor	520,000	6.0	1976
Rozas de Puerto Real	15,000	0.2	1988
Pinilla	36,000	0.4	1992
La Aceña	43,000	0.5	2000
TOTAL	3,750,000	43.4	

Source: own elaboration from Canal de Isabel II (www.cyii.es)

Table 7.14. Urban water deposits owned by the *Canal de Isabel II*, 2009.

	Storage capacity (m^3)	Year of foundation		Storage capacity (m^3)	Year of foundation
Bravo de Murillo	188,412	1879	Getafe	254,897	1975
Islas Filipinas	463,500	1915	Valmayor	94,967	1976
Valdelatas	33,408	1915	Ciudad Tres Cantos	78,624	1978
El Olivar	44,232	1919	Majadohonda	40,000	1984
Plaza Castilla	141,602	1940	Torrelaguna	13,500	1989
Hortaleza	81,000	1962	Valgallegos	20,500	1990
San Blas	53,767	1965	El Chaparral	19,000	1992
Vallecas	120,698	1967	La Jarosa	18,400	1992
El Plantio	143,176	1967	Navacerrada	20,000	1992
El Goloso	534,355	1969	Nuevo Portachuelo	18,400	1993
Retamares	250,556	1969	Reunión	37,000	1994

Source: own elaboration from Canal de Isabel II (www.cyii.es)

Table 7.15. Main water conductions developed in the region of Madrid since the foundation of the CYII

	since	Length	conduction capacity (m^3/s)	Origen	End
Canal Bajo	1858	59	4	Original deposit Lozoya	Madrid
Canal de la Parra	1904	23	3	Azud de la Parra	Canal Bajo
Canal de El Guadalix	1906	4	4	Azud de El Mesto	Canal Bajo
Canal de Santillana	1912	36	4,5	Manzanares El Real dam	Madrid
Canal de El Villar	1912	16,7	8	El Villar dam	Original deposit Lozoya
Canal Alto	1940	55	6	Original deposit Lozoya	Madrid
Canal del Este	1945	13,7	3,25	El Olivar	Vallecas (Madrid)
Canal de El Jarama	1960	35	8	El Vado dam	Original deposit Lozoya
Canal de Picadas	1967	49,2	3,8	Picadas dam	Majadahonda
Canal del Oeste	1968	30,7	3	El Goloso water tank	Retamares water tank
Canal de El Vellón	1968	7	8	Pedrezuela dam	El Atazar channel
Transfer Nalvmedio-Navacerrada	1969	4,5	5,8	Navalmedio dam	Navacerrada reservoir
Canal de El Atazar	1970	59	16	El Atazar	Madrid
Canal de El Sorbe	1972	9,3	8	Pozo de los Ramos diversion dam	Jarama channel
Canal de Valmayor	1976	17,4	6	Valmayor dam	Majadahonda
Nieves water transfer	1976	5,1	30	Las Nieves diversion dam	Valmayor dam
La Aceña-La Jarosa water transfer	1991	10,2	10	La Aceña dam	La Jarosa dam
S.Juan-Valmayor	1993	32	6	San Juan dam	Valmayor dam

Source: own elaboration from Canal de Isabel II webpage, López de Berges y de los Santos (1975) and Raúl Sanz (2001)[949]

[949] http://www.iesleonardo.info/san/comenius/, last accessed 24th November 2009

Along the supply system, there are also 9 laboratories and 31 automatic surveillance stations to guarantee the quality of the water.

As we mentioned, the *Canal de Isabel II* manages the integral water cycle in the CAM, which included wastewater treatment and sanitation operations. In 1985, once the PIAM was enacted the first wastewater treatment plants (EDAR, in Spanish) were started to be built, basically in those municipalities discharging their water upstream the water reservoirs and also in the industrial areas. Later the *Plan de Saneameinto de Madrid (PSD) 1995-2005* was undertaken, including the *Plan 100 por 100 depuración* that foresaw the full wastewater treatment in the CAM, and complying with the Wastewater European Directive[950] all the urban and industrial used waters were treated in the CAM.

Currently, the CYII manages all wastewater treatment of the Madrid region thanks to the agreement in 2005 between the city of Madrid and the CYII regarding the sewage and wastewater treatment in the capital. As a result of the contract, the CYII would manage the sewage and wastewater system of the city of Madrid until 2030 and the town council would receive 700 million Euros in return[951]. In total there are 149 wastewater treatment plants, around 5,000 kilometers of sewerage system and 700 collectors. Related to wastewater, there is an ongoing plan, the plan *Madrid dpura*, in Madrid to use reclaimed water for urban park irrigation and industrial uses. The plan *Madrid dpura*[952] foresees the reutilization of some 70 hm^3 per year, new wastewater treatment plants and the improvement of existing ones.

[950] Directive 91/271/CEE
[951] Press release, 26th September 2005, "Aguirre y Ruiz-Gallardón firman un acuerdo para la gestión integral del agua en la capital", Comunidad de Madrid and Ayuntamiento de Madrid
[952] Plan de Depuración y Reutilización del agua en la comunidad de Madrid 2005-2010

7.7 Diversification and the expansion of the Canal de Isabel II beyond the regional borders

From the 1990s onwards the management board of the CYII approved the development of a policy of activity diversification and expansion, provided that the priority continued to be water supply in the CAM (Martínez Vázquez de Parga 2001a). The decree 51/2002[953] (article 3) reformulated the functions of the *Canal de Isabel II*. On the one hand, it asserted the duty of water supply in the city of Madrid, and water supply and sanitation in the CAM. On the other hand, it also considered the possibility of providing consultancy and technical assistance services regardless of the territorial scope (3.1). In addition, the same article (3.2) enabled the Canal to develop commercial or industrial activities directly linked to its core functions; in that sense, the CYII was allowed to participate in commercial societies.

The diversification included pushing forward the energy production sector, developing telecommunications and mobile communications businesses, or even environmental businesses. It also included the internationalization of the water supply business and the creation of subsidiary water firms and ventures with other private suppliers.

7.7.1 Water

In 1991 the CYII obtained its first water concession beyond the CAM borders. It was in Cáceres, in the neighboring *Castilla-La Mancha* Autonomous Community. The next step in the expansion was not Spain but Argentine[954]: the participation in the tender for the water supply in Buenos Aires that eventually was won by AGBAR. By the mid 1990s, the Canal created together with the AGBAR group, Endesa and Argentaria[955] the society Interagua in order to participate in tenders for water supply in Spain and Latin America.

[953] *Decreto 51/2002, de 4 de Abril, por el que se regula la naturaleza, funciones y órganos de gobierno del Canal de Isabel II*
[954] El País, Martes 7 de Enero de 1992, "El Canal estudia inverter en Argentina, según apunta el PP"
[955] ABC, Domingo 24 de Marzo 1996, p.48, "Ricardo Fornesa: La nueva ley del seguro favorece de alguna manera a las empresas más grandes", Paloma Díaz-Jares

The materialization of the international expansion of the water business of *Canal de Isabel II* can be traced back to 2000, with the beginning of technical assistance contracts between the CYII and the World Bank to carry out projects in countries such as Brazil, Venezuela, Cuba or Argelia (Ortega de Miguel and Sanz Mulas 2007). The World Bank qualified the *Canal de Isabel II* as a model firm in 2001. This is why the CYII, especially in Latin America, executed some projects totally or partially financed by this financing organism. At the end of 2001, the Canal consolidated this international expansion with the acquisition of 75 percent (for some 73 million dollars) of the Colombian firm INASSA[956,957] in a joint operation with the Valencia-based firm Tecvasa. Tecvasa was constituted in 1999 by a consortium of water sector Valencia firms and the bank *Caja de Ahorros del Mediterraneo*[958].

Once the offer was accepted, the consortium created the Special Purpose Vehicle Company (SPV) *Canal Extensia Sociedad Anónima*, with the authorization of the CAM parliament[959]. In addition, the *Canal de Isabel II* was authorized by the Regional parliament to take out a long-term loan of some 51.1 million dollars[960].

INASSA, owning the Colombian firm Triple AAA, had concessions in several Latin American countries such as Venezuela, Ecuador (in Samborondón) or Dominican Republic (Santo Domingo) apart from Colombia. Triple AAA bought to the AGBAR group the concessions in Colombia of Barranquilla, Santa Marta, Soledad and Puerto Colombia (García and Marín 2008). Regarding the Colombian business, the managers of the Triple AAA company argued that "the Colombian WSS [Water Supply and Sanitation] sector is not attractive for investors" due "serious threats" as regulatory instability, tax pressure, political use of tariffs or the legal framework changes[961] despite the company was performing well (Ortega de Miguel and Sanz

[956] Expansión.com, 17/11/01, "Canal de Isabel II se hace con el 75% de Inassa"
[957] Expansión.com, 4/3/02, "El Canal de Isabel II desembarca en aguas latinoamericanas"
[958] Cinco Días.com, 3/5/02, "Tecvasa gana su tercer contrato de gestión de agua en Colombia", Joaquim Clemente / Tecvasa webpage: www.tecvasa.com Last accessed 19th November 2009
[959] *ACUERDO de 29 de noviembre de 2001, del Consejo de Gobierno, por el que se autoriza al Canal de Isabel II para la constitución de la Empresa Pública "Canal Extensia, Sociedad Anónima", y a esta empresa, una vez constituida, para adquirir a título oneroso acciones de "Interamericana de Aguas y Servicios, Sociedad Anónima" ("INASSA"), por un total de 73.000.000 de dólares, aprobando un endeudamiento de 51.100.000 dólares. B.O.C.M 285, p.30, 4116*
[960] idem.
[961] Power point presentation by Javier Malia, "Public-Private Synergies for Water Public Service Management: The Experience of Triple A de Barranquilla", at the WB's Water Week, Washington, Februrary 2004. Document retrieved from:
http://siteresources.worldbank.org/EXTWSS/Resources/337301-1147283808455/2532553-1149773713946/Malia_PublicPrivateSynergies.pdf , last accessed 19th November 2009

Mulas 2007). In 2005, when allegedly the company finished its expansion in Latin America (García and Marín 2008), Watco Dominicana and Inassa were the two key axes of businesses, the latter having in turn different subsidiary companies (figure 7.18). In Latin America the CYII supplied a population of 6-7 million people[962].

Eventually, in 2006 Tecvasa sold 25 percent of participations it had in the joint venture to the CYII (Ortega de Miguel and Sanz Mulas 2007). From 2004, Tecvasa reoriented its objectives, focusing on the Spanish water supply and sanitation (WSS) market and irrigation modernization, especially in the Autonomous Community of Valencia[963]. Despite leaving all the joint ventures with the *Canal de Isabel II*, TECVASA currently manages some service contracts in Dominican Republic (Santiago de los Caballeros, 700,000 people; Puerto Plata, 200,000 people) [964].

Similar to the trajectory of AGBAR, a major step forward of the CYII in becoming a transnational company was the entrance into the Chinese water market in 2005; concretely in the Chinese region of Shangdong (south-east of Beijing). At a first step, the CYII was awarded the technical part of the construction of a giant wastewater treatment plant. It was also foreseen the collaboration with a project to supply 90 million people in this country. According to the president of the CYII, and referring to the firm:

> "We are efficient in the integral treatment of water along all its cycle and this is recognized world-widely. That is why we were not surprised when hearing that China was interested in our systems our methods and our technologies"[965]

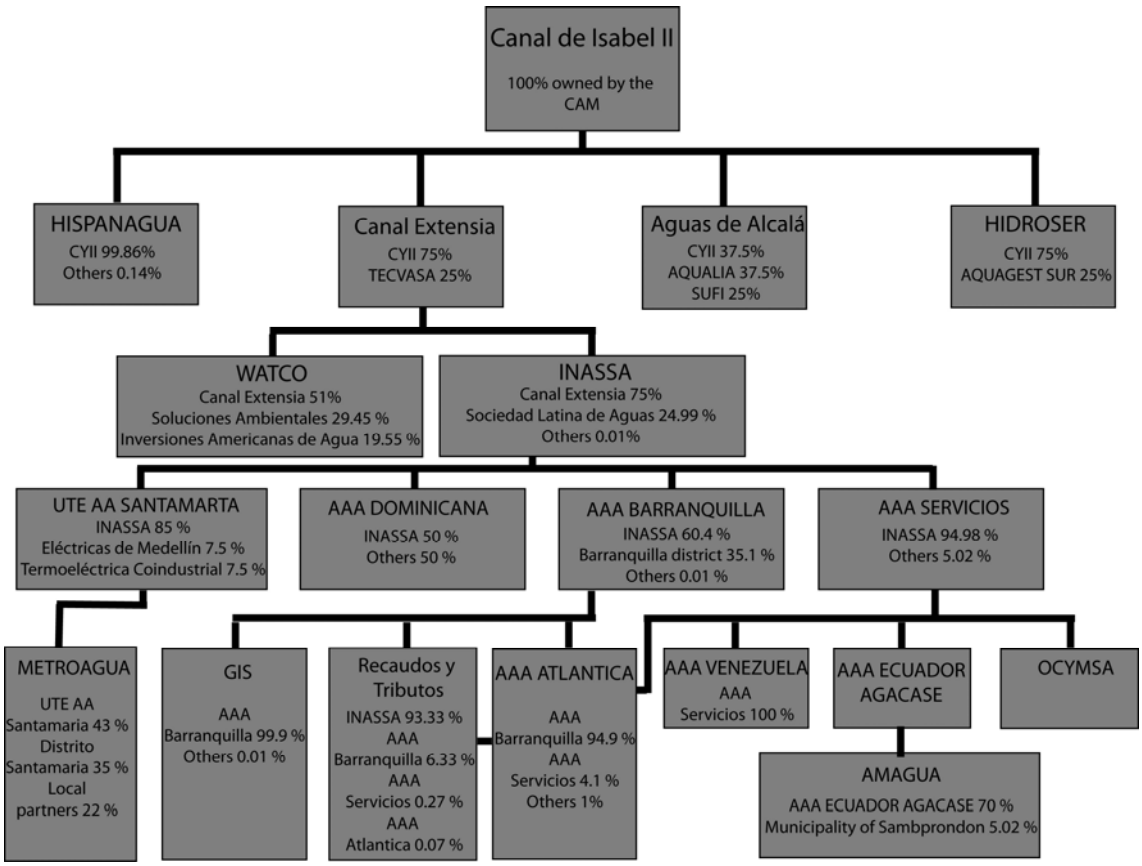
In 2004, the CYII in a partnership with Aqualia and SUFISA, *Aguas de Alcalá*, was awarded with the concession of the water supply in Alcalá de Henares, one of the few municipalities that were not supplied by the CYII in Madrid. As Ortega de Miguel and Sanz Mulas (2007) this kind of agreement signified an important change in the relations between the CYII and the municipalities (public-public).

In the water sector the CYII owns more companies: *Hispanagua* and *Hidroser*. The former, *Hispanagua*, was created in 1995 with the main objective to build, maintain

[962] ABC, Lunes 31 de Enero 2005, p.82, "El Canal de Isabel II desembarca en China dentro de un proyecto para dar agua a 90 millones de personas", Miguel Larrañaga
[963] Tecvasa webpage: www.tecvasa.com. Last accessed 19th November 2009
[964] idem
[965] Our translation, words by Ignacio González, president of the CYII and vicepresident of the CAM, ABC, Lunes 31 de Enero 2005, p.82, "El Canal de Isabel II desembarca en China dentro de un proyecto para dar agua a 90 millones de personas", Miguel Larrañaga

and exploit infrastructures related to the water cycle. *Hidroser*, constituted in 1994 was created with the aim to develop commercial activities in the integral water cycle, and currently manages the concession in Cáceres.

Figure 7.18. Structure of the water business of *Canal de Isabel II*, 2005



Source: adapted from Cámara de Cuentas (2005c) and Ortega de Miguel and Sanz Mulas (2007)

7.7.2 Energy production and supply

Apart from the internationalization and diversification of the water business, the *Canal de Isabel II* also extended its reach to the energy sector. Already in 1965 the CYII bought the shares of *Hidroeléctrica Española* and *Unión Fenosa* in *Hidráulica de Santilla*[966]. By then the latter firm focused on the production of electricity from the Santillana dam and also had the concession to supply part of Madrid. As we have seen, the increasing needs of water of Madrid by the 1960s obliged the *Canal de Isabel II* to acquire this firm in order to unify the water network (Jiménez 2003),

[966] Canal de Isabel II webpage: www.cyii.es. Last accessed 19th November 2009

although the total monopoly of the Canal in water supply was not obtained until 1989-1991 with the formal handing out of the remaining water assets of *Hidráulica*.

In the early 1990s some of the existing power stations (Torrelaguna and Navallar) were improved, new small hydraulic power stations were built along the Lozoya river dams and eight energy transport lines were also built (Martínez Vázquez de Parga 2001a). Once finished they were handed out to *Hidráulica de Santillana* for its exploitation until 2016 (Ortega de Miguel and Sanz Mulas 2007).

In the 1995, and because the need of financing for the construction of production plants in the Lozoya river, part of the firm was sold out to private capital. Interestingly it was *Aguas de Barcelona* who bought 49 percent of the shares of *Hidráulica de Santillana* to *Canal de Isabel II*[967]. The relation between the private company and *Canal de Isabel II* was ridden with difficulties, as the main objective of the former one was to produce as much energy as possible, while the latter one had to manage to keep the reservoirs high for drought periods[968]. Eventually, the Catalan water company offered the Canal to buy back the shares, and the public organism accepted.

In 1997, once the *Partido Popular* was ruling the CAM, the privatization of *Hidráulica de Santillana* was put on the table again, with an offer by *Hidroeléctrica del Cantábrico* to buy 51 percent of the shares of the company[969]. Eventually, *Hidroléctrica* bought 49 percent of the shares. However, climate conditions, especially droughts, jeopardized to some extent the activity of energy production[970]. Despite this, in 2002, *Hidroeléctrica del Cantábrico*, by then controlled by the energy group EDP, and *Canal de Isabel II* created a new holding society, *Canal de Energia S.L.* with the objective to commercialize electricity and gas in the region of Madrid[971]. In this new society, *Hidráulica del Cantábrico* owned most of the shares

[967] ABC, Domingo 24 de Marzo 1996, p.48, "Ricardo Fornesa: La nueva ley del seguro favorece de alguna manera a las empresas más grandes", Paloma Díaz-Jares

[968] Opinion of Óscar Jiménez Bajo. Secretario General de la Agrupación Socialista de Torrelaguna. "La privatización del Canal de Isabel II", Friday 26th September de 2008, http://blogdeoscarjimenezbajo.blogspot.com/ Last accessed 20th November 2009

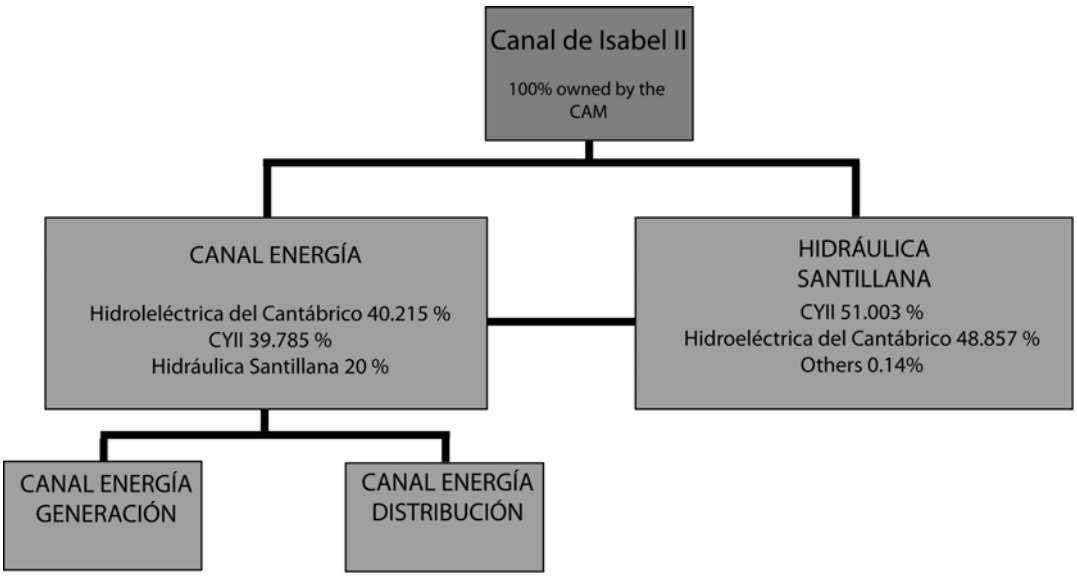
[969] ABC,Miércoles 30 de Abril 1997, p.67, "La Comunidad obtendrá 2.500 millones con la privatización de Hidráulica Santillana", Ángeles del Pozo

[970] La Voz de Asturias, 14/3/06, "HC desiste de crear un grupo energético con Canal de Isabel II", Pablo A. Rubio

[971] *European Commission, 14/6/2002. Asunto nº. Comp/M. 2819 – Canal Isabel II/Hidroeléctrica del Cantábrico. Notificación de 8.5.2002 de conformidad con el artículo 4 del Reglamento nº4064/89 del Consejo.* Available at: http://ec.europa.eu/competition/mergers/cases/decisions/m2819_es.pdf Last accessed 20th November 2009

(figure 7.19). The major energy suppliers of Madrid (*Unión Fenosa* and Iberdrola) deeply criticized the fact that a public company, *Canal de Isabel II*, used relation with its clients to sell the services of a private company.

Figure 7.19. Structure of the energy production business of *Canal de Isabel II*, 2005



Source: adapted from Cámara de Cuentas (2005c) and Ortega de Miguel and Sanz Mulas (2007)

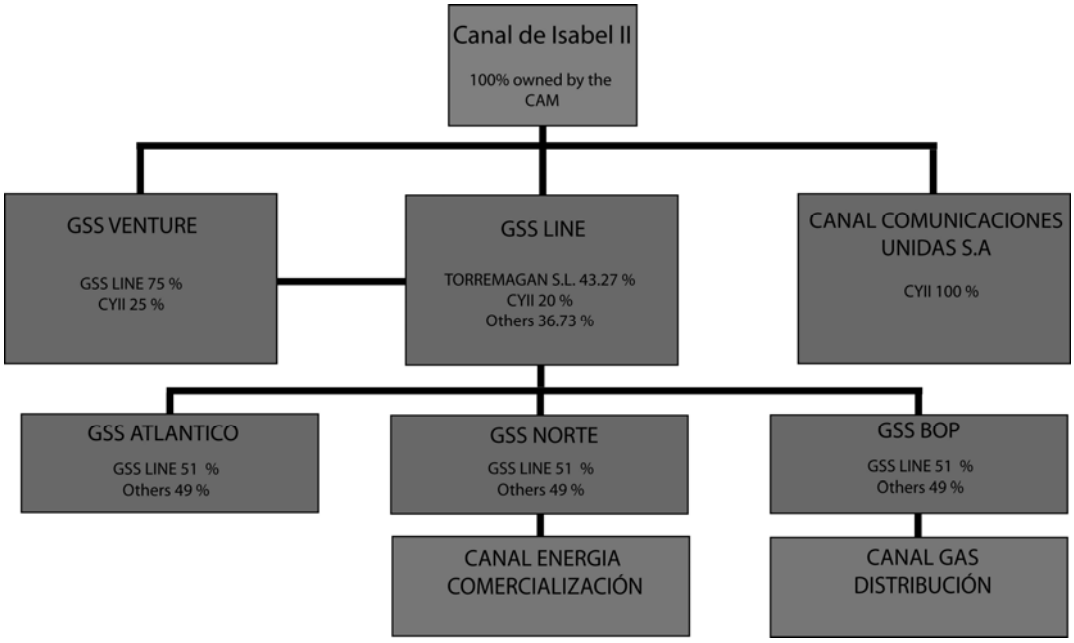
Eventually, in 2006 the agreement between the two companies was extinguished and the *Canal de Isabel II* acquired all the shares of both *Hidráulica de Santillana* (producing electricity) and *Canal Energía* (in charge of distributing and commercializing the electricity produced and also gas)[972]. The production of energy of *Hidráulica Santillana* by 2000 reached some 100,000 MWh (Jiménez 2003) while by 2007 had decreased to some 84,000 MWh (DG de Industria, Energía y Minas 2009) and was mainly obtained from seven dams: *Navallar, Pinilla, Torrelaguna, Riosequillo, Puentes Viejas, El Villar* and *El Atazar*. It is also interesting to remark that the CYII also produced some 50,000 MWh from the wastewater treatment plants (DG de Industria, Energía y Minas 2009) in turn used for the operation of the same installations.

[972] La Voz de Asturias, 14/3/06, "HC desiste de crear un grupo energético con Canal de Isabel II", Pablo A. Rubio

7.7.3 Mobile communications

Similar to the Barcelona case, the water supplier of Madrid also entered the telecommunication sector. With time, the modernization of the CYII water infrastructure prompted the development of some telecommunication services (telecontrol, mobile and ground telephones, data transmission, etc) to control the water supply. The surplus capacity and infrastructure was eventually leased to some firms. Under some UTE (*Unión temporal de empresas*) schemes, joint adventures were engaged with *Unión Fenosa* creating *Canal de Comunicaciones Unidas* or with Sistelcom-Telemensaje, creating Sogatel (Martínez Vázquez de Parga 2001a).

Figure 7.20. Structure of the telecommunication business of *Canal de Isabel II*, 2005



Source: adapted from Cámara de Cuentas (2005c) and Ortega de Miguel and Sanz Mulas (2007)

Eventually some of these firms were totally acquired by the CYII as it happened with *Canal de Comunicaciones Unidas* (figure 7.20), centered in telecommunications and the environment in Madrid and Guadalajara[973]. In 2000 the *Canal de Isabel II* entered into Global Sales Solution group (GSS group), dedicated to contact centre services and field marketing, with 20 percent of the shares. In turn, the telecommunications platform served the CYII to complement its Energy adventure.

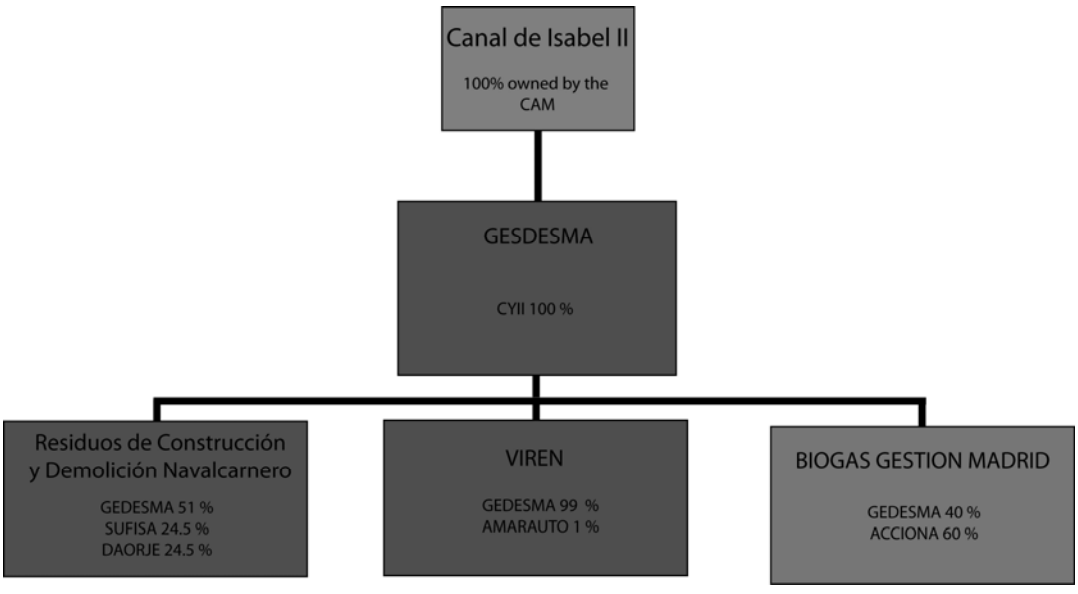
[973] Webpage Canal de Isable II, www.cyii.es. Last accessed 20th November 2009.

Eventually in 2007, GSS line, devoted to customer service, was sold to the Italian company Omnnia[974].

7.7.4 The environmental business

Establishing parallelisms with the AGBAR group, we argue that environmental management was seen a business niche by the Madrilenian water group. Until mid 2005 the *Canal de Isabel II* was the owner of the firm *Gestión y Desarrollo del Medio Ambiente de Madrid* (GEDESMA) focusing on clean energy production (solar, biogas and also in waste treatment (urban waste and construction)[975]. This firm had participations in other ventures with private partners (figure 7.21), for instance a joint venture with ACCIONA related to biogas production and management. Gedesma also was involved in the management of waste, especially from the building sector. In 2009, GEDESMA is no longer part of the *Canal de Isabel II*, but has become a Plc directly owned by the Madrid regional government. In a first step, by the second half of 2005 the regional administration acquired most of the environmental firm[976] to be eventually and fully acquired in 2006[977].

Figure 7.21. Structure of the Environment business of *Canal de Isabel II*, 2005



Source: adapted from Cámara de Cuentas (2005c) and Ortega de Miguel and Sanz Mulas (2007)

[974] El País.es, 30/7/09, "El Canal de Isabel II cambia de gerente y anula su contrato estrella", Inmaculada G. Mardones
[975] See http://www.gedesma.es/, last accessed 19th November 2009
[976] *Acuerdo del Consejo de Gobierno de 16 de Junio de 2005*
[977] *Acuerdo de fecha 28 de diciembre de 2006*

7.8 Conclusion: from a local to a international company

> "Throughout its 154 years of history, the *Canal de Isabel II* has become one of the world leaders of water supply, with worldwide recognized prestige. […] In 2001, the World Bank qualified this entity as a model firm whose success could be exportable to other exploitations of the integral water cycle. Is therefore, one of the oldest firm in water management in the world, unique operator made up 100 percent of Spanish capital and one of the of the entities locomotoras of the Madrid economy" [978]

From a small state-owned firm dependent on the Ministry of Public Works, the *Canal de Isabel II* has changed the organizational structure several times, gaining the status of an independent state-owned company and forming part of the *Comunidad de Madrid* structure since its creation in 1984. Since then onwards, especially the 1990s, the *Canal de Isabel II* has been expanding its activities, such as energy production and commercialization, or telecommunications. Furthermore, it has become an international supplier of water.

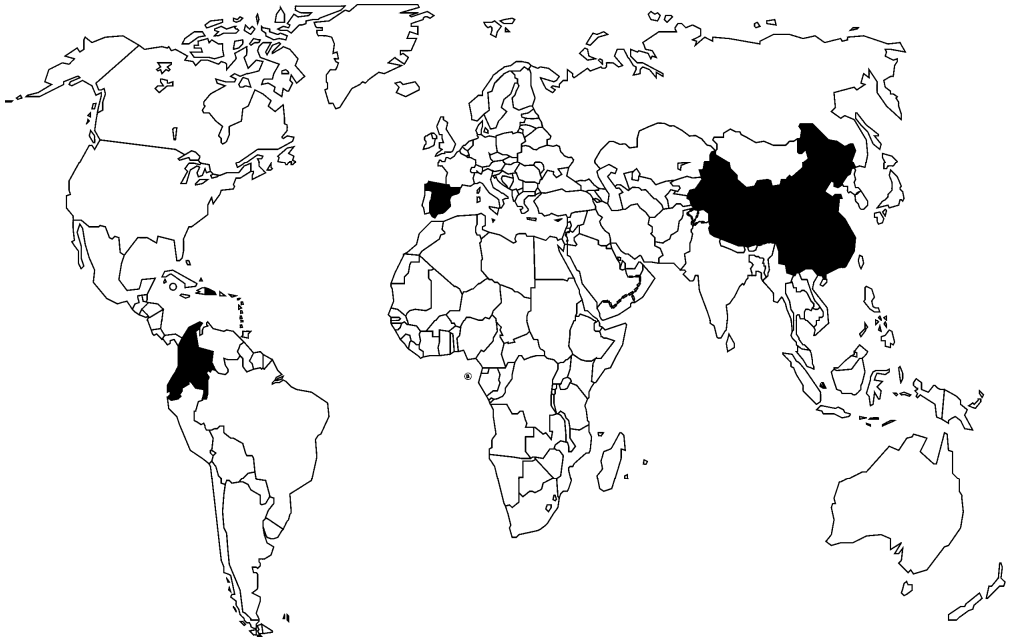
At the international level as we have mentioned, the *Canal de Isabel II* has business and partnerships to supply water in some Latin American countries such as Colombia and Ecuador, and Dominican Republic in the Caribbean. China is the more recent adventure of the *Canal de Isabel II* and with time could become a major market for the firm (map 7.6).

The Canal has also its own foundation, as the AGBAR group has, the *Fundación Canal de Isabel II*, initiating its activities in 2001 with the 150th birthday of the CYII. This entity is devoted to raise environmental and water saving awareness among the population of the CAM through the organization and promotion of cultural, historic and scientific activities[979].

[978] Press release by the Canal de Isabel II, 26 junio de 2005, "El vicepresidente primero, Ignacio González, se reunirá con distintas autoridasdes del país asiático", Our translation

[979] *Fundación Canal de Isabel II* webpage http://www.fundacioncanal.com/, last accessed 21st November 2009.

Map 7.6. The *Canal de Isabel II* at the international level



Source: own elaboration

Regarding the corporatization and internationalization of the Canal, in 2005 the *Cámara de Cuentas de la Comunidad de Madrid* (2005a,b,c) [Audit Chamber of Madrid] criticized the lack of transparency of the CYII and took issue with the activities of the firm beyond the regional borders (Cámara de Cuentas 2005a:33):

> "the current dimension of the CYII with increasing commercial and mercantile interests beyond the CM, seem to contradict its nature of *Administración Instrumental* [Instrumental Administration], provider of urban water of Autonomic ownership; instead it seems to respond to the Business-patrimonial sector of the autonomic administration. Thus, the object and juridical character of this public firm should be reconsidered", our translation

Similarly to these warnings, Ortega de Miguel and Sanz Mulas (2007) argued that despite the fact the CYII has a legal personality different from the CAM, its annual budget is included in the CAM general budget. These authors studied the impact on public goals and objectives when a public-owned company such as the *Canal de Isabel II* begins to operate commercially like a private firm.

Even the conservative Partido Popular, by 1994 in the opposition in Madrid made a harsh critique to the internationalization and diversification of the *Canal de Isabel II*. The MP José María de la Torre, in the context of a possible joint venture between the Canal, *Aguas de Barcelona*, *Endesa* and the bank *Argentaria*, denounced this situation:

> "we have been detecting different operations of the Canal such as the bid for the Buenos Aires water concession, or the desire to get into the telecommunications sector […] Behind this movements, there could exist disguised attempts to privatize the Canal or some of its subsidiaries, such as the Hidráulica Santillana […] if this is the case, the PP will totally oppose", José María de la Torre, deputy of the PP in the CAM parliament[980]

> "it is not feasible that a firm with debts around 60,000 million pesetas get involved in adventures in the Comunidad, or even abroad", José María de la Torre, deputy of the PP in the CAM parliament[981]

Notwithstanding the criticisms to the excessive diversification and internationalization of the company by several experts including the *Cámara de Cuentas* (2005), this organism recognized the suitability of the public model of water supply in Madrid:

> "The public management of the water cycle has been shown as the suitable one in the case of Madrid, as the report concerning the management of the *Canal de Isabel II* by the World Bank pointed out. This continuous public management has not been the tendency in other big European cities that have had concessions during long periods but that have returned to the public management model after such periods" (Cámara de Cuentas 2005a:14, our translation)

From within the *Canal de Isabel II* and the regional government the high efficiency of the regional state-owned company in providing the service has been remarked several times:

> "The Canal is a very efficient firm regarding water supply. Our leakage rate is around 10 percent; few firms in the world could attain this, and that is why we are a reference for the World Bank", Ignacio González (2005)[982], our translation

The good results of the public model of water supply have not impeded however the shadow of privatization looming large. In the next chapter, we will present the recent debate on the privatization of the *Canal de Isabel II* providing a chronology of the process and analyzing the discourses both from the proponents and the detractors of private participation in the water supply and sanitation sector.

[980] ABC, Martes 9 de Agosto 1994, p.48, "El PP acusa al Canal de Isabel II de maniobras empresariales oscuras y ajenas a su función"
[981] idem
[982] Own translation, words by Ignacio González, president of the CYII and vicepresident of the CAM, ABC, Lunes 31 de Enero 2005, p.82, "El Canal de Isabel II desembarca en China dentro de un proyecto para dar agua a 90 millones de personas", Miguel Larrañaga

8 Water privatization in Madrid?

In the previous chapter of this dissertation we have analyzed different material and discursive trends of the process of urbanization of the water supply in Madrid during the late 19th and throughout the 20th century. Similarly to the Barcelona case study (chapter 4), we have traced back the process of constitution of a centralized water supplier, in this case a public one. We have also presented the evolution of the built infrastructure, a key aspect to understand how Madrid's water supply system kept pace with the dramatic urbanization processes experienced by the metropolitan area during the 20th century. Questions related to the urban metabolism of water of Madrid's urban region have also been appraised. Similarly to Barcelona (chapter 5) suburbanization is an important factor to be taken when analyzing the social production of water scarcity.

We have seen how the *Canal de Isabel II*, the autonomic state-owned firm supplying water most of the citizens of the CAM, has diversified its business embracing the telecommunication, the environmental or the energy production sectors, and has internationalized its core activity, water supply and sanitation services, in a similar fashion AGBAR has done (Chapter 6).

In the present chapter we will trace the recent debate on the privatization of the *Canal de Isabel II* in the context of a radical turn towards Neoliberalism in the Autonomous Community of Madrid. With this we will arrive to the end of our empirical analysis to give place to the conclusions of the dissertation.

8.1 An introduction to Madrid political economy: a laboratory of Neoliberalism?

> "We do not want to regulate the life of the individuals, but to offer the society with more freedom of choice", Güemes et al. (2008), our translation
>
> "We are liberal and reformist", Esperanza Aguirre, 19th September 2008[983], our translation
>
> "Liberal policies do not only promote more prosperity and opportunities for everybody, but they are also the most social and those allowing boosts and better articulate solidarity among citizens", Esperanza Aguirre, October 2008[984], our translation

Freedom of choice, less regulations, public-private collaboration, efficiency, etc. are words that currently prevail in the public discourse of most Western economies. Spain is not an exception, despite the late implementation of the neoliberal project in this country. In this context, Madrid appears to be a step ahead of the national level regarding the implementation of such policies. To exemplify such trend we present some key areas where Madrid government has lead a revolution at the Spanish level:

- **Health:** Madrid has 8 public hospitals managed under public-private arrangements (Güemes et al. 2008). The government of Madrid is preparing the *Ley de Libertad de Elección a la Sanidad Pública madrileña* [Law on the freedom of choice in the public health system] in order to "guarantee real equality of opportunities" and "to bring sanity closer to its real owners: the citizens"[985].

[983] Interview to Esperanza Aguirre by Federico Jiménez Losantos, Cadena Cope.
[984] Público, 12/10/08, "Esperanza Aguirre agita la ola privatizadora " by Yolanda González
[985] Esperanza Aguirre, 15th September 2009, in the "*Debate sobre el Estado de la Región*", Asamblea de Madrid, 15 de septiembre de 2009. Available at: http://www.madrid.org/lapresidencia/contenidos/discursos_presidencia.htm Last accessed: 19th October 2009

- **Education:** Investment funds to build and improve public schools dropped by 40 million Euros in 2008[986] at the same time that the public-private arrangements and the aid to private centers increased.
- **Land development policies:** the current legislation[987] in Madrid permits to develop all land except in the case of explicit protection. We have already analyzed how urbanization patterns have changed in Madrid over the last decades (chapter 7) and how the market leads land development.

Madrid is not only the capital of Spain but it is currently one of the most important and successful financial centers of the world. Some authors have recently analyzed how global Madrid has been constituted. Emmanuel Rodríguez López (2007) analyzes how Madrid has become one of the financial and business centers of Europe. From having an image of a pseudo colonial capital, Madrid has been converted into a global city attracting transnational flows of capital and workers. Currently, most of the headquarters of Spanish multinationals are located in Madrid, which also hosts an important stock exchange center, the IBEX-35. With the creation of the *Latibex* in 1999, involving the most important firms of Latin America, Madrid has also become the third most important stock-exchange market of this world region (just behind Ciudad de Mexico and Sao Paulo).

However, to understand the *zeitgeist* of Madrid and its politics it is useful to analyze the discourse of politicians ruling this global city. In this respect, there exists a key document that everyone wondering how a 'road map' to neoliberalize the Spanish administration would look like should consult. Among the papers presented at the 16th regional conference of the *Partido Popular de Madrid*, there was one called "*Servicios Públicos de Calidad*" [Public Services of Quality] (Güemes et al. 2008)[988].

This document pointed towards a "third wave of modernization of the public sector" [*tercera ola de modernización del sector público*]. According to their authors (Güemes et al. 2008) the first wave of modernization concerned the municipalities, when the public administration bestowed "a leading role to society in the management of such [local] services". In other words: concessions of public services

[986] Público, 12/10/08, "Esperanza Aguirre agita la ola privatizadora" by Yolanda González
[987] *Ley 9/2001, de 17 de julio, del Suelo, de la Comunidad de Madrid. Modified by the Ley 2/2005, de 12 de abril.*
[988] Our translation

to private firms. This led to a “dramatic improvement of quality and efficiency”. In turn, “the firms that participated in that process became multinationals in the delivery of services, and they managed water, waste treatment, motorways or airports in many places around the world” (point 44). That is what happened with the Barcelona water company (chapter 6). A second wave of modernization took place according to Güemes et al. (2008) when the State public monopolies (air transport, telecommunications, energy, etc.) were abolished. Privatization and introduction of competition meant and extraordinary stimulus to those firms, which became efficient businesses with concerns for international expansion (p.46).

Next, we present some excerpts of the points that illustrate better how the conservatives of Madrid see these two ways of modernization:

> 42. The process of deregulation and liberalization undertaken in the Spanish economy, coinciding with the ascend to power of the Partido Popular at the local and autonomic, and eventually at the State level, triggered a deep modernizing change in the role of the public sector in the society. It generated important benefits to taxpayers, improved the quality of the service and contributed to the development of a solid business fabric with a great international projection.
>
> 43. The axis of the reforms undertaken by the governments of the Partido Popular has been and still is the devolution to civil society and citizens of the leading role in the management of what belongs to them.
>
> 47. The liberalization and modernization reforms of the public sector permitted to end with a public sector that impoverished the taxpayers, jeopardized public budget and weighed on economic growth. They established the bases of the so-called “popular capitalism”, and briefly they contributed in a decisive way to trigger one of the periods of major economic growth, job creation and prosperity of the Spanish society. (Our translation)

According to these authors, the so-called third way of modernization (point 50) should “deal with the devolution to society of the leading role in the management of what belongs to society”. This time, modernization would take place at the autonomous and local level and would be about “respecting the public ownership of public services while promoting competition, and tightening the supervision and the control over government”. At the first stages this process of modernization would be aimed to education and health (p.51).

The paper refers to the *Nueva Vía* (referring to New Public Management, discussed in chapter 1) principles that many countries are undertaking "to seek for sustainability of public services and to adapt them to the expectations of a more demanding and better informed society" (p.52). To implement this change, the authors propose to:

- To reduce bureaucracy and turn the governments into more efficient and modern organizations, attentive to citizens
- To reduce the intervention of governments and increase the leading role of society
- To trust more in society
- To strengthen the collaboration with society and mimic its practices

Some principles inspire and inform the practice and the materialization of this New Public Management schemes according to the authors of the paper:

- **Freedom to choose** (25, 57-63), citing Von Hayek, is argued to be one of the pillars of such transformation of the public administration: "Freedom to chose strengthens democracy and the ability of citizens to actively participate in the decision regarding which services the population needs in each moment" (p.59); "Freedom to chose improves the equity on the access to public services, as the citizens with less resources are the ones that have less opportunities when public services do not respond properly to their needs" (p.60).
- **Competition** (65-70) is the other main pillar of New Public Management: "competition contributes to allocate more efficiently the resources and improves the quality of the services paid by citizens with their taxes" (p.66)
- **Transparency** (71-75) is required to grant the citizens their right of freedom to choose (p.71)
- **Equity** (76-83). This principle is probably the less frequent to appear in free-market road maps. However, as it happens with concepts such as "the environment", "sustainability", "public participation", etc. Historically used in left-wing discourses, it seems that free market rationale has co-opted also such term: "equity is strengthened when service provision takes into account

the personal circumstances of their direct users" (p.78) or "inefficient and poor public services tear up equity" (p.80). The paper argues that the abuse of public services also threatens public services (p.81).

- **Efficiency** (84-91): expenditure restraint, cost-benefit analysis and also "new management formulas, such as PPP" (p.87), or in other words Public-Private partnerships, widely presented in chapter 3.

It is interesting to observe that the proponents of such model avoid mentioning the privatization of public services (the word privatization only appears three times in the document and it is used to describe past situations) but speak about modernization and public-private collaboration. As we will see, the word "privatization", as it happened with the word "inter-basin water transfer" in chapter 5 has become a *taboo* word.

8.2 Opening the integral water cycle of Madrid to private flows of money

The left-wing newspaper *Público*, in the edition of the 12th of October of 2008[989] denounced the wave of privatization promoted by Esperanza Aguirre in the last years, especially in what concerns education and health (figure 8.1):

> "The Prime Minister [of the Madrid Region, Esperanza Aguirre] uses the Region to test her neoliberal ideas, the very same ones that the current crisis has questioned"
>
> "She has lead the public sector to lose importance in Health and Education"
>
> "Now, her aim is to hand over water management"

Figure 8.1. Front-page journal Público, 12th October 2008.

Source: Público

In the context of neoliberalization of urban governance taking place in Madrid, water management seems to be the next sphere for private capital circulation and accumulation. In this section, through media analysis, we attempt to explain how the process has developed and what kind of social contestation has generated.

[989] Público, 12/10/08, front page "Esperanza Aguirre S.A."Transcription of the discourse of Esperanza Aguirre in the "*Debate sobre el Estado de la Región*", Asamblea de Madrid, 15 de septiembre de 2009. Available at: http://www.madrid.org/lapresidencia/contenidos/discursos_presidencia.htm . Last accessed: 19th October 2009

8.2.1 The genealogy of the decision to change the configuration of Madrid water supply

On the 16th September of 2008[990] the Prime Minister of the region of Madrid, Esperanza Aguirre, made an announcement that could change forever the nature of the water supply in the region: the "partial privatization" of the *Canal de Isabel II*. The idea to privatize the Canal firm is anything but new. Rumors of a possible privatization of the *Canal de Isabel II* were already on the air in 2002[991]. Even before, in the decade of 1990s, there was also small talk regarding the privatization of the firm; the prime minister of the *Comunidad Autónoma de Madrid* [Autonomous Community of Madrid, CAM] by then, Ruiz-Gallardón, however, refuted those allegations and claimed that the Canal would not be privatized. Despite this claims, by 1998 the *Canal de Isabel II* had privatized all its public attention offices[992]. Hence, we could argue that by mid 1990s, some parts of the Canal were undergoing privatization processes.

In the *Debate sobre el Estado de la Región* [debate on the state of the Region] of 2008, Esperanza Aguirre, announced the reconfiguration of the state-owned firm *Canal de Isabel II* into a public limited company that would manage the integral water cycle in Madrid. In the beginning, the capital investment would be entirely held by the Autonomous community and, afterwards, 49 percent of the shares will be floated on the stock market[993].

The privatization process would require three separate steps, the first one being totally independent of the other two:

a) The creation of a Public Limited Company (PLC) with 100 percent of the capital owned by the CAM. This operation would require a regional law enabling the Madrid Parliament to act accordingly.

[990] For the exact word of Esperanza Aguirre in this debate see "Discurso de la Presidenta de la Comunidad de Madrid en el Debate sobre el Estado de la Región", 16th september 2008, http://www.madrid.org/lapresidencia/contenidos/discursos_presidencia.htm . Last accessed: 19th october 2009.

[991] ABC, Martes 10 de Diciembre 2002, p.89, "La dimisión forzada de sus dos principales ejecutivos abre una grave crisis en Aguas de Valencia"

[992] El País.es, 18/9/98, "El Canal privatiza sus oficinas de atención al público porque le resulta más barato", V.G. Olaya

[993] See El Mundo, 16/9/08, "Aguirre da entrada al capital privado en el Canal de Isabel II" / 20 minutos, 16/9/08 , "Aguirre pondrá el 49 porciento del Canal de Isabel II en manos privadas y lo sacará a Bolsa"

b) The floating of the shares in the stock exchange. For this to become possible documentation had to be arranged and sent the *Comisión Nacional del Mercado de Valores* [National Stock Market Commission].

c) The launch of an Initial Public Offering of shares to achieve liquidity.

The rationale behind the will to change the legal configuration of the Canal is to enable the citizens of Madrid to participate directly in the management of the Canal. This "popular capitalism", in Redwood's (1988) terms, praises the benefits of privatization and wider ownership. This Madrid version of such dogma applied to water follows those lines:

> "we provide *madrileños* the chance to be owners of their water and we also guarantee the future of water in our Comunidad"; "new ways of management and financing to ensure its public character, its efficacy and efficiency, while boosting *madrileños* direct involvement in their water firm, and bringing in private water business techniques, wide extended in our country" *(Esperanza Aguirre, 16th September 2008)*[994]

> "It will have a lot of success in the stock exchange" (Esperanza Aguirre, 19th September 2008)[995]

> "Plus, it will bring about a higher degree of citizenry involvement in the firm that supplies water in the region" (spokesman of the PP in the CAM parliament, 18th September 2008)[996]

> "I believe in a liberal and reformist ideology that does not resign with what is wrong and that always put the individual and the family before public authorities. For me, the right to choose is fundamental, regardless it suits or not the public authorities" (Esperanza Aguirre, 19th September 2008)[997]

This discourse parallels that of Margaret Thatcher in the wave of privatizations in England in the 1980s (Marsh 1991) and concretely of the water sector of 1989(Bakker 2005).

However, Aguirre seemed to contradict what the *Partido Popular de Madrid* had argued some time before. In the paper *Servicios públicos de calidad* presented in the 16th conference of the PPM, it was stated that: "*Lo público tiene dueño: los*

[994] El País, 16/9/08, "Aguirre anuncia la privatización del 49 porciento del Canal de Isabel II", our translation
[995] Interview to Esperanza Aguirre by Federico Jiménez Losantos, Cadena Cope. Our translation
[996] Spokesman of the PP in the CAM Parliament, ABC, 19/9/08, "El modelo de gestión del Canal, igual que el previsto por el PSOE para AENA", our translation
[997] La Razón, 19/9/08, Interview to Esperanza Aguirre, our translation

ciudadanos que financian los servicios públicos con sus impuestos" (point 85) (Güemes et al. 2008). Therefore and according to the conference of the *Partido Popular de Madrid* in 2008, public services and patrimony are already owned by the *madrileños.*

Apart from the more ideological reasons presented before, the main alleged trigger of such important reform was the urgent need of capital to cope with new environmental requirements concerning wastewater treatment and water reuse. New environmental requirements and the need to guarantee water to supply a growing population forced the CAM to perform "an extra effort" on investments in new infrastructures and technological processes[998]. Such "environmental needs", among them some projects of wastewater treatment and water reutilization, would cost the region of Madrid some 4,000 million Euros in the next ten years, out of which 2,700 million would be spent in the application of the *Plan Nacional de Calidad de las Aguas* (2007-2015)[999] [Spanish Water Quality National Plan]. According to the rationale laid out by the president, the partial privatization of the *Canal de Isabel II* would raise financial resources and thus complement the limited funds of the administration. The need to privatize because of stricter European legislation reassembles the discourses articulated to justify the privatization of English water suppliers in 1989 (Bakker 2003c). Among the investments to be performed, the installation of state-of-the art treatment systems in sewage treatment plants was paramount. It was expected that those systems would improve water to be used downstream the Tajo river basin[1000].

The 4,000 million Euros needed over the next ten years would be divided as follows[1001]:

- 3,700 million Euros to comply with the *Plan Nacional de Calidad de las Aguas* and the European requirements on wastewater treatment and water reuse.

- 300 million Euros to build two new water reservoirs (in the north and south of Madrid)

[998] El Economista, 16/9/08, "La Comunidad de Madrid sacará a Bolsa el 49 porciento del Canal de Isabel II"
[999] El País, 16/9/08, "Aguirre anuncia la privatización del 49 porciento del Canal de Isabel II"
[1000] El Economista, 20/11/08, "Madrid creará una sociedad anónima pública que gestione el Canal de Isabel II", by EFE
[1001] El País, 30/12/08, "El PP aprueba privatizar el Canal entre abucheos y con la abstención del PSM", by Rebeca Carranco

According to Aguirre, "the alternative was indebtedness and to borrow 4,000 million Euros. However, we prefer to go for the other option, which consists in calling investors to participate as shareholders, but maintaining the main part of capital"[1002]. She accepted that the CYII had capacity for indebtedness but argued that "we want to go for the other alternative, that chosen by the important firms, which is to increase the capital"[1003].

In the context of the increase in the frequency of droughts, the need of further resources was also advanced as a reason to seek for private financial aid. In this case the rationale was that as the supply of Madrid had not increased in the last 30 years, two new reservoirs, 100 hm^3 each, would have to be built[1004].

The combination of increasing water needs, for a growing population, and improvement of environmental quality were presented, as the two main challenges Madrid had to deal concerning water management:

> "water management in the Autonomous Community of Madrid has to face significant challenges, which would require important investments to create new infrastructures, the development of plans to reuse water and the application of the *Plan Nacional de Calidad de Aguas* [Water Quality National Plan], all these adding to 4,000 millions Euros within the next 10 years"[1005], our translation

Aguirre argued that "there is no doubt that to obtain 4,000 million Euro to invest in the next years, against the problem of the current financial situation, requires new effective and efficient ways of management and financing to engage the citizens of Madrid with their water firm"[1006]. The financial crisis appeared to be another ingredient in the mix of arguments to justify the entrance of private capital into the most important public firm owned by the CAM. We recall that by mid 2008 the debt of the region was 10,613 million Euros, which had increased by 1,297 million further in 2009[1007]. In the middle of the "worst economic crisis Spain has faced in the last 30

[1002] EcoDiario (El Economista), 9/10/08, "Aguirre mantiene su idea de privatizar el Canal de Isabel II", our translation
[1003] El País, 10/10/08, "La Comunidad dice que prefiere vender una parte del Canal a endeudarlo", by Soledad Alcaide, our translation
[1004] Diario Directo, 16/9/08 , "Saldrá a Bolsa el 49 porciento del Canal de Isabel II para dar entrada a capital privado", our translation
[1005] Our translation, Spokesman of the PP in the CAM Parliament, ABC, 19/9/08, "El modelo de gestión del Canal, igual que el previsto por el PSOE para AENA"
[1006] El Economista, 16/9/08, La Comunidad de Madrid sacará a Bolsa el 49 porciento del Canal de Isabel II
[1007] El País, 25/11/08, "Aguirre cede los bienes del Canal a una sociedad que sacará a Bolsa", by Soledad Alcaide

years", Aguirre pointed out that the CAM was planning "structural adjustments" based on austerity and on diminishing Regional public expenditure, because, in her words, "when governments are austere, societies are prosperous" [1008]. Therefore, crises, both economic and environmental, are in Naomi Klein's terms (2007) opportunities for pushing forward the barriers of capital accumulation, as the case of Madrid seems to prove.

By 2008, it was argued that the *Canal de Isabel II* had an estimated value of 3,500 million Euros, with 1,800 million Euros of owned funds according to the reports accessed by *Negocios.com*[1009]. The capitalization would be even higher than that of *Aguas de Barcelona*, quoted with a value of 2,250 million Euros in the stock exchange[1010]. Therefore, an initial public offering of 49 percent of the shares of the Canal would mean an injection of capital from 1,400 to 1,700 million Euros[1011].

The privatization of Madrid's water supply was compared recurrently with the situation in Barcelona, where water supply had been private for over 140 years. To defend their position and intentions to change the legal nature of the *Canal de Isabel II*, Ignacio González[1012] explained that 51 percent of domestic water in Spain was supplied by partially or totally private firms. According to an expert interviewed by the economic journal *Negocios.com*[1013] to carry out such operation did not depend on political signs. Although the case of Madrid could be compared with Valencia (also ruled by the PP rules), where the water supplier Emivasa is made out of mixed capital, it could also be compared with Barcelona (left-green coalition) where the private firm AGBAR supplies the city. Similarly to Barcelona, the private firm Aqualia supplies Vigo, ruled by the socialists. Privatization of water supply is thus not seen as a political decision but as a technical one, a sing of the hegemony of the economic model.

[1008] El Economista, 16/9/08, "La Comunidad de Madrid sacará a Bolsa el 49percent del Canal de Isabel II", our translation
[1009] Negocios.com / La Gaceta, 25/09/08, "Madrid puede obtener 1.700 millones si privatiza el Canal de Isabel II" by Millán I. Berzosa
[1010] idem
[1011] idem
[1012] El Economista, 20/11/08, "Madrid creará una sociedad anónima pública que gestione el Canal de Isabel II" by EFE
[1013] Negocios.com / La Gaceta, 25.09.08, "Madrid puede obtener 1.700 millones si privatiza el Canal de Isabel II" [Madrid could obtain 1,700 million euros if it privatizes the Canal de Isabel II] by Millán I. Berzosa

By mid October, Aguirre acknowledged that "it was not the best moment to float [CYII] in the stock exchange"[1014]. Thus, Aguirre announced in *Radio Nacional* on Friday 17th October that the partial privatization of the *Canal de Isabel II* was postponed until the economic situation improved: "[W]hen I made the announcement, the Spanish Stock Exchange (the Ibex) soared. Long time has to pass before this can be carried out"[1015]

The opinion of the media was divided. Economic journals in general backed the process. For instance, the journal *Expansión*, probably the most well known economic Spanish newspaper, saw the privatization as an opportunity to change the situation of steadily losses in the public sector:

> While state public sector diminished, the Autonomous Communities has not ceased to create loss-making state-owned firms. In that sense, it should be positively appreciated decisions made by Autonomous Communities, such is the case of Madrid, to privatize enterprises such as Telemadrid [the regional public television channel] or the Canal de Isabel II. Especially in those moments when autonomous and local financing it is up in the air[1016], our translation

Another excerpt of an opinion piece confirms such support:

> In the mid 19th century, when it was considered the construction of a dam in the upper Lozoya to store the river's flow of water and ultimately conducted it to Madrid through a conduction of 70 km length, it was considered as hideously monumental. Notwithstanding the skeptical and the critics the project was developed. […] Today, the oldest public firm in Spain faces a challenge even greater than in his birth: its reinvention and its growth. Privatization could be the trigger. [...] the proposal is not only a step forward of the liberal measures in the Comunidad de Madrid, which is taking the lead in issues such as the privatization of the management of some hospitals. It also means the search for new ways of financing in order to guarantee that the continuous growth of the Canal de Isabel II, with more than 2,200 workers and with activities that have slightly gone beyond the autonomous borders. [...]In financial terms, investing in the Canal de Isabel II, with increasing supplies and regulated prices, could be considered like investing in treasury bonds and waiting to cash back secure interests"[1017], our translation

[1014] El País, 18/10/08, "Aguirre avisa de que también aplazará obras públicas", E.G. Sevillano, our translation
[1015] Cinco Días, 18.10.08, "Aguirre aplaza la salida a Bolsa del Canal de Isabel II" , our translation
[1016] Our translation, Expansión.com, 2/10/08, "Empresas Públicas"
[1017] Our translation from Expansión, 18/9/08 "De Lozoya al parquet" by M.A. Patiño,

The economic journal *Negocios* also published favorable opinions backing the process. According to Francisco Ruiz, water expert of the financial group Fortis, and interviewed by this journal, "to externalize the management grants efficiency; there isn't absolutely any connection with price increases". According to him "AGBAR could not increment the price as much as they feel like to in Barcelona, but they are constrained". This expert argues that admitting that a private firm will search for the maximum benefit, it will be also more transparent in the management of the resources. As a result: "the town councils are freed of costs, and this money could be devoted to infrastructures, water treatment or other goals"[1018].

From other general media, such as *El País* or *Público* criticisms abounded. For instance, Enric González[1019], columnist of El País, suggested than in the near future not only we would hear about public rescue plans for the finance and banking sector but also for the service firms. To justify such claims, he referred to Peter Hain, ex minister of the UK, who the day before had said that some water and energy companies, and also railway firms in the UK, would collapse because they were privatized. The columnist pointed out that while in the rest of Europe the public sector was expanding, in Madrid Aguirre was going in the opposite way.

As it happened with the drought episode of 2008, we want to illuminate the selective use of words to define the same objects or processes. In this case, the 'privatization' (for some) or 'capitalization' (for others). Along these lines, the president of the Canal did not want to recognize during his intervention that the entrance of private capital into a public firm was a form of privatization: "we are not neither privatizing nor giving entrance to a private in the management". He forgot to mention that, after being floated in the stock exchange, the firm would become a mixed firm. Instead, he spoke about "capitalization" and compared it with what the Spanish Government did with AENA (*Aeropuertos Españoles y Navegación Aérea*) [1020]. He said that the term privatization did not "scare" him but in the case of the Canal the political opposition was "wrongly" using it because it did "not fit with reality". He argued that "to privatize is to sell to particulars and in this case nothing is being sold". Instead, he argued, the regional government had initiated "an operation of capitalization, of

[1018] Negocios.com / La Gaceta, 25.09.08, "Madrid puede obtener 1.700 millones si privatiza el Canal de Isabel II" by Millán I. Berzosa, our translation
[1019] El País, 13/10/08, "Solvencia" , column by Enric González
[1020] El País, 10/10/08, "La Comunidad dice que prefiere vender una parte del Canal a endeudarlo" by Soledad Alcaide, our translation

fundraising, to cope with future investments"; this operation had not "anything to conceal". He qualified as an act of "transparency" the fact that the government had limited to 49 percent de maximum sale of shares. If the government wants to extend this percentage: "the *Assamblea* has to decide whether it goes further or not"[1021].

8.2.2 Contestation from the left and social movements

The announcement of the privatization generated much contestation, especially from the institutional left, in the opposition in the Parliament of the CAM, and from the trade unions and social movements of the region of Madrid. At the Madrid Parliament, the two political parties in the opposition, the centre-left (PSOE) and the left (IU) denounced the privatization. Both parties criticized the "sale" of water announced by Aguirre.

According to the Madrid socialists (PSM) once the announcement of water privatization was made "just the air remains to be privatized by her" [referring to Esperanza Aguirre][1022]. The spokeswoman of the PSM, Maru Menéndez, added that: "she [referring to Aguirre] has the shamelessness, the day that we have heard about the total economic failure of Lehman Brothers, which is her economic model of reference, to propose the same recipes […]"."She [referring again to the president of the CAM] is dealing with a permanent line of business opportunities that includes very worrisome recipes" because in Menéndez's opinion "they are those that have unleashed this international financial crises and this extremely serious unemployment problem"[1023]. The Socialist party of Madrid denounced that the model proposed by Aguirre paved the way "to turn water into a simple commodity"[1024], and even threatened to look for a legal way to stop the privatization process: the town councils where the socialist rule "could boycott the privatization announced by Aguirre" by means of considering the rupture of the agreements". Regarding the latter, the general secretary of the PSM, Tomás Gómez, argued that "water belongs to all and cannot be privatized" and warned Aguirre that "she will face the opposition of the

[1021] El País, 25/11/08, Ignacio González: "Llevamos cinco años vendiendo patrimonio del Canal" by Agencias
[1022] Words by Maru Menéndez, spokeswoman of the PSM, 16/9/08, 20 minutos, "Aguirre pondrá el 49 porciento del Canal de Isabel II en manos privadas y lo sacará a Bolsa", our translation
[1023] Diario de Alcalá, 18/09/08, "La oposición dice que Aguirre 'sólo le falta sacar a la venta el aire'", our translation
[1024] EcoDiario (El Economista), 18/09/08, "PSM estudia, a través de los Ayuntameintos, evitar la privatización del Canal de Isabel II", our translation

socialist party and the whole of Madrid's citizens"[1025]. Tomás Gómez announced that the 34 socialist municipalities would cancel agreements with the Canal in order to boycott the privatization. The legal argument the socialists and the conservative mayor of Madrid City would use stated that according to the *Ley de Contratos del Sector Público*[1026] [law of public sector contracting] the cancellation of the agreement is justified in case of change of legal status of the Canal. In addition, they contended that public administrations are obliged to open a public tender to hire a private firm[1027].

Maru Menéndez pointed out that "the privatization of public services has very negative consequences for everybody"[1028] for everybody: "We lose patrimony that belongs to everybody and, it also means a democratic backward step since these processes have been accompanied by control mechanisms". She added that "an enterprise that has to obtain benefits could only attain this aim by curtailing investments". Regarding the privatization of the *Canal de Isabel II*, which Aguirre posed as step to allow citizens to be the "owners of water", Maru Menéndez (spokeswoman of the PSM) responded that: "it is a decision to gain money by cheating on *madrileños* arguing that they can be shareholders, when currently *madrileños* already are the most important shareholders of the Canal".

According to Madrid socialists, the partial privatization of the *Canal de Isabel II* would enable the entrance of investment funds from countries such as Kuwait or Dubai into the shareholders of the water firm instead of allowing the participation of the citizens of Madrid, which was one of the alleged goals expressed by the regional government. The spokesman of the PSM, Adolfo Navarro, wondered how was possible "to change the essence of the Canal like it was a private *cortijo*". He also wondered why Aguirre was "dramatically promoting privatization, when even neoliberals in the United States are going backwards"[1029]. In response, the spokesman of the PP, David Pérez, pointed out that the plan of the government of Madrid for the *Canal de Isabel II* was "identical" to that proposed by the Spanish

[1025] El Mundo, 18/09/08, "El PSM estudia la formal legal de impedir la privatización del Canal de Isabel II", our translation
[1026] *Ley 30/2007, de 30 de octubre, de Contratos del Sector Público*
[1027] El País, 19/9/08, "La privatización del agua reabre la guerra entre Gallardón y Aguirre" 1/2
[1028] Público, 12/10/08, "Esperanza Aguirre agita la ola privatizadora" by Yolanda González, our translation
[1029] Ecodiario (El Economista), 30/09/08, "PSOE dice que serán fondos kuwaitíes, no españoles, los que entren en el Canal de Isabel II con su salida a Bolsa", our translation

government for AENA, the Spanish airport agency. In that sense, according to Pérez, "we can suppose that the Kuwaitis imagined by the socialists are going to take over the airport company". He also recalled that the plan of the regional government was to widen the capital of the Canal by giving the chance to the citizens of Madrid who desire it to participate in the ownership. This would be done "in a transparent way, always maintaining the public ownership of the Canal, increasing service quality without increasing prices"[1030].

On the other hand, the spokeswoman of IU, Inés Sabanés, during the course of the *Debate sobre el Estado de la Región*, frontally opposed and reproached the announcement made by Aguirre to divest 49 percent of the *Canal de Isabel II*: "while *madrileños* are preoccupied to have a decent job, an affordable home, a place in the school, you offer shares of the Canal as a solution to the problems and the economic crisis"[1031].

From the trade unions this proposal was largely criticized as well. The trade union UGT (*Unión General de Trabajadores*) criticized the proposal of Aguirre depicting it as inappropriate in the context of the current economic crisis. UGT recognized that in other Autonomous Communities private firms manage water, but the trade union argued that water was "an essential and scarce good" and that "in a situation of crisis privatizing water is absolutely inappropriate"[1032].

Likwise, the spokesman of the trade union CCOO, Javier López, highlighted the poorness of the argumentation that with the privatization the *madrileños* would be the owners of the *Canal de Isabel II*: "we already are [the owners of the *Canal de Isabel II*] because [the *Canal de Isabel II*] belongs to the CAM and the CAM belongs to the *madrileños*". He also added that "it is the justification of an operation that permits the participation of a series of sectors that are learning to live off the public administrations". Referring to the prime minister of Madrid, Javier López declared that "if she does not have money to build two dams or reservoirs and needs to privatize the Canal, this is deplorable" [1033]. The trade union UGT suggested that

[1030] Ecodiario (El Economista), 30/09/08, "PP dice que si los kuwaitíes se quedan con el Canal de Isabel II, también se harán con AENA, en vías de privatización", our translation
[1031] Ecodiario (El Economista), 16/09/08, "Sindicatos critican la decision de Aguirre de 'privatizar' el Canal de Isabel II y lo ven 'inapropiado' en una crisis", our translation
[1032] idem
[1033] El País, 17/09/08, "Aguirre recupera a Lamela para la dirección regional del PP"

"joint strategies with other trade unions" could be undertaken "in the defence of a public service of quality, just like the current one"[1034].

Demonstrations were also made, promoted especially by trade unions "to show the rejection by the workers of the privatization plans of the conservative government in Madrid". The first took place the 23rd of September and the second the 1st of October[1035]. Trade unions also launched a campaign to warn the citizens of Madrid about the consequences of the privatization of the CYII, such as "the loss of service quality or the increase of the price, among others"[1036]. As a response, Aguirre argued that neither there would not be any price increases, and that: "there is nothing the workers (of the CYII) and the town councils have to be afraid of"[1037].

The Spanish government was cautious about this case. Elena Espinosa, the Spanish Minister for the Environment, declared that water issues "are the legal duty of the autonomous communities". In that sense, she was "absolutely respectful with the actions each community may promote". She highlighted that "citizens will be who eventually have to decide whether the CAM has adopted the best decision to manage a public good". Elsewhere, the secretary for the Environment and Rural Development of the PSOE, Hugo Morán, stated that Aguirre's proposal reveals "PP's real strategic postulates regarding water, at the national level". He also assured that socialist rejected "to privatize" water[1038].

Different references to other kind of privatizations were presented by the conservative party ruling the region of Madrid to justify private participation in the *Canal de Isabel II*. The cases of private water supply in Barcelona and Valencia (or Vigo, Gijón, etc.) were already mentioned: if Barcelona had private water supply, why Madrid could not have the same? The case of recent privatization proposal of Aena by the Spanish government was used also to criticize the attitude of the Socialist party regarding water privatization in Madrid:

[1034] El Mundo, 19/09/2008, "Gallardón: si entra capital privado en el Canal rescindiré el convenio"
[1035] EcoDiario (El Economista), 30/09/08, "Trabajadores del Canal Isabel II se concentran mañana en contra de la privatizaicón mientras se reúne el Consejo de Administración"
[1036] El Economista, 24/09/08, "UGT amenaza con más concentraciones en contra de la privatización del Canal de Isabel II", our translation
[1037] EcoDiario (El Economista), 9/10/08, "Aguirre mantiene su idea de privatizar el Canal de Isabel II"
[1038] Ecodiario (El Economista), 17/9/08, "Espinosa respeta la decisión de Aguirre de querer crear una sociedad para sacar a Bolsa el 49 porciento del Canal de Isabel II", our translation

> "how come that the socialist party does not agree with the new model to manage the Canal de Isabel II when it happens to be identical to the one the Spanish Government is going to use with Aena [the organism in charge to manage the Spanish airports]"[1039]

Eventually, in order to denunciate the double standard of the PSOE the PP made references to the revocation of the National Water Plan of 2001 by the socialists:

> "the socialist party defends that 'water belongs to all' but they have promoted the lack of territorial solidarity regarding water resources" [1040]

8.2.3 Criticisms from the right: the city of Madrid as an unexpected obstacle to privatization

The announcement of the legal change in the ownership of the *Canal de Isabel II* not only unleashed the rage of the social movements and the institutional left, but also raised important turmoil within the conservative party, and fuelled the endless and permanent dispute between the prime minister of Madrid and the mayor of Madrid, Alberto Ruiz-Gallardón (figure 8.2).

Figure 8.2. Cartoon regarding the privatization of the *Canal de Isabel II*.

Source: Público, 19th September 2008.

The mayor of Madrid, although considering the privatization of the *Canal de Isabel II* as "a great opportunity", stated that the Town Council of Madrid would have to cancel the contract and open a new tender. Gallardón clarified that Madrid had two distinct contract-agreements with the *Canal de Isabel II*: one for supply, and another one for sewerage and wastewater treatment and exploitation. We recall that in 2005

[1039] Spokesman of the PP in the Parliament of Madrid, ABC, 19/9/08, "El modelo de gestión del Canal, igual que el previsto por el PSOE para AENA"
[1040] idem

Gallardón transferred the jurisdiction of wastewater management to the Canal for a period of 31 years, receiving in compensation 920 million Euros[1041].

In 1996, when the mayor of Madrid was the president of the Region, he stated that he would never privatize the Canal[1042]. Gallardón, president of the CAM for 8 years, declared that he did not privatize the CYII because in his government program "such a proposal did not have a place", and not because of ideological reasons but just because "he has not any reason to do so"[1043].

Gallardón said that the town council would be "forced" to denounce the agreement with the Canal for water supply and sanitation because otherwise it would incur into the "illegality" of maintaining a "direct awarding" with a "private" firm. In the same line, Ana Botella, Madrid's town councilor for the environment, warned that the town council would cancel the contracts of water supply and sanitation in the case the regional government privatized the *Canal de Isabel II*[1044]. In other words, Gallardón announced that "once the *Canal de Isabel II* stops to be a public body", the town council of Madrid would not be able to "keep the agreement" as "it would be illegal", regardless of the final percentage to be privatized[1045].

Concretely, article 16 (figure 8.3) of the agreement of wastewater treatment and sanitation and the clause 16 of the agreement of water supply opened the door for the cancellation of the contracts in the case of change of legal status of the firm. In both clauses it was specified that should the Canal lose "public firm conditions" the authorization by the Town Council to go on with the procedure will be necessary. Otherwise, "those actions will be considered as the cause to terminate the agreement"[1046].

[1041] El País, 19/9/08, "La privatización del Canal reabre la Guerra de Aguirre y Gallardón" 2/2
[1042] idem
[1043] El Mundo, 19/09/2008, "Gallardón: si entra capital privado en el Canal rescindiré el convenio", our translation
[1044] El País, 2.10.08, "Botella repite que si se privatiza el Canal cancelará el contrato"
[1045] El País, 18/9/08, "Gallardón cancelará los convenios con el Canal cuando Aguirre lo privatice"
[1046] El País, 19/9/08, "La privatización del Canal reabre la Guerra de Aguirre y Gallardón" 2/2

Figure 8.3. Agreement between the Municipality of Madrid and the *Canal de Isabel II*, 2005. .

Cláusula 16, Vigencia del Contrato: "Será necesaria la autorización expresa del Ayuntamiento respecto de la continuación del objeto de este convenio, en el caso de la pérdida de la condición de empresa pública del Canal de Isabel II y / o la traslación del objeto del presente convenio bien por la Comunidad de Madrid o por la empresa pública Canal de Isabel II a otra entidad pública o privada. En caso de no obtenerse dicha autorización, se considerarán tales acciones como causa anticipada de finalización del convenio".

Source: agreement between the Canal de Isabel II and the Town Council of Madrid for the water supply of the city[1047]

Once denounced the agreements (the first one in force until 2010 and the second one until 2036) the town council would have to open tenders in order to preserve free market competition and avoid arbitrary hiring. Those tenders would be opened to European firms, including the *Canal de Isabel II*. The latter was considered, however, as the "best one" by Gallardón[1048]. The mayor of Madrid was confident on a good offer by the Canal, "the most solvent water firm in Spain", when the tender is opened[1049]. The mayor was "convinced" that CYII would compete with other important Spanish and European firms[1050]. This decision "opens the way to a space of opportunity" for the Town Council, that can be translated in more income and a higher degree of quality for the users[1051], as any European firm including the *Canal de Isabel II* could participate in the tender for urban water supply.

According to the mayor of Madrid, town councils are the competent administration in water distribution and sanitation within their municipality, despite the fact that the *Comunidad* is in charge to manage the reservoirs and to supply bulk water to the cities. He recognized that the *Comunidad* had the right to decide how it manages state owned firms. However, under privatization, important opportunities in terms of money for the town council and better quality for the users unfold.

Gallardón accepted that he would have to settle 700 million Euros to cancel the last agreement; however this would not suppose a problem for local treasury as long as the awarded firm would cover this amount. In addition, he said that there was not any

[1047] Convenio de relaciones entre el Ayuntamiento de Madrid y el Canal de Isabel II en material de abastecimiento de agua para la Ciudad de Madrid, 29th November 2005, BO. Ayuntamiento de Madrid 12/01/2006 num. 5686 pag. 135-139

1048 La Razón, 18/09/08, "Nuevo enfrentamiento Aguirre-Gallardón por la privatización del Canal de Isabel II"

[1049] El País, 18/9/08, "Gallardón cancelará los convenios con el Canal cuando Aguirre lo privatice"

[1050] La Razón, 18/09/08, "Nuevo enfrentamiento Aguirre-Gallardón por la privatización del Canal de Isabel II"

[1051] El Mundo, 19/09/2008, "Gallardón: si entra capital privado en el Canal rescindiré el convenio", our translation

reason to expect increases of price: first, because the town council would establish a clause regulating the maximum price; second, because the CYII already obtained benefits with current tariffs and his likely proposal would not imply price increases.

Finally Gallardón did not clarify whether the city would be divided into zones (as with street cleaning or as with public lightening). However, he did not see it as necessary because it was an "integral and interconnected service"[1052].

From the CAM government it was argued that the *Canal de Isabel II* had already paid in advance the sum of money for those agreements (30-years-contracts). The president of the Canal insinuated that if Gallardón asked for more money, this money had been already given[1053]. He concluded by saying that "the agreement is signed, is in force, it will not change, and [the city] has received already an amount of money that clearly exceeds the aforementioned 800 million Euros"[1054].

For the president of the Canal, "there are not any legal reasons, but just the political will" of the town council to "break" the agreement with the CYII, in order "to obtain more money". He asked Madrid's local authorities "not to draw attention away with legal argumentations" to justify the cancellation of the agreement.

González recalled that the partial privatization would not have repercussions on prices or quality. He also asked to the town council "to reveal the real aim pursued" and to clarify whether they wanted "to dramatically raise tariffs" or "to award the management to a 100 percent private firm". He also expressed doubts that any private firm could pay "in three years" the service of the next 30 years as the CYII had done "to help with the town council's financial situation". Hence, he stated that a change of company would imply an "overprice", and declared him "very surprised about the fact that some criticize the intention of the Canal to capitalize and then hand out the management to a total private firm, and even worse a foreign one"[1055].

The regional vice-president, Ignacio González, warned that "the water network belongs to the *Canal de Isabel II*. In the case the contract is cancelled, [the city] will have to pay a fee", and he added: "How is [the city] going to pay for the cancellation

[1052] La Razón, 18/09/08, "Nuevo enfrentamiento Aguirre-Gallardón por la privatización del Canal de Isabel II"
[1053] ABC, 18/09/08, "La Comunidad Madrid dice que el convenio del Canal con el Ayuntamiento 'no va a cambiar' a pesar de su salida a Bolsa"
[1054] idem
[1055] El Mundo, 2/10/08, "González: no existen razones legales para que Gallardón rompa con el Canal", our translation

of the agreement? By means of the town council budget or will it have an impact on the tariff? And all this, to permit the entrance of a 100 percent private firm?"[1056]

Regarding the critics made by socialist municipalities considering the project unfeasible, the Autonomic Presidency Chancellor, Francisco Granados, made very clear that the privatization:

> "goes ahead and there will not be any going back. To be sincere, I am very surprised by so much controversy and opposition, but I challenge any town council, including Madrid, to bring me a legal report demonstrating that the project is legally unfeasible. If they show that the project is not viable, we will see. However, our legal services say that the proposal is totally feasible" (Francisco Granados)[1057]

8.2.4 Legal problems of the privatization

The privatization process came across with other hurdles. A legal report (cited by El País[1058]) requested by the *Confederación Hidrográfica del Tajo (CHT)* regarding the likely consequences of the partial privatization of the Canal argued that "the privatization of the Canal would entail a change of ownership that would have to be approved by the Central Administration". The CHT has de duty, on behalf of the State, to manage the Tajo's integral cycle of water, and the CYII is granted with a free concession to supply all the *madrileños.* In the case the legal nature and ownership of the Canal is modified, it would have to be "approved by the Central Administration".

The legal report highlighted the "legal difficulties" and the need to reach "political agreements", as "it is not possible to issue a statement on the effects on State water competitions" of the privatization of the CYII. However, the report made clear that reservoirs and other infrastructures used by the Canal are part of the "public domain", and therefore could not be privatized. The report recalled that some reservoirs were built by the Central Administration and handed out to the CAM latter. Thus "this public domain could no be legally held by any private interest". Likewise, the same was applicable for the infrastructures included in the *Plan*

[1056] El País, 3/10/08, "El Canal cobrará canon a Gallardón si rompe el convenio", our translation
[1057] Our translation, Francisco Granados, ABC, 19/9/08, "El modelo de gestión del Canal, igual que el previsto por el PSOE para AENA"
[1058] El País, 9/10/08, "Un informe estatal considera casi inviable la privatización del Canal"

Hidrológico "belonging to the Central Administration, which transferred its use to the Canal as a public body, but not as a private firm".

The report concluded by saying that "the decrease of patrimony that could happen without the town councils and the Central Administration could turn the operation unviable" [1059].

The socialist Adolfo Navarro highlighted that the regional executive faced an "institutional conflict that may destabilize the firm" since they did not take into account that both distribution network and sanitation are municipal jurisdiction and that the concession of water came from the *Confederación Hidrográfica del Tajo*.[1060]

In the same line, the regional deputy for IU Miguel Reneses remembered that it concerned the Central Government to approve the change of ownership of the *Canal de Isabel II* due to the fact that the *Confederacion Hidrográfica del Tajo* was the body in charge of the management of the integral water cycle. He recalled that "the *Confederación Hidrográfica del Tajo* is who managed the integral water cycle and the concession is made for a public body", and therefore "if ownership changes, so it does the condition of the concession" [1061]. If partial privatization went on "some 40 municipalities of the *Comunidad* could cancel the agreement" because, he added, town councils are the final responsible for sanitation and water supply. Regarding Gallardón he said: "I am talking about leftist municipalities, because what Gallardón aims is another thing, he wants to privatize them himself [referring to water supply and sanitation services]"

The regional deputy clearly summarized the different obstacles the process of privatization may face: "I think that the regional government is in a difficult situation, because it faces opposition by citizens, by institutions, and, we hope, from the central government, which has the legal authority to change the concession because it has to grant the authorization"[1062].

[1059] idem, our translation
[1060] El País, 10/10/08, "La Comunidad dice que prefiere vender una parte del Canal a endeudarlo" by Soledad Alcaide
[1061] EcoDiario (El Economista), 9/10/08, "IU advierte que el Gobierno central tiene que aprobar el cambio de titularidad del Canal de Isabel II", our translation
[1062] idem

8.2.5 The constitution of a PLC: an interrupted procedure

On the 20th of November 2008 the government of the CAM authorized the creation of a Public Limited Company (PLC) to manage water infrastructure in the region[1063] through the *Ley de Medidas Fiscales y Administrativas* [Fiscal and Administrative Measures Law], commonly known as *Ley de Acompañamiento* [Accompanying Law]. In turn, this law would speed, among other minor actions, other controversial legal reforms such as the reform of the Ley de Cajas [Savings Bank Law][1064], and other 20 regional laws. This strategy was devised in order to avoid an in-depth debate in the regional assembly for each legal reform. Hence, to oppose some of the articles, political groups in the Parliament had to present amendments to the totality of laws[1065]. Thus, the reconfiguration of the Canal was not expressed in a special law but with two articles (16 and 17) of the Ley 3/2008[1066] (known as *Ley de Acompañamientos*).

The *Consejo Económico y Social* (CES) [Economic and Social Board], related to the regional government and in charge of overseeing and inform about regional government economic laws warned about the *Ley de Acompañamiento*. It issued a non-binding report that although approving the draft challenged its use to carry out legal reforms. Thus, "the Comunidad de Madrid should avoid using the *Ley de Medidas Fiscales y Administrativas* to regulate or modify specific regulations that, due to their complexity or significance, should be dealt with in a single law. The report also recommended Aguirre to "adequately inform about the benefits" the citizens would obtain from the privatization of the Canal[1067].

Article 16 of the *Ley de Medidas Fiscales y Administrativas* allowed converting the *Canal de Isabel II* into a PLC. This article stated that the Canal would hold the concessions and authorizations over water extractions and all the functions of the CAM regarding water. In other words, it will continue to exercise the legal authority

[1063] El Economista, 20/11/08, "Madrid creará una sociedad anónima pública que gestione el Canal de Isabel II" [by EFE / EcoDiario (El Economista), 20/11/08, "El gobierno regional autoriza la privatización del 49 porciento del Canal de Isabel II" by Servimedia
[1064] El País, 21/1108, "Las reformas del Canal y Caja Madrid impulsan el choque con el alcalde" by S. Alcaide
[1065] El País, 25/11/08, "Aguirre cede los bienes del Canal a una sociedad que sacará a Bolsa" by Soledad Alcaide
[1066] *Ley 3/2008, de 29 de diciembre, de Medidas Fiscales y Administrativas (Comunidad de Madrid)*
1067 El País, 27/11/08, "El Consejo Económico critica el uso que hace Aguirre de la Ley de Medidas" by Soledad Alcaide

of water extraction, wastewater treatment and water reuse, the functions related to the hydraulic services of the municipalities, and the services provided according current legislation. The *Comunidad* would keep its own properties (*bienes de su titularidad*) and also the legal ownership of Canal properties related to the regional general network, composed of water supply, sanitation and water reuse systems. On the other hand, the *Canal de Isabel II* will pass on to the PLC "the ownership of public assets" (with no public use) of the firm that are not a component of the hydraulic infrastructure. According to *El País*[1068], the patrimony of the Canal included some 200 real estate properties across the region and land in almost all the municipalities. Flats were traditionally bought and then rented out to the company workers. The company also owned the historical building that was used as water deposits (*Campo de Guardias, Bravo Murillo, Islas Filipinas* y *Santa Engracia*), the *Teatros del Canal*, and the properties of *plaza de Castilla* where the *Fundación del Canal* is located. According to *Canal de Isabel II* sources (quoted by El País), the market price of the assets in September 2008 was some 2,900 million Euros. The PLC would also obtain the ownership of all shares and participations in commercial associations owned by the Canal. The workers will be incorporated in the new society with the same conditions.

The article 17 of the same law modified the *Ley 17/1984*[1069] in order to be able to promote such reconfiguration of water supply in Madrid.

Once reconverted the firm into a PLC by means of the authorization by the *Acuerdo del Consejo de Gobierno*, the shares of the Canal, up to 49 percent, would be publicly floated to permit "citizens" and "interested investors" purchase them. This process would guarantee the principles of deal equity, publicity, transparency, objectivity and concurrence, as the current legislation obliges.

The regional government commissioned the process of asset valuation from a north-American company[1070], American Appraisal. American Appraisal carried out in

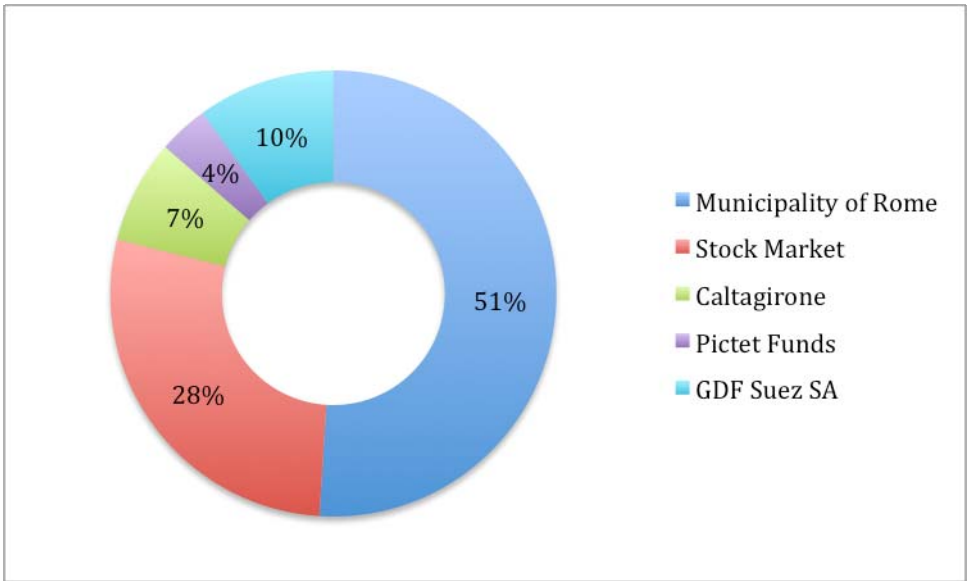
[1068] El País, 25/11/08, "Aguirre cede los bienes del Canal a una sociedad que sacará a Bolsa" by Soledad Alcaide
[1069] *Ley 17/1984, de 20 de diciembre, Reguladora del Abastecimiento y Saneamiento de Agua en la Comunidad de Madrid*
[1070] El Economista, 20/11/08, "La Asamblea de Madrid vota la privatización y salida a bolsa del Canal de Isabel II" by Agencia EFE

1989 a first modern valuation of the patrimony of the Canal: some 500,000 million pesetas (some 3,000 million Euros) [1071].

Figure 8.4. A similar process of privatization: the water company of Rome

Some medias and even politicians compared Madrid's water company with that of Rome's (Acea). Acea had been listed in the stock exchange of Milano since 1999. Previously, in 1998, the firm was transformed into *Società per Azioni* (joint-stock company). This multi-utility industrial group, one of the most important of Italy, is based on the integral cycle of water and the production and commercialization of energy[1072].Among their shareholders (see figure below) the municipality holds 51 percent of the shares, followed by GDF Suez, the company that controls Aguas de Barcelona, with some 10 percent. An important portion of the shares is in the stock exchange market (27 percent) while the remainder is owned by Caltagirone and Pictet Funds

Shareholding structure of Rome's water company, June 2009



Source: own elaboration from data from Acea Spa (www.aceaspa.it)

The process sought by the *Canal de Isabel II* was compared to that experienced by Rome's water company in the late 1990s (figure 8.4) and even with the privatization of public water utilities in England and the floating of shares in the stock exchange of share by 5 of the 10 most important water companies (Northumbrian, North West Water, South-West Water, Yorkshire Water and Severn Trent).

[1071] El País, 23/1/09, "Descabezado el equipo de gestores económicos de la empresa, by I.G. Madrones
[1072] Source: http://www.aceaspa.it/, last accessed Saturday 17th October 2009

The asset inventory and the subsequent economic valuation was jurisdiction of the *Consejo de Gobierno* of Madrid, presided by Aguirre. The regional government would also to enact a contract to regulate the services of the PLC (exploitation, maintenance, operation and conservation of the current network of the Canal). This new society would have a number of distinctive characteristics. The president of the Canal justified the deferral of the process one year in order to "capitalize" the PLC in a better economic environment[1073].

The approval of the *Ley de Acompañamientos* raised bitter criticisms by the political opposition in the Madrid Parliament. IU, by means of Inés Sabanés, argued that "with one stroke they approve the most polemic measures". She added: "we will not to tolerate that year after year the relevant measures are slipped in through the backdoor, avoiding the necessary procedures and debates. It should be a democratic commitment not to use the *Ley de Acompañamientos* a wrong way"[1074]. Likewise, the socialist spokeswoman, Maru Menéndez warned that "we will use all the available instruments suitable to bring to a halt the privatization of the Canal".

CCOO considered that the privatization of the *Canal de Isabel II* (included in the *Ley de Acompañamiento*) could put the public firm and even the water supply in risk. The trade union considered that *Canal de Isabel II* was an unquestionable and clear example that reveals that public management of essential services is more proper and efficient that private management. The secretary of Institutional Politics of CCOO in Madrid, Jaime Cedrún, argued that the privatization only responded to "an ideological approach" and to "a business operation" to "transfer to a few of what belongs to everybody". Finally he criticized Aguirre to destabilize an exemplary public firm 150 years old by applying liberal policies, whose failure had been already demonstrated[1075].

IU proposed motions in all the municipalities of Madrid asking the town councils to show "total opposition to the privatization of the *Canal de Isabel II*" and asking the regional government to refrain from intentions contrary to public interest". This measure asked the town councils to appraise "the future consequences resulting from

[1073] El País, 25/11/08, "Aguirre cede los bienes del Canal a una sociedad que sacará a Bolsa" by Soledad Alcaide
[1074] El País, 21/11/08, "Las reformas del Canal y Caja Madrid impulsan el choque con el alcalde" by S. Alcaide, our translation
[1075] iAgua, 23/11/08, "CCOO considera que la privatización del Canal pone en riesgo el abastecimiento de Madrid"

the likely termination or modification of the current existing relationship between Madrilenian town councils and a firm that substantially changes its shareholders and legal status".

They also demanded "to ask the minister of Environment to present a claim of unconstitutionality against the creation of the Plc, as it implied a clear jurisdictional invasion to the State and the Ministry of Environment, and did not comply with European Water Framework Directive.

By means of Gerardo de Val (secretary of municipal politics), IU blamed the regional government to "have brought the Comunidad de Madrid to unsustainable limits of indebtedness", and that as a result wanted to privatize an essential public service. He argued that this operation was carried out "to give more business opportunities to private capital, by means of the appropriation and "mercantilization" of public goods, in this case a sector wherein incomes are guaranteed by the consumption of over six million *madrileños*". For IU "the Canal de Isabel II is a public company that offers full service guarantees and whose challenges are, in IU opinion, the continuous public service quality, without any need of private intervention in the management of an essential and strategic good such as water". The privatization was said not to bring about any benefit to the citizens but will harm consumers, implying social and environment negative consequences[1076].

According to Santiago Martín Barajas, spokesman of *Ecologistas en Acción*, an NGO forming part of the *Plataforma Gestión Pública del Agua* [Platform for the public management of water] "behind all this there could be dramatic real state operation, in the downtown of Madrid"[1077]. It is important to recall that the patrimony includes real estate of important economic value affected by the urban plan to extend the Castellana Avenue (*Operación Chamartín*). A great deal of this patrimony located in Madrid, was handed out to the Canal for 25 years for 750 million Euros, in an agreement between Gallardón and Aguirre in 2005[1078]. According to *Ecologistas en Acción*, components of the Mesa del Agua (altogether with the FAVM, consumers associations, trade unions and also the PSOE) real estate interests were behind the

[1076] EcoDiario (El Economista), 22/11/08, "IU presenta mociones en todos los ayuntamientos contra la privatización del Canal de Isabel II" by Servimedia, our translation
[1077] El País, 30/12/08, "El PP aprueba privatizar el Canal entre abucheos y con la abstención del PSM" by Rebeca Carranco
[1078] El País, 23/1/09, "Descabezado el equipo de gestores económicos de la empresa", by I.G. Madrones

semi-privatization of the Canal. They also cast doubts on the benefits of creating a Plc and float in the stock exchange 49percent of the shares. Finally they also asked for more explanations for the need of 4,500 million euros (the main argument to privatize)[1079].

The spokesman of the environmental group denounced that there was not any justification for such privatization because the Canal "is a profitable firm, raising each year important economic benefits". He recalled that some years ago the Canal financed strictly environment important actions, for instance the ecological restoration of river banks in the region, with investments of several million Euros". In his opinion, "it is unthinkable that such action could be carried out again if the entity is privatized". The draft of the *Presupuestos regionals* forecased that the firm would obtain a benefit of 99,7 million Euros in 2009 (98,5 in 2008) and would bill for a value of 737 million [1080]. Today the Canal is the firm providing more revenues to the regional government of Madrid. Moreover, it holds important assets (according to the firm, more than 2,900 million Euros), especially real estate[1081].

The president of the Canal did not understand the controversies generated around the real estate of the *Canal de Isabel II* and its likely handing out to the PLC. "For five years we have been taking decisions to sell patrimony, real estate and plots of the Canal that are not appropriate for our service. Every year non-productive patrimony in relation to water management is sold"; so he does not see "what is the problem in doing so" now. However, he denied that assets would be handed out to the future Plc. "Nothing is to be transferred. We will grant to the Plc the right of use of the assets that make up the general network in the *Comunidad de Madrid* as well as the ownership of patrimony not related to the network".[1082].

[1079] El País, 23/1/09, "El suelo está tras la privatización parcial del patrimonio del Canal" by Inmaculada de la Vega
[1080] El País, 25/11/08, "Aguirre cede los bienes del Canal a una sociedad que sacará a Bolsa" by Soledad Alcaide
[1081] El País, 30/12/08, "El PP aprueba privatizar el Canal entre abucheos y con la abstención del PSM" by Rebeca Carranco
[1082] El País, 25/11/08, Ignacio González: "Llevamos cinco años vendiendo patrimonio del Canal" by Agencias, our translation

8.2.6 The law enabling the change of the CYII is legally approved

On the 29th December 2008 the *Asamblea* finally voted for the *Ley de Medidas Fiscales y Adminstrativas*. Differently to the rest of legislative pieces, this law did not need to be debated in commissions or in a *ponencia*. Thus, 20 laws were reformed with this omnibus bill. Socialists (42 deputies) abstained and *Izquierda Unida* (11 deputies) voted against. The law was approved with the votes of the PP (67 deputies)[1083].

Enrique Echegoyen, deputy of the PSM, criticized how this law has been approved: "ten minutes to talk about 20 laws…" and ironically said: "I hope that in the next year we would be able to go through them more calmly". Regarding the privatization he argued that "they are absolutely unnecessary measures (…). The firm is solvent and has benefits that allow them to finance itself at the long term".

The socialist deputy wondered in the *Asamblea* "why they insist on stating that public is bad and private is good?" Despite the critiques made, the socialist did not vote against the law. They argue that they did so to be coherent with the mandate of José Luís Rodríguez Zapatero of not voting against public budget to ensure stability in a context of economic crisis. However, the socialists in Madrid Town council plenary had voted against the Fiscal Municipal Ordinances, which are the equivalent to the *Ley de Acompañamiento*.

Both IU and the PSM presented amendments to the *Ley de Acompañamiento* asking for the suppression of the article that authorized the privatization of the public water firm. The PP, with absolute majority, ignored this and went on with the reform.

The socialist threatened again to cancel the agreement between their town councils and the *Canal de Isabel II*. Some socialist municipalities (for instance Alcorcón, Aranjuez, Collado Villalba, Coslada, Fuenlabrada, Getafe, Leganés and Parla, among others) have more than a million people Maru Menéndez, the PSM spokeswoman in the *Asamblea* said: "we will promote the denounces to the agreement due to patrimonial responsibility towards the Canal". The deputy of IU, Miguel Reneses, warned that the privatization of the *Canal de Isabel II* "may put on risk that public

[1083] El País, 30/12/08, "El PP aprueba privatizar el Canal entre abucheos y con la abstención del PSM" by Rebeca Carranco

firm that belongs to all *madrileños* and whose operation has been impeccable up to now"[1084].

The general secretary of the PSM, Tomás Gómez, stated that they were against the privatization of *Canal de Isabel II* as well as the privatization of *Caja Madrid* (both included within the *Ley de Medidas Fiscales*, approved in December. "The socialists are totally against the privatization of the *Canal de Isabel II* and of *Caja Madrid*. We are radically against the privatization of both institutions". "The Canal works well" and "provides a good service to the citizens". "Water in Madrid belongs to *madrileños* and we will not consent that *madrileño*'s water is owned by a few". "We are working to avoid this", mainly through socialist town councils. "Our main tool to avoid the privatization of the Canal will be the town councils ruled by the PSOE because we the socialist are *fuerza de gobierno* in Madrid" as socialist municipal rule includes over a million people in the region. "Also the socialist municipalities are going to denounce the agreement with the *Canal de Isabel II* to avoid the privatization of a scarce good that belongs to all *madrileños*"[1085]. "We will promote a municipal legislative initiative, where we will urge the suppression of the article 16 of the *Ley de Medidas*, of the *Ley de Acompañamiento*, whereby the process of privatization of the *Canal de Isabel II* is authorized […]. We are even legally considering the possibilities to support the *derechos de reversion* of those citizens that were expropriated by the Canal for the common interest and that today could be affected as a consequence of the process of privatization"[1086].

Maru Menéndez, announced that the PSOE would promote legislative initiatives in all the municipalities of the region to suppress the article 16 of the *Ley de Acompañamiento* of the Regional Budget for 2009. This article allowed the entrance of private capital in the company. She met with the *Mesa del Agua*, composed by the trade unions CCOO and UGT, environmentalist groups, and the *Federación Regional de Asociaciones de Vecinos de Madrid* (FRAVM). The reason to promote such actions was to create a debate on the privatization of the water company in each

[1084] idem
[1085] EcoDiario (El Economista), 18/1/09, "Ayuntamientos del PSOE denunciarán convenios con el Canal de Isabel II y harán iniciativas legislativas contra su privatización" by Europa Press, our translation
[1086] El País, 29/1/09, "Maru Menéndez explica las iniciativas contra la salida a Bolsa del Canal", Radio Interview (transcribed and translated by the author), accessed the 2nd February 2009, our translation

municipality. They also thought about promoting other actions such as an *Iniciativa Legislativa Popular* [Public legislative initiative].

On the other hand, the representative of the trade Union CCOO challenged the argument given by the Comunidad to justify the entrance of private capital in the CYII while considering that there was not any need to build more infrastructure to ensure water for *madrileños*: "the storage capacity suffices to supply the whole population", adding that "it is not necessary to build new infrastructures, reservoirs, that justify the entrance of private capital"[1087].

Some representatives of the *Federación Regional de Asociaciones de Vecinos de Madrid* (FRAVM, the Regional Federation of Neighborhood Associations) and activist of the environmentalist group *Ecologistas en Acción* chained up to a building of the *Canal de Isabel II* and distributed leaflets to protest against the privatization of that entity. This action is included in the campaign "*Campaña por una gestión cien por cien pública del agua*" (figure 8.5) [Campaign for water management one hundred percent public]. According to Santiago Barajas, activist of *Ecologistats en Acción*, the privatization "will produce very serious damages, both in terms of water quality for the citizens, and for the environment and Madrid Rivers" [1088]. During the protest the activist opened out a banner that read "Public water for all. No to privatization". Some delegates of the Union's representatives Committee supported the protest. They also handed a letter to the Administrative Manager of the firm asking for a public debate on the process of mercantilization of the Canal[1089].

The representative of the FRAVM, Francisco Caño warned that "we will keep the protests until the president [Aguirre] gives up the idea to get rid of the patrimony of all *madrileños*. We do not want a public service to go private and that the ownership, belonging to all the citizens, to be pillaged by some few who have the money to buy the shares"[1090].

[1087] El País, "29/1/09, "El PSOE planta cara a la privatización del Canal" by EP, our translation
[1088] EcoDiario (El Economista), 20/1/09, "Vecinos y ecologistas se encadenan en la marquesina de un edificio del Canal de Isabel II para protestar por su venta" by Servimedia
[1089] El País, 21/1/09, "Encadenados por un Canal público"
[1090] EcoDiario (El Economista), 20/1/09, "Vecinos y ecologistas se encadenan en la marquesina de un edificio del Canal de Isabel II para protestar por su venta" by Servimedia, our translation

Figure 8.5. Sticker against the privatization of the *Canal de Isabel II*.

Source: Plataforma Gestión Pública del Agua

According to Santiago Barajas, and referring to the alleged need of two dams, argued that "they are totally unnecessary infrastructures as the Ministry for the Environment has reported for years". On the other hand, the *Confederación Hidrográfica del Tajo* [Tajo Water Agency], the organism in charge of approving the construction of the dams, pointed out that such projects were not included in the *Plan Hidrológico* [Water Plan] and that it had not received any news from the Comunidad regarding those dams[1091]. The spokesman of *Ecologistas en Acción* continued arguing that "if necessary these dams should have been financed with the benefits obtained in the past –some 80 millions in average per year during the last five years– used to finance the emergency call number or the construction of Metrosur and the Teatro del Canal" [1092].

To face the privatization process with more chances of success Esperanza Aguirre and Ignacio González remade the board of executives of the *Canal de Isabel II*[1093].

The spokesman of the PSOE in the *Assamblea de Madrid*, Adolfo Navarro, asked for additional information regarding the need of investments: "4,500 million Euros

[1091] El País, 23/1/09, "El suelo está tras la privatización parcial del patrimonio del Canal" by Inmaculada de la Vega
[1092] idem, our translation
[1093] El País, 23/1/09, "Descabezado el equipo de gestores económicos de la empresa", by I.G. Madrones

considered in the investment plan means an average of 400 million Euros per year, which in turn has been the average investment figure for the last 5 years. Provided that the Canal generates benefits –some 90 million in 2008–, it could resort to indebtedness without privatizing patrimonial assets".

The socialist spokesman was afraid that seeking for private benefits could affect the quality of service and that some utilities in the downtown area, for instance, the plots of land of the deposits in Santander and Islas Filipinas (85,125 square meters) or those located in Bravo de Murillo and Santa Engracia (65,360) or the water deposit in Plaza Castilla (50,000 square meters) with an estimated value reached of 746 million Euros, could be relocated in lands of less value. The firm owned also tracts in the districts of Hortaleza and Fuencarral, in municipalities such as Majadahonda and in the *Sierra de Guadarrama*.

Actually, a staff member of the company interviewed by El País argued that some of current utilities in central Madrid could be dispensable as "water is already treated in the *Sierra*, and they only serve as a guarantee for a whole day in case of the breakdown of some main artery". However, the CYII denied this assertion, and argued that "they are indispensable because the guarantee water supply in case of burst or in moments of maximum demand"[1094].

Despite the confirmation in June 2009 by the manager of the *Canal de Isabel II* of the privatizations purposes[1095], the current situation seems to have reached a standstill:

> "presenting this year we have elaborated and approved the legal framework to develop the process of capitalization of the Canal de Isabel II that I announced last year in this very Debate. And we are waiting for the most appropriate moment to float it on the stock exchange" (Esperanza Aguirre, 15th September 2009 [1096])

8.2.7 Is 2010 the year when the reconfiguration will take place?

At the time of writing and as said just before, the privatization of the *Canal de Isabel II* appears to be in a standstill. However, the vice president of the Canal stated that

[1094] idem, our translation
[1095] Cinco Días, 2/6/09, "El Canal de Isabel II confirma su privatización", p.8
[1096] Transcription of the discourse of Esperanza Aguirre in the "*Debate sobre el Estado de la Región*", Asamblea de Madrid, 15 de septiembre de 2009. Available at: http://www.madrid.org/lapresidencia/contenidos/discursos_presidencia.htm . Last accessed: 19th October 2009

the process was on the way. Once all the valuation process is made, the president said that if market demand exists (to buy the shares) the process would be definitively launched[1097].

It is likely that the debate will be reopened in 2010 and that the choreographies of power in the CAM, in the municipalities of the region and also within the conservative party would take the form of struggles to eventually decide whether or not privatization would proceed. We must note that 2010 could be the year of real convergence between the water supply of Madrid and Barcelona, in terms of governance, because the integral water cycle of both cities may be governed totally or partially by private capital.

[1097] Europa Press, Jueves 7 de Enero de 2010, "La Comunidad de Madrid afirma que el proceso de privatización del Canal de Isabel II sigue en marcha"

PART 3:

CONCLUSIONS

9 Conclusions

> "The environment is no longer a simple concern of proactive governments. It has become a global economic issue", Suez Environnment Challenges[1098]
>
> "Making the planet sustainable is the best job on Earth", Suez Environment welcome page webpage[1099]
>
> "The environment is an industrial challenge", (Veolia Environnement, 2009)[1100], welcome Internet site)

We have based our investigation in the history of the urbanization of water supply in the two most important cities of Spain from the mid 19th century until today. In our enquiry we have not only traced past histories, but we have also discussed the current situation and the future prospects of water governance in both cities. The overlooked nexus between Neoliberalism and environmental governance and change has been one of the main motivations for our task.

Urban Political Ecology has permitted us to view the water problematic of Madrid and Barcelona from a different a more illuminating angle. However, we have also been aware of the multiple readings of Neoliberalism and neoliberalization processes from different and divergent perspectives. We have navigated through the Critical Geography literature, which oscillates between accounts disclosing a hegemonic and rigid model and readings emphasizing difference and precluding any universal explanation. Perhaps a more proper framework to analyze such processes would be one based on *hybrid* understandings of neoliberalization.

The cases of Barcelona and Madrid disclose how local water flows could turn into global flows of capital. Capital flows through the hydrosocial cycle of water, expanding the frontiers of the cycle, both geographically (transfers from far away)

[1098] http://www.suez-environnement.com/en/profile/about-us/challenges/challenges/. Last accessed 10th January
[1099] http://www.suez-environnement.com. Last accessed 10th January 2010.
[1100] Last accessed 18th December 2009, www.veolia.com/en/

and technologically (desalination, reutilization, etc.). Drawing on Swyngedouw (1997) we argue that water lubricates the circulation of Capital. Water continually flows through the hydrosocial cycle, showing us the deep entanglement between flows of water and flows of power and capital. Water could not be abstracted from the social conditions that give it its meaning, and from the societies and territories through which it flows.

Once we have delved into the bibliographical review and the Barcelona and Madrid cases, it is time to recapitulate and summarize the main conclusions that could be drawn from our work. We will use the research questions raised at the beginning of the thesis to help us to organize and structure these conclusions.

9.1 The urbanization of the water supply and the debates between the public and the private

With the inquiry into the urbanization of the water supply we wanted to disclose the historic-geographic contingencies that had shaped the development of the water supply in Barcelona and Madrid since the 19th century, when centralized water suppliers were established in both areas. In our research questions we wanted to trace the attempts to municipalize the supply and disclose why they did not thrive in Barcelona. At the same time, we wanted to know whether and why private initiative did not take hold in Madrid (at least during the 20th century),

With our account of the urbanization of water supply we have appraised how water has been captured and directed to the urban fabric to keep pace with the expansion of Barcelona and Madrid. By tracing the water flow through the city we have in turn disclosed the functioning of modern societies in all their complexity, following Gandy's dictum (2002:22): the "history of cities can be read as a history of water".

The urban history of Barcelona and Madrid and its metropolitan areas could not be conceived without the continuous flow of water feeding an intricate and complex hydrosocial cycle. A key example supporting that is the case of Madrid: this city lost its condition of capital in the past due to poor water supply; in the 19th century, the Spanish State did not want that to happen again, and multiple efforts were made to avoid such situation.

In this process of urbanization of the water supply, new natures have been produced (Smith 1984) both in the city (private and public gardens, monumental fountains, etc) and far way (artificial lakes, modification of streams, etc). In Madrid, the mobilization of resources, both economic and natural, to keep pace with the expansion of the built environment has been arguably larger than in the case of Barcelona.

An initial key difference between the two cities lies in the fact that since the creation of the centralized and monopolist water supplier, Madrid has been drinking mainly surface water, first from the Lozoya river, and later incorporating new flows, to the point that today Madrid's urban fabric obtains its water from some seven rivers and water from the Tajo is expected as early as 2010. Groundwater has played a

secondary role, just to complement water supply during droughts or scarcity episodes.

The built infrastructure to tame the flow of H_2O and obtain water ready to feed the hydrosocial cycle of urban Barcelona has been different. Groundwater in Barcelona played a key role until mid 20th century. It was not until the intervention of the State, during Franco's dictatorship, when surface water from the Llobregat began to be extracted and treated. The materialization of the transfer from the Ter river, combined with contamination of aquifers relegated groundwater use at the end of the 20th century to situations of scarcity. Eventually, the sea has been turned into an important water provider to Metropolitan Barcelona, with desalination in operation since 2009.

It is interesting to note that our two case studies show two distinct kinds of ecological projects (hence political projects, according to David Harvey (1996)) concerning the mobilization of water resources. On the one hand, the Madrid's modern water supply relied from the beginning on water from beyond the urban limits transported by gravity through channels. On the other hand, Barcelona and its metropolitan area were mainly supplied by nearby groundwater sources or other surface waters, and the steam machine had an important role.

The geographical location of Madrid and Barcelona diverges sharply and this clearly affects the nature of the available water flows and of the ensuing difference in the ecological (and political) projects to bring water to the urban fabric. Thus, while Madrid has many rivers originating in the *Sierra* quite close to the city, two rivers, the Llobregat and the Besòs, surround Barcelona. However, since Barcelona is a coastal city this means that the city is located in the lower course of both rivers and therefore, is more exposed to quality problems. In this sense, industrial pollution combined with the salinity of the *Llobregat* river made not viable the direct extraction of water from the river in the 19th century.

Such differences are not only being the result of geographical conditions (few rivers of lower qualities in the Barcelona case). Rather the contrary since we argue that the nature of the supplier has played a critical role in conditioning the trajectory of the built infrastructure. The magnitude of the project of the *Canal de Isabel II* would not have been possible without direct state intervention. The failed private initiatives to

construct a modern water supply during the 19th and 20th centuries proved that the water project of the *Canal de Isabel II* needed public intervention. This does not mean, however, independence from the private sphere. In order to rise funds for the construction of such work private capital was needed as well, since the State alone could not finance the entire project either.

In what concerns Barcelona, the most remarkable feature is perhaps the strong tension between the municipality and the private suppliers, especially with the SGAB. Furthermore, we have identified that private participation was sometimes encouraged directly by the public sector, as Davis (2005) suggested. In the 1910s when the municipalization of the water service was on the agenda, a shift in local power combined with the irruption of typhus precluded such event. By the late 19th and early 20th centuries private participation in the water supply and sanitation services was widely debated as Budds and McGranahan (2003) also stated.

Esteban Castro (2009) contends that during the early period of modern water supply the water flows provided by private suppliers were only directed to the well-off neighborhoods. In the case of Barcelona we can observe a high heterogeneity of water companies supplying different parts of the city; however, access to water at home was rare and most of the citizens relied on public fountains. In the case of Madrid, we come across the role of the *aguador*, water vendors, who sold water for a price and therefore subject to the ability to pay of the consumer.

The 20th century history of urban water supply in Barcelona and Madrid bring to the surface a complex web of intricate power choreographies (Swyngedouw 2004). A dialectical relation between the State and Capital (Swyngedouw 2007) has existed in both cases, although in Barcelona this relation can be observed more clearly. The inward character of Spanish Capitalism after World War I led to the takeover of the SGAB, owned by French and Belgian capital, by local bankers. Despite the fact that early rationale was to speculate and then sell the company to the Town Council, bankers soon saw in urban water supply a real money making machine.

With the Spanish Second Republic and the Civil War the fate of the nature of the supply could have changed forever. The Francoist victory precluded such turn, and tight links between the dictatorship and capital crystallized in the case of Barcelona, with the regime returning the company to the bankers after workers collectivized it in

1936. By then, the town council of Barcelona had renounced to manage the supply; even it had the opportunity when the Ter transfer was built in the mid 1960s. Instead, the municipality handed out these flows to the SGAB.

With the arrival of democracy, the configuration of the water supply gained in complexity especially after Spain joined the European Union and had to adapt to new economic and legal frameworks. In table 9.1 we summarize the key moments in urbanization of water in Barcelona, with the main actors as well as the predominant discourses.

Table 9.1. Key moments in Barcelona water urbanization

Period	Key actors	Dominant discourse	Institutional and Social Outcomes	Scalar networks
Late 19th and early 20th century	Landowners and industrialist/Urban popular classes	Water as a private good	Privatization, quest for new supplies beyond the city limits	Transnational -local
1920s decade	Bankers/Municipality, French and Belgium owners	Water to speculate	"Nationalization" of the SGAB (takeover by Spanish private capital)	National-local
Spanish Civil War (1936-39)	Bankers/Urban popular classes	Water as an essential good	Collectivization of "Aguas de Barcelona"	National-local
Franco's dictatorship (1939-1950)	Economic and political elites	Water as an strategic and economic good	Re-privatization of the SGAB	National-local
Franco's dictatorship (1950-1975)	Political and economic elites/Water donor Regions	Water as an strategic good (still privately managed)	Construction of dams and long distance water transfers, Transfer from the Ter River, Dismissal of the Ebro Transfer	Transnational -National-Local
1980-1990s	Metropolitan and Catalan Administration, rich neighborhoods/Working classes, lower income families	Water as an economic good and a key factor for the expansion of the urban continuum	"Water Wars", Creation of the Catalan Water Agency, National Water Plan	Transnational -National-Metropolitan
2000-onwards	European Government, Spanish Government, Catalan Water Administration	Water as economic, and eco-social good	Desalination plants instead of Ebro water transfer. Drought increasing social awareness for conserving water	Transnational -National-Metropolitan

Source: own elaboration

In Madrid, movements back and forth for the control of the *Canal de Isabel II* were made as well. Nevertheless real control over water always remained in the public sphere, and concretely in the State. In the context of decentralization of the Spanish

State in the 1980s, the definitive and most critical shift took place: the *Canal de Isabel II* became a Regional State-owned firm, with total control over the entire water cycle.

The colonial past of Spain was re-imagined and re-invented under late 20th century democracy. Economic globalization permitted Spanish corporations flood Central and South America with investments when Latin American countries, under the advice of the World Bank and the International Monetary Fund, opened their markets and put basic public services for sale. Spanish capital was particularly interested in energy, building, telecommunications and water. We will return to this key point later.

While politic and economic factors, such as the arrival of democracy, joining the EU in 1986 or engaging in Globalization have shaped urban water governance in Barcelona and Madrid profoundly, other factors, such as droughts, are also critical to explain the modern trajectory of the water supply in both areas.

9.2 Drought as a key element in the articulation of Spanish water politics and policies

Along the history of the urbanization of water in Barcelona and Madrid we have come across different episodes of drought. Historically these episodes served to justify hydraulic structuralism as the unique solution. We have seen this for Barcelona, especially during the 1950s and 1960s. In Madrid, drought has conditioned water politics during the 20th century as well.

In the context of the implementation of European directives, which promote the self-fulfillment of needs at the basin level, a new kind of hydraulic structuralism is promulgated: desalination, and by extension reverse osmosis. Desalinization must not be mistaken as the use of a "local" source. Instead and through this apparent conflict-free and consensual technology, we are colonizing the sea, increasing the level of complexity of the hydrosocial cycle, and deepening our dependence on the environment, through the use of larger quantities of energy. At the same time, this reliance on technology may change how people envisage this resource and stimulate higher consumption.

Drought and scarcity conditions also provide us with the possibility of discussing different approaches to water planning and management. In our theoretical review, we have acknowledged the existence of two major water paradigms: supply-side management and demand-side management. We contend that both Madrid and Barcelona are situated halfway between those two approaches: that is, the supply system still relies on centralized infrastructures but complements these resources with investments in decentralized facilities, efficient technologies and human capital, which in turn is highly reliant on technology improvements. In the Spanish case this is clearly reflected in the increasing mix of dams, desalination plants and some demand-side strategies to curb consumption, such as price mechanisms, or the creation of water markets. Briefly, at least in Spain, it could be said that both paradigms coexist. For example, the Ebro water transfer was withdrawn by the current socialist government (Saurí 2003) and some interesting management tools have been introduced in order to control demand, mainly in the urban and industrial sector. However, about 40 desalinations plants are being built in the Spanish

Mediterranean coast. We argue that this technology, contrarily to the general belief and despite its novelty, fits in the "old paradigm", in the sense that it does not attempt to manage current resources but to enlarge the stock of available water. Impacts are translated from the Pyrenees to the Sea and to further away, due to the need of fossil fuels that contribute to global warming Moreover, desalinization may increase the geopolitical conflicts for scarce energy resources and may pollute marine ecosystems.

Fetishism of technology has been constantly present in the history of the modern supply of water in Barcelona and Madrid, with dams as the magnificent work of *man* to control nature disguised this time in the form of the drought phantom. Fetishization of technology and science continues with desalination at the forefront. The outcome of this is the production of socio-natural and socio-technical hybrid complexes, which fuse modern practices, scientific knowledge and metabolic processes in order to offer solutions to the vagaries of the natural environment.

9.2.1 Suburbanization and new water sources

The metabolic processes described in the thesis shape the expansion of the urban fabric in important ways. Urbanization patterns are widely contributing to the manufacturing of drought, bringing about an uneven geography of water consumption in Barcelona and Madrid. In both urban areas since the 1990s we can observe a sharp decrease in the urban water metabolism, especially in the compact and Mediterranean city, and also in manufacturing. Nonetheless, at the same time, a countertendency of accelerated increase of water use appears in some specific locations of these areas. As we have seen, this is caused by suburbanization, i.e. urban growth in low-density patterns. Suburbanization is already an important factor contributing to the social production of drought, and in the future could be even more critical in inducing a water crisis much in the same vein as it happens in Australia or the Western United States. In turn, uneven consumptions raise questions about equity and about who should bear the burden of water use reduction when scarcity episodes occur. The crisis of the real estate market, combined with the global financial crises unleashed in 2007, has contributed to slow down sharply the suburbanization process. However, we argue that the suburban environment has an important stock of homes for sale once economic perspectives improve.

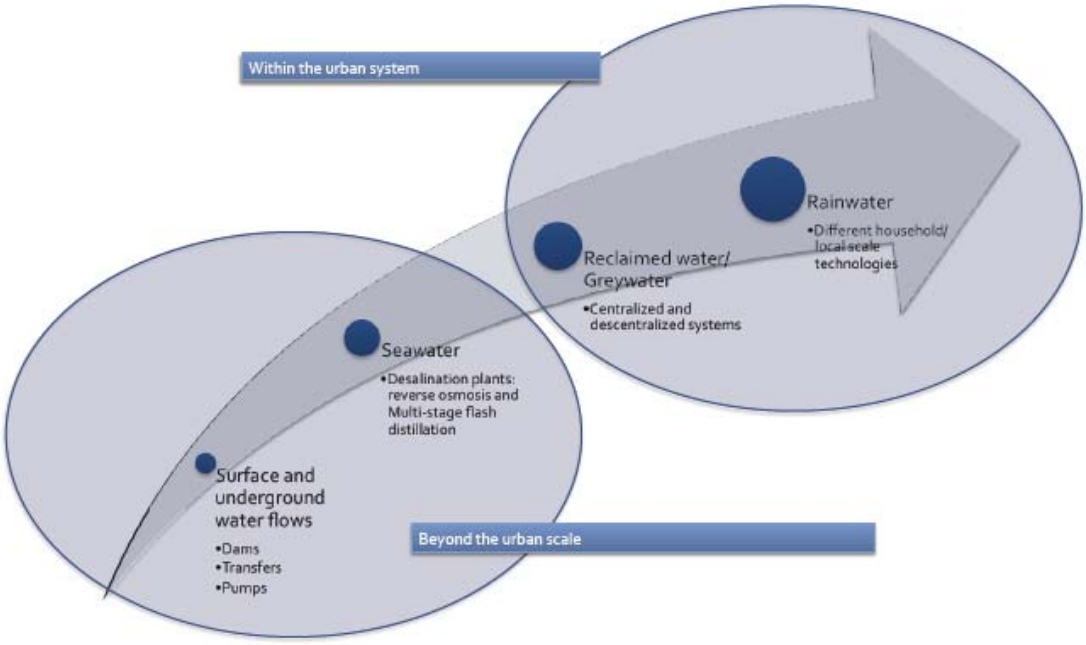
Sustainability discourses under the umbrella of Ecological Modernization have inundated the real estate business, sometimes as marketing strategy, other times as a result of tighter regulatory frameworks. Efficiency systems in new technologies of indoor water consumption begin to be implemented. At the same time, however, these savings have been outweighed by the increase of outdoor water uses with the presence of lush gardens and swimming pools.

New conceptualizations of the water cycle have led to new regulatory frameworks including flows of water not envisaged as usable until very recently: rainwater and recycled water. This turn in the scale of water catchment points towards an apparent shift in the water paradigms and also of the role of the State in the provision of water (decentralization). The degree of implementation of such schemes however is still very recent and a coherent appraisal is not possible. However, it is reasonable to argue that this change would face probably opposition by some stakeholders, stretching from the private water companies or the water agencies (both observing decreasing incomes as a result) to part of the population, skeptical about the quality of such water and unwilling to use personal time and resources to increase the sustainability of the supply. There is an existing tension in water planning since, it promotes local-based technologies and desalination and water transfers which clearly exceeds the urban scale at the same time in an attempt to, expand the socio-natural relations and add more complexity to the scalar networks which provide water (figure 9.1).

Furthermore and drawing on Bakker (2001), we argue that resource scarcity is one of the main arguments to justify the accumulation of capital and the expansion of the markets. Thus, desalination and reverse osmosis technologies could be seen as key frontiers of capital accumulation, at least in coastal locations. In the near future, we contend that reverse osmosis could be also critical to enable water reutilization for drinking uses both in coastal (Barcelona) and in continental locations (Madrid). The generalization of such technologies, combined with the increasing penetration of decentralized systems, such as water harvesting or greywater recycling, could bring about deep changes in how we imagine the hydrosocial cycle, in economic, political and legal terms. Who owns seawater or rainwater? Could we establish a price and concessions over wastewater, as it already happens in the United States or Australia

(Troy 2008)? These, among others, are questions for which we do not any response yet.

Figure 9.1. Change in the scale of technology



Source: own elaboration

As we said, the enhancement of water markets is another outcome of increasing water demands. In Madrid, the future of water supply seems to be the Tajo and the creation of water markets, with farmers selling their rights to the water operator, as it happens in many places of Western United States. In Barcelona this is also an option of future, especially from the Segre and Ebro. At the same time the creation of new water markets, as Mansfield (2007a) building on Marx argues, may contribute to the social production of scarcity.

Under Ecological modernization the state acts an enabler of markets for new environmental technologies. In the case of water this is clear for Barcelona in what concerns, desalination but also for water reutilization or rainwater harvesting. The State searches techno-institutional fixes to solve environmental problems through efficiency, techno-scientific management and innovation.

Apart from this more market and technology-oriented fixes, in parallel, the Administration, at least in Barcelona, is integrating water (and in general environmental) concerns into land use planning and urban development.

Municipalities are leaving increasingly aside single-house developments, and turning towards a mixed model, halfway between the compact and the suburban, with collective gardens and swimming pools.

Turning our attention again towards droughts, we can state that political and economic power relations (already described) aside, discursive issues are also critical. Technocratic-oriented discourses, as Swyngedouw argues (2004), serve to manufacture social crises in the political terrain of water management. In the case of Barcelona we expect to have shown an example of such discourses in our newspaper research. For the media, and particularly for the most widely known newspaper of Barcelona, the drought became a tragic spectacle, which obliterated the social production of such scarcity. The mediatization of the episode magnified the gravity of the situation, not giving space for a reflection on how water was to be governed in a dry environment, but insisting on the need of more infrastructures. At the beginning of the 21st century the environment has become an arena of power and spectacle (Brú 1997).

The recent drought of Barcelona, with citizens decreasing their consumption without extra economic penalizations (as it happened in Madrid with the droughts of mid 1990s) shows that non-monetary incentives work. In this sense, Carvalho and Rodrigues (2006) argue that relying too much on economic incentives may produce a crowding-out effect that could erode the intrinsic motivations and social practices of citizens not guided by the market. However, one could argue that economic mechanisms monopolize the paths that should guide us towards a more sustainable society. Indirect mechanisms for aligning social, economic and personal conduct with socio-political objectives (Miller and Rose 2008) inundate the water governance and management practices of our times.

9.3 Neoliberalizing the water cycle: commonalities and differences

Our work has also paid attention to the articulation of the specific projects of resource regulation and governance in Barcelona and Madrid. In turn, we have framed and linked such changes with the wide transformations in the modes of political economic governance in both cities.

As McCarthy and Prudham (2004) argue neoliberal orthodoxies could hybridize with environmentalism, or at least with certain kind of environmentalism (see also Castro (2009)), which results in governance models based on capitalist social relations. In this sense, environmental governance is affected by the neoliberal imperatives to privatize, marketize or deregulate (Mansfield 2007a), as we have seen in our case studies. Current environmental governance not only could be the output of Neoliberalism coalescing with environmentalism, but also could even be constituent of Neoliberalism and promote its ascendancy (Heynen et al. 2007b). Therefore, environmentalism could function as an environmental fix to the capitalist mode of production in order to face the problems of sustained growth (Castree 2008a). In one word,, the environment is not only constituent but also constitutive of the neoliberal project.

The neoliberal project however is neither homogenous nor monolithic, but uneven and hybrid, and coevolves with society. In this sense, we agree with Castree (2006) about the 'perplexing amorphousness' of neoliberal reforms of environmental governance as a barrier to generalize Neoliberalism as a single and coherent project.

Commonalities and differences between Barcelona and Madrid indeed exist. We take the advice of Noel Castree (2005) to attempt to avoid identifying merely formal rather than substantive commonalities between cases. We are also aware of the risk to make excessive parallelisms and label both cases as the materialization of Neoliberalism when the differences may clearly outweigh the similarities. Instead, with our cases study we try to elucidate the neoliberal dimensions in both cities (Castree 2008), acknowledging that path dependencies determine to some extent both the directionality and the boundaries of such neoliberalization processes (Larner et al. 2007). Drawing on Toke and Lauber's (2007) idea of the importance of the

creation of path dependence, in our empirical cases in Madrid and Barcelona we observe that an important and early manifestation of Neoliberalism, or directly of liberalism, shaped the institutional environments of the government of the water flow. This is why we have been interested in the material and historic side of the urbanization of water in Madrid and Barcelona, and not just on the recent governance changes.

In what follows we will flow through the multiple ways environmental governance and management may fuse with Neoliberalism, and we will estimate whether or not it applies to our case studies.

The modification of the Spanish Water Law in 1999 (and 2001) opened the doors to the creation of water markets within river basins. In Barcelona and during the drought of 2008, as we have seen, the Catalan government proposed to buy water rights from the irrigation communities of the Ebro Basin. Further **marketization** of water could be a reality if interconnection between basins materializes. As we have mentioned, in Madrid, the prospects for the future seem to go in the same direction as the American case. Thus one likely future objective of the *Canal de Isabel II* could be to buy water rights of some irrigation communities in the Tajo river basin to have extra water for Madrid.

In what concerns, the governance of the resource **commercialization** strategies are present in both cases, as water is more seen as an economic rather than a public good. As Bakker (2007b) writes this process redefines users as individual customers rather than a collective of citizens. We contend that despite not being private, the *Canal de Isabel II* is run along fully commercialized lines, almost identical to those of the private water supplier of Barcelona. There is an increasing tendency towards redesigning institutions according to market values, and emphasizing the role of economic incentives in shaping the role of individuals (Carvalho and Rodrigues 2006), as our case studies show. However, to some extent in both areas exist cross-subsidies between customers due to the progressive block-rate pricing schemes, which lessen the effects to some extent.

Commodification is one of the main processes that denote the neoliberalization of the environment. H_2O could become a commodity, but we argue that it would be a fictitious commodity (Bridge 2007) in the Polanyian sense (Polany (2001 [1944]), as

it is not originally produced to be sold. However, on the other hand, we wonder if water flowing through taps, especially when coming from desalination plants it is still a fictitious commodity or has lost its fictitious status during the long transformative process undergone by desalted water.

In the context of the water industry privatization in England and Wales, Bakker (2003c, 2005, 2007a) points at two main barriers hindering the commodification of water: the variation of water quality between catchments and the fact that water supply networks were not integrated even within company supply areas. Bakker (2007a) speaks, therefore, about a quasi-commodity or a partially commodified good. Other barriers to commodification, in this case before the privatization of water supply in England (chapter 3), were the absence of competition and the lack of market-based pricing mechanisms.

In Barcelona and Madrid supply networks are quite integrated. However this does not impede variations in water quality, especially in Barcelona where the quality of water, especially concerning organoleptic parameters, is geographically very uneven. However, with the operation of the desalination plant and the project of interconnection between the Llobregat and Ter water systems, these differences may fade. With respect to competition, in both locations water remains a natural monopoly with no feasible prospects of reversing such trend. As in England, the price of water is tightly regulated by the public administration. However, in both cases, and differently than the English case, metering is the generalized method of charging and the resource is monetized. Full internalization and internalization of energy and environmental costs, following the mandate of the European Water Framework Directive, could facilitate the transition towards full market-based valuation mechanisms. We are aware, however, as Castro (2009) warns, not to conflate commodification with the application of economic principles in water management.

Water is separated from its context in both case studies, in what Castree (2003) calls individuation, with legal (water concessions) and material boundaries (pipes, dams) established around the flow of the liquid. However, water cannot be freely bought and sold as a normal good, but is subjected to the authorization of a strong regulator, the basin water agency.

Castree (2003) also points at alienability and displacement as two extra conditions to create a commodity. Water follows a process of alienation, as it is physically and morally detached from its sellers. By means of displacement, social and natural relations to produce the commodity are concealed. In Barcelona and Madrid, as it happens under capitalism in general water has been separated from its socio-ecological context (Swyngedouw 2004). We recall that commodities are not things but socio-natural relations. Hence, as Maria Kaika (2005) argues, the commodity relations under capitalism mask the various socio-ecological processes of domination, subordination, exploitation and repression that foster the expanding urbanization process. In Barcelona the city has colonized basins in the Pyrenees, aquifers in the alluvial plain and also the sea, by means of desalination. Desalted water, due to the high-energy requirements, has a special significance, as it does not only conceal the socio-natural relations behind the water *per se* but also of the amounts of energy (probably obtained from Algerian gas). In few years, possibly, Barcelona would also drink water from another river, be it the Rhone or the Ebro. In the case of Madrid, the mix of sources is even higher, with seven rivers supplying the city, and water coming from the Tajo in 2010.

We can argue that urban water in both areas is commodified, hence, mechanisms are applied (water treatment) in order to standardize a class of goods (water) coming from different sources (different rivers, aquifers or even from the sea) and are sold with a single price (unified block rate tariff). However, we remark, as Bakker (2003c, 2005, 2007a) did for the English case, that commodification is not complete as the price is not exclusively set in the market but rather the product of a political negotiation. However, exchange values are prioritized over used values, which is a sign of commodification as Castree (2003) argues. According to this, and drawing on Radin (1996) we are of the opinion that water in Barcelona and Madrid has undergone with time a process of incomplete commodification. Despite being present in the market, water is subjected to regulatory control by the State, which is a non-neoliberal fix to the neoliberal system, and difficult universal commodification. The State plays a role in regulating fictitious commodities as self-regulation by the market is utopian (Block 2001 [1944])

We emphasize the fact that probably the degree of commodification of water was greater in the 19th century than in the 20th or 21st century in our case studies,

especially in Barcelona where water supply has been mostly operated by a private agent, but also in Madrid where before the creation of the Canal there was the figure of the water vendor. Paradoxically however, Barcelona citizens rely heavily (much more than those of Madrid) on bottled water, which is differently than tap water, a totally commodified element, an extreme case of commodification as Castro (2009) remarks.

Privatization of environmental resources gains momentum, as new products and processes are no longer sufficient to absorb the increasing volume of capital searching for a profitable investment. We use the term privatization in a wide sense, including both the privatization of resources but also the private participation in the provision of such resources. Literally speaking, by water privatization in Spain we refer to the later rather than the former sense, as water is ultimately a public good (or that is what current legislation says). However, according to what we have seen, the limits separating both forms of privatization are increasingly blurred; for instance in the example of desalination (or of bulk water supply in general), a private operator is "producing" seawater, selling it to the administration and buying again for distributing in the city.

The revision of the literature on water privatization discloses, first, that private participation in the water sector may adopt different faces, stretching from supportive tasks to a full control over the resource and the service. Above all, however, we put at the forefront the hegemonic presence of PPP or Public-Private Partnerships with the associated discourses on shared responsibilities and projects. PPPs blur the frontier between the public and the private and conceal the real degree of private participation.

Public-Private Partnerships (PPP) deserve a special mention since they are currently the most used mechanism of private intervention in the water cycle. State intervention is no longer presented by private capital as something annoying and disturbing, but instead as something necessary for the proper functioning of many services. We have been seen this in our accounts, and specially when analyzing the discourses of managers of the water companies and water administration. Privatization does not happen spontaneously, as free markets ideally portray, but as Mansfield (2008) argues, the State performs a key role in such process.

While Madrid privatization, in the case it is finally carried out, could be clearly been presented as a case of Harvey's accumulation by disposition, or Marx's primitive accumulation, with private capital controlling something that previously was of all the citizens, the early water privatization process in Barcelona deserves probably an alternative labeling. In this case, private capital, in general terms (we recall that by then groundwater was a private good according to the law), did not dispossess neither took what was public, but expanded through the acquisition of other private companies. What could suppose accumulation by dispossession would be the change of ownership of the bulk water supplier, *Aigües Ter-Llobregat*. We suspect that contexts of economic crisis may serve to push forward the barriers of capital accumulation, as Naomi Klein (2007) demonstrated.

Environmental improvements, in water quality terms, are presented, under the label of ecological modernization and market environmentalism, as one of the main reasons to push private participation in the water cycle in Madrid. In Barcelona, the underlying reason to increase further infrastructures is scarcity, and as the financial situation of the regulator is delicate, private capital leads such projects. Neoliberal agendas thus, as Lockie and Higgins (2007) contend, are quite interventionist in environmental issues. Rather than deregulation, we argue that current trends are better explained if we use the expression **reregulation**. As Karl Polanyi (2001[1944]:205) stated: "No market economy separated from the political sphere is possible".

One of the proponents of free market environmentalism, Anderson (1991) defends that such paradigm is perfectly compatible with ecology. Castree (2008a) reaches the conclusion that 'neoliberalism' is, in environmental terms, an apparent paradox: by giving full reign to capital accumulation, it seeks to both protect and degrade the biophysical world, while manufacturing new nature in cases where that world is physically fungible.

Neoliberalism appears thus as a self-contradicting theory of the state that impels rather than reduces state intervention (O'Neill 1997). State intervention points, on the one hand, at opening new spheres for the circulation of capital and retrenching from some areas. Thus in both Madrid and Barcelona we observe State bodies and private firm strategies to 'roll-back' direct state responsibility for environmental goods and services and natural resource management.

At the same time, however, the state becomes very involved in organizing privatization (Swyngedouw 2007) and in establishing a post-regulatory framework. Glassman (2007) draws on Harvey (2005) to argue that the most powerful capitalist interests use the state to roll back, but also to roll-out regulation and privatization in an opportunistic way.

Therefore, State implication also increases (roll-out): free-market economy is planned so that advanced capitalism suffers from an indispensable impurity (Carvalho and Rodrigues 2006) leading to the Polanyan double movement (Polanyi 2001[1944]). As private participation is deeply entrenched, the State has to implement some regulatory mechanisms, such as price control or environmental monitoring.

Neoliberalization, through process of reregulation, could result in the improvement of some environmental conditions. Bakker (2003c, 2005, 2007a) talks about the improvements in water quality after the privatization of water in England and Wales. Similarly, we remark that in the case of Barcelona, the expansion of private management over some resources has improved environmental quality, especially in the nearby rivers, once said to be the most polluted of Europe.

We agree with Mansfield (2007) in the fact that privatization is a key moment for creating commodified things through which capital can circulate, and therefore we emphasize the relational character of privatization and commodification (Mansfield 2008, Prudham 2008). However, privatization may not forcedly induce commodification, as the environment may enact barriers (for instance uneven water quality) to such process. In the other way round, we argue that partial commodification may exist even without privatization.

Mansfield argues that it through privatization that Neoliberalism becomes possible (Mansfield 2007). We, defend however, that Neoliberalism could occur without privatization taking place. **Corporatization** is one of the examples. Corporatization, as Sanz (1998) remarks, is a way to achieve more efficiency and efficacy in the use of public resources and to ensure that a service remains public. On the other hand, corporatization implies the first step towards the privatization of the service. Corporatization could even have a deeper impact than privatization as Castro (2009)

notes. In addition, this process spurs deep changes in how water service management is conceived.

Under Corporatization, or what is the same "New Public Management", market is introduced into the State (Gamble 2006) so that the State emulates private practices and private ethos (Smith 2004). This process means a shift from the government towards the governance of water, and occurs under roll-out Neoliberalism (Peck and Tickell 2002). Market proxies in the public sector are therefore a characteristic of Neoliberalism (Castree 2008a). In Madrid we observe one of the fixes to the problem of economic growth under the shell of Neoliberalism (Castree 2008a) not requiring privatization: resource management following market-mimicking ways. The case of corporatization of the Canal could be seen also as a neoliberal governmental technology as the Canal was granted with (accountable) autonomy with calculable spaces to monitor outcomes based on targets and auditing. This is an example of what Larner (2007) calls the government at distance and the shift from bureaucracy towards business.

The accumulation of capital by the private suppliers, especially in France, but also in Barcelona, due to the monopoly over the urban water flow since the mid 19th century, enabled these suppliers to seek successfully internationalization and diversification in the second half of the 20th century. The implementation of New Public Management Schemes and the corporatization of public water facilities, as happened in Madrid, have resulted in state-owned water companies diversifying the activities and expanding beyond their natural area. According to Hall and Lobina (2007) the internationalization of corporatized public utilities may be a first step towards privatization. This seems to be happening in Madrid. In turn, corporatization is seen by Esteban Castro (2009) as a result of the inertia of privatization processes.

The internationalization and diversification of the activity of the *Canal of the Isabel II* deserves special attention, as it clearly constituent of the corporatization shift of this firm. Despite being a public company the Canal behaves as a private operator outside the borders of Madrid. By means of water operator's partnerships (WOPs), the *Canal de Isabel II* has important presence in Central and Latin America, while China is the next objective.

Moreover, AGBAR and *Canal de Isabel II* have a joint venture (Aquacer) and have competed to obtain water concessions Therefore, outside the regional borders of Madrid, very few differences appear to exist between the two companies.

The internationalization of the Canal is not, however, a singular case, as many other public suppliers are following such path. In Asia for instance, the Hashimoto Action Plan (UNSGAB 2006) functions as a tool to help state-owned water commercial water utilities to internationally expand and become transnational companies.

Special mention deserves the economic history of AGBAR, with an accelerated diversification and geographical expansion process started in the 1970 and 1980 and reaching a climax in the 1990s. Water but also the environment and the health sector were primary business objectives, many times using Public-Private Partnerships and a tight collaboration with public authorities

In our historical account, we have also been aware of the **multi-scalar character** of the political economic configurations over the water flow (Castree 2005, Cox and Mair 1989). In this respect and, building on Peck (2004) we contend that to understand the connections between the local and global levels is critical. Without this multi-scalar perspective we could not assess the ongoing debates and changes in water governance at the local level. For instance, the European Water Framework Directive has deeply changed the way water resources are imagined or what role will have water pricing (full cost recovery, incorporation of environmental costs, etc). These multi-scalar choreographies do not imply one-way top-down directions. Citizens, cities and regions are not passive receivers of Neoliberal orthodoxy from institutions such as the WB, the IMF or the European Union, but they configure and act as subjects with their own agendas. We coincide with Peck (2004) in highlighting the importance of local institutions in shaping the style of neoliberalization and its outcomes.

Neoliberalism possesses at the same time local and transnational dimensions. As Peck and Tickell (2007) defend, neoliberalization is a politically constructed project deeply rooted in local political economies. Cities have become the incubators of the ideological strategies through which the dominance of the current politic-economical model is maintained. In that sense Madrid, and to some extent Barcelona, constitute a “new localism” (Brenner and Theodore 2002a, 2002b, 2002c).

Without having a clear idea about the international trajectory of AGBAR or the *Canal de Isabel II* in Latin America or China we will miss part a crucial part of our narrative. The other half would be missed if the local political and economic climate were not taken into account.

9.4 Future prospects: The Great Transformation of the water supply in Madrid and Barcelona?

We argue that in both Madrid and Barcelona the trend may be towards the loss of public control over the integral water cycle. The state could become a mere regulator as it happens in the case of England. This would crystallize in the transition from governing through society to governing through the market, or, in other words, governing at distance. In both cases, a clear neoliberalization of the integral water cycle could occur, as market expands and colonizes even in the case of raw water supply. It is important to mention that in Barcelona and since the mid 1950s AGBAR controls part of the modern raw water supply of water through a direct concession to extract water from the Llobregat river. Furthermore, it also own one of the two water treatment plants in that river.

Desalination, the new source of water in Metropolitan Barcelona deserves special attention. Regarding the control over the water flow, the Temporal Union of Firms led by AGBAR was awarded with a BOT (Build-Own-Transfer) type contract whereby that company is entitled to manage and exploit the plant during two years. According to Castree (2008a) this could also be seen as another fix to ensure the sustained growth of capital under Neoliberalism. In the case of managerial responsibilities not exercised by the state because the resource (i.e. desalted water) did no exist yet the private sector is given these responsibilities directly in what appears to be a “natural” decision. Consequently firms and other private interested actors step into this vacuum deliberately created. In Barcelona and despite the fact that the responsibility of raw water supply is held by the public administration, the construction and management of the desalination plant was granted to AGBAR and other companies through a BOT arrangement. This could likely end with the definitive divesture of the plant.

One of the arguments of the Catalan government to oppose the transfer from the Rhone river was that the transfer would imply the control of part of the water flow by the French State (see chapter 5). Curiously, in October 2009 AGBAR was fully purchased by Suez, a French company (chapter 6). We see that in one way or another, French capital has come to control the urban water flow of Barcelona and of most towns of Catalunya.

We suspect that during the next years a large transformation of the water supply in Barcelona and Madrid may happen, and that this transformation could emulate the story of the English and Welsh water sectors two decades ago. Under neoliberal globalization, fears of foreign control of environmental resources are largely compensated by the promises of efficiency and sustainability captured in the citations at the beginning of this chapter.

It is up to the citizens to believe or not such promises and to think and act for other alternatives that help to democratize and envisage an emancipatory future for the urban fabric and the critical natural resource that shapes our cities and indeed our lives.

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