



Water Governance & Private Sector Participation in OECD Countries

Final Report

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1. Water Governance & Private Sector Participation in OECD Countries

1.1. Introduction

1.1.1 Background

In light of the ongoing debates regarding private sector participation in traditionally "public" services, this study seeks to examine how social and environmental objectives are being met under different models of water service provision in OECD countries. Given the broad range of institutional arrangements found in these countries to date, we are provided with a unique opportunity to build upon previous studies that outlined ownership and management patterns of water utilities in the OECD countries, and start to draw out some of the lessons learned by water utilities under specific frameworks and regulatory conditions. By examining the role of various regulators (government, utility, independent) and their relationships with specific water utilities, we hope to identify how social and environmental objectives can be met with the primary aim of ensuring that all water service customers are well served and that the environment is protected. While private sector participation is often discussed in ideological terms, in essence laid out as an *end* in itself, its various forms are more accurately a *means* by which effective and efficient provision of water services may be achieved. Such provision is not in end in itself but a means for establishing and maintaining sustainable communities over the long run. From an environmental and social perspective the most critical question to be addressed here is: *which contract designs, regulatory frameworks, and decision-making processes contribute to the most equitable, efficient and effective water services?*

The operation of urban water services typically falls under the heading of "public services", even in cases where they are provided by private enterprises. It is not tradition alone that dictates the importance of keeping water management interests in the "public interest". It is the existence of externalities, both positive and negative, and which are not captured by market mechanisms, which define a role for government. In the past, such externalities relating to urban water services have been mainly associated with *public health*. For example, should sewerage not be effective in removing human wastes from an urban area, epidemics are likely to follow. Disease affects not only those without connections to serviceable sewers, but eventually every citizen who is not immune. Thus, everyone has an interest in effective sewerage services.

Today, *environmental* externalities have also gained in prominence. It has become important to protect over-extraction of water from natural aquatic systems. When the water table in a catchment area is lowered, thereby affecting vegetation and surface flows, water supply externalities occur. Effective and stable treatment of wastewater is necessary to reduce pollution, and nutrient removal must be carried out to avoid eutrophication.

In addition, the provision of urban water services is largely indivisible. The technical systems required are complex and must cover long distances. The capital expenditure needed is large in comparison to operating costs, as is the marginal cost of connecting an additional user. It is therefore not economic to build separate supply systems for only a small number of inhabitants of a city -- it is more economic for everyone to be connected to one system. Furthermore, once systems are in place, it is physically impossible to build a second system. In consequence, urban water systems are usually considered to be "natural monopolies"

In order to ensure that these natural monopolies are exploited properly, taking into consideration social and environmental priorities, it is important to have proper forms of governance in place. Regulation of both a formal and informal nature often contributes to establishing and maintaining this governance, most significantly protecting against abuses of monopoly power. Economic regulation in particular seeks to address the conditions of supply

access and prices. Similarly, customer service, water quality, investments, profits, and return on capital are also often subject to regulation.

Irrespective of the type of private sector participation (PSP) arrangement selected (see below), municipalities seeking to reform water services need to take fully into consideration the significance of both social and environmental objectives. This means selecting the appropriate institutional arrangements that are conducive to meeting the following goals:

- *Achieving minimum service levels, ensuring that services are affordable for all users, and encouraging public participation in tariff modifications* (social objectives).
- *Adequate drinking water quality, and sufficient water-based ecosystem protection* (environmental objectives).

1.1.2 Scope and Methodology

This study will first briefly review the main issues and concepts regarding the provision of water services in the OECD, including a summary of the debate regarding Private Sector Participation and an overview of ownership, management, and regulatory patterns in OECD countries. This will be followed by five in-depth case studies on water utilities in France, Germany, Mexico, the United States, and the United Kingdom. Specific attention will be given to the evolution of social, environmental, economic, and institutional contexts in which water service provision has taken place, in particular specific contractual and legal arrangements. The final section of the study presents analysis and conclusions regarding the effectiveness and efficiency of different regulatory arrangements in meeting social and environmental standards in a collective democratic fashion. Particular attention will be placed on water governance that fosters affordable, safe, and equitable access for all consumers. In this section several indicators for the assessment of socially and environmentally sound water governance will be presented.

The methods employed in this study draw primarily upon in-depth comparative case studies, process tracing, and content analysis. The country case studies have been selected on the basis of a most-different-systems approach; in other words, the utilities selected should reflect the range of private sector participation options. The very nature of water management systems is so diverse within countries, not to mention between them, that one must exercise caution when attempting to establish common patterns. In addition, given the differences across countries in measuring and accounting for drinking water quality standards, is a near impossibility at this juncture to conduct a cross national study based entirely on traditional indicators for environmental quality or social equity.

The challenges faced by heterogeneous data can in part be avoided by examining types and not patterns. By concentrating on the experiences of specific utilities we hope to provide the reader with insight into how contracts for management and operation of water service provision facilitate or discourage meeting of environmental and social objectives. This work is the product of participation in an OECD lead working party on global and structural policies, under the auspices of the Environment Directorate and the Environmental Policy Committee. It was conducted primarily as a desk study and draws on extensive primary sources ranging from a utility's annual reports to interviews with water management experts.

2. Private sector participation

There are significant challenges associated with reforming urban water services. The most pressing of these fall under one of the following headings:

- Infrastructure (reduction in leaking, replacement/expansion of networks, technological innovation);

- Financial (sustainable & equitable tariffs, efficient revenue collection, investment);
- Environment and health (public health needs, conservation, environmental management);
- Socio-political (affordability, transparency, accountability, higher standards coverage);
- Managerial (improving efficiency and productivity, capacity building, efficient procurement) (Hall, 2001).

Few would question the pressing need to address these challenges; however, there has been considerable debate as to *how* to go about doing so. Private Sector Participation (PSP) is one of the proposed means through which reform of urban water supply is often attempted. There are a number of developments placing PSP at the forefront of discussions on how to reform water services. These developments have their source in discussions relating the redefinition of the role of the state, the function and size of the public sector, utility management, the water industry specifically, and taxation and user charges. The "drivers" of PSP as a policy option are summarised in Box 1.

Box 1	Factors Driving Demand for PSP
<p>Societal: Public agencies have been unable to satisfy basic water needs for all. The context is one of dwindling public funds, increased demand, large investment gaps, ageing infrastructure in need of rehabilitation, and calls for increased decentralisation.</p> <p>Commercial: The Dublin Water Conference in 1992 established water as an "economic good". This challenged the traditional approach to water service provision, which held that water services were the domain of public agencies alone.</p> <p>Financial: There is a belief that the private sector can mobilise capital faster and cheaper than the public sector. The expectation that by shifting assets from public control into private ownership and capital markets, economic efficiencies can be unleashed.</p> <p>Ideological: This refers to the notion that "smaller government is better".</p> <p>Pragmatic: Inability of governments to finance rising capital, operation, and maintenance costs or municipal water systems. Need to invest in infrastructure, increasing population, and constrained public finances.</p> <p><i>SOURCES:</i> (Hall, 2001) (Thompson, 2001) (Kraemer, 1998). (Categories taken from Pacific Institute, 2002)</p>	

A former Argentinean government official attempted to account for why private sector participation in Tucumán's public water system had been contentious. She explained to the multinational water company providing water services to the city that local residents hold "water is a gift from God". The executive's response was simply..."but he forgot to lay the pipes." (NY Times, August 26, 2002). This exchange illustrates the dilemma at the core of any municipal and national government's need to provide water and sanitation services. In the face of increased demand for services, diminished public resources and deteriorating infrastructure conditions, PSP may be a partial solution. However, PSP is also a solution that can create serious problems of social acceptability, if not properly managed.

At the heart of this exchange, and more broadly within the debate over introducing PSP into water services provision, lies the conceptual issue of whether or not water should be treated as a commodity or a social service (i.e., with public good and merit good properties) (Rees, 1998). The question is often framed in terms of a trade off between water's importance as a "substance necessary for life itself" and as a "profit-making business" (NY Times, 2002).

On the one hand, PSP is proposed as a solution to perceived government failures -- failures that are commonly attributed to state ownership and management *per se*. This is the view that "most governments do a poor job of delivering water and sewerage services" (*Economist*, March 25, 2000). Most advocates of this view point to state organisations that

are insulated from competitive incentives, exposed to short term political interventions and interest group capture. The argument holds that state managers pursue their own utility needs -- not those of the public interest (Rees 1998). It should be noted that such general references to 'state' or 'government' often have in mind national or central governments and not necessarily local or municipal governments.

This view also contends that environmental goals can best be accommodated in the PSP model, through the imposition of environmental norms into the pricing structure (economic instruments). Furthermore, achieving social goals related to water management can best be achieved by redistributing the surplus generated through a more efficient system in the form of social transfers. In short, the accent of this paradigm is on the economic objective of efficiency, as well as the use of economic instruments to promote environmental and social goals.

On the other hand, those concerned about the PSP model stress the implications (and frequently, the track records) of private actors in assuming responsibility for social and environmental objectives (i.e. equal access to good quality drinking water, affordability, and environmental sustainability). Proponents of this view claim that private participation:

- Usurps a basic responsibility of governments
- Risks bypassing under-represented and under-served communities
- Worsens economic inequalities and the affordability of water
- Fails to protect public ownership of water and water rights
- Fails to include adequate public participation and contract monitoring
- Ignores impacts on ecosystems or downstream water users
- Neglects the potential for long-term water use efficiency and conservation improvements
- Lessens protection of water quality
- Lacks dispute resolution procedures
- Irreversibly transfers assets out of local communities

(Pacific Institute, 2002).

PSP is also accused of leading to recurring patterns of crises by introducing a "vicious circle of instability" into certain types of institutional arrangements. For example, it has been suggested that as public services come to be provided by private enterprises in small areas, mergers and acquisition activities gradually lead to a concentration of power (Gomez-Ibanez and Meyer, 1993). Monopoly abuse ensues and regulatory regimes (often in the form of price-caps or service provision requirements) are installed. This regulation reduces profitability, leading in turn to under-capitalisation of the industry. The result is a reduction in the quality and scope of the service. At some point, government is required either to inject large amounts of capital, or to provide regular subsidies in order to maintain service standards and levels. This then leads to the re-nationalisation of the water industry, where the cycle begins anew (Kraemer, 1998).

2.1 Type and degree of PSP

Defining PSP in the context of urban water services requires determining the loci of responsibility for assets, operation & management, risk, capital investments, as well as establishing the legal status of the operator.

Administrative PSP is characterised by public ownership of assets, public management, operation, investment and legal status. Depending on the municipality, there may be separate units created within the public administration, with corresponding separate accounts.

Corporative PSP is present in cases where a separate public body ("corporation") is formed. The water service provider has both active and passive legation, requiring it to represent itself in any conflicts arising from interference in day-to-day operations. This legal standing enables the water service provider to minimise political interference, especially when compared to Administrative PSP. Assets are publicly owned, but investments are received directly to the water provider, not in the form of central budget transfers. These providers have the ability to finance operations independently, and often award pay on the basis of private sector pay scales. In both Administrative and Corporative PSP, operations and management duties may be contracted out to the private sector or other public agents.

Legal PSP takes three forms. The first form is that of a Municipal Enterprise, a private-law body that is 100% owned by one municipality or territorial corporation. The second form is a Public Enterprise, with 100% of assets owned by more than one municipality or territorial corporation. Both forms of enterprises are subject to company law, and asset and share exchanges occur. The third type is a Mixed Enterprise. Like Municipal and Public Enterprise, a Mixed Enterprise is a private-law body that operates under company law. However, unlike a Municipal and Public Enterprises, only 50% or more of the assets are municipally or publicly owned (by one or more partners). The remaining assets are controlled by private actors namely through investment and capital participation.

Under *PSP by Delegation*, assets remain public while operations, management, and capital investments may be carried out by a private contractor. Contractual options vary, ranging from leases to concessions to services. The length of contracts may also vary from 3-30 years. At the end of the contract, assets are transferred back to the municipal or (rarely) state authorities.

Financial PSP has often been referred to as "full privatisation", because 100% of the assets are owned by private investors. This is the rarest form of PSP -- found mainly in the **UK** and the **US**, in the form of investor-owned utilities.

Table 1 Classification of urban water supply: institutional arrangements

CHARACTERISTICS OF PSP	OPTION/MECHANISM	PUBLIC RESPONSIBILITY	PRIVATE RESPONSIBILITY
Financial	Divestiture (sale or transfer)		Asset Ownership O&M Capital Investments Commercial Risk
Delegation	Concessions BOT	Asset Ownership	O&M Capital Investments Commercial Risk
Legal (Muni. Enterprise Public Enterprise Mixed Enterprise)	Leasing Shared Ownership	Asset Ownership, Capital Investment, Commercial Risk Joint corporate	O&M Commercial Risk Legal Status Joint corporate
Corporate & Administrative	Management & Service Contracts (Tech. assistance Supply Civil works)	Asset Ownership, O&M, Capital Investments Commercial Risk Legal status	O&M

Drawing on previous work by Kraemer (1998) and Johnstone (1999), and definitions used by the World Bank, Eureau, and several Regional Development Banks (EIB, IADB, EADB), Table 1 provides a classification of different forms of PSP in urban water services. This classification will serve as the basis for definitions used throughout the remainder of this Chapter.

This categorisation was determined on the basis of service provision, system operation, and legal status. It only loosely corresponds to the spectrum of “more public” to “more private” arrangements. This is roughly scaled on the basis of “greatest PSP” to “least”, with Financial PSP indicating the greatest degree, and Administrative PSP the least. The “Characteristics of PSP” column refers to various options or mechanisms currently employed in introducing private sector methods into water service provisions. “Public and Private Responsibility” detail the components/elements of the water service provider that are under the private or public domain based on the type of option (or the mechanism) that is chosen.

Table 2 PSP arrangements, options and example of municipalities in the OECD

	Dominant Types of PSP	Common Options & Mechanisms of PSP	Example
Australia	COR/DEL/FIN/LEG	BOT	Sydney Water Corporation
Austria	ADM/LEG	Direct management, public company, cooperatives, association	N/A
Belgium	DEL/LEG/ADM	Direct management, associations, concessions	Antwerp (AAW)
Canada	DEL/LEG	Direct management	Montreal/Smith Falls
Czech Rep.	LEG/FIN	Shared ownership, concessions	Brno/Ostrava/Karlsbad
Denmark	DEL/LEG	Direct management	Copenhagen Water
Finland	LEG/ADM	Direct management, shared ownership	(municipal)
France	DEL/ADM/LEG	Concessions	Gr�noble/Paris/Alsace
Germany	LEG/DEL	Shared ownership	Berlin/Hamburg
Greece	LEG/ADM	Direct management, shared ownership	Athens
Hungary	LEG	Shared ownership	Debreceni/Pecs/Budapest
Iceland	N/A	N/A	N/A
Ireland	ADM	Direct management	Cork County
Italy	LEG/ADM/DEL	Service contracts, concessions, direct management	Monza (AGAM)
Japan	ADM	Directs management	Yokohama
Korea	ADM	Direct management	Pusan
Luxembourg	ADM	Direct management, production associations	N/A
Mexico	DEL/ADM	Concession, service and lease contracts	DF/Chihuahua
Netherlands	ADM/LEG	Public company, waterworks	GWA Amsterdam Water
New Zealand	ADM/LEG	Public company	Auckland/Kapiti Coast District Council
Norway	ADM/LEG/FIN	N/A	N/A
Poland	LEG/DEL	Lease	Gdansk
Portugal	DEL/LEG	Concession and BOT	Lisbon
Slovak Rep.	(Proposed) ADM/LEG	Proposed corporation, direct management	Water & Sewerage Works
Spain	DEL/LEG/ADM	Direct management, shared ownership, concession, lease	Seville
Sweden	DEL/LEG	Direct management, shared ownership, limited company	Motala River Basin
Switzerland	LEG	N/A	N/A
Turkey	ADM/LEG	Public company, concession	ANSU/Izmit
UK	FIN/ADM	Investor owned assets, management service contracts	Thames Water Co./London
US	LEG/FIN/ADM	Public company, investor owned assets, management service contracts	Anaheim/Suburban Water

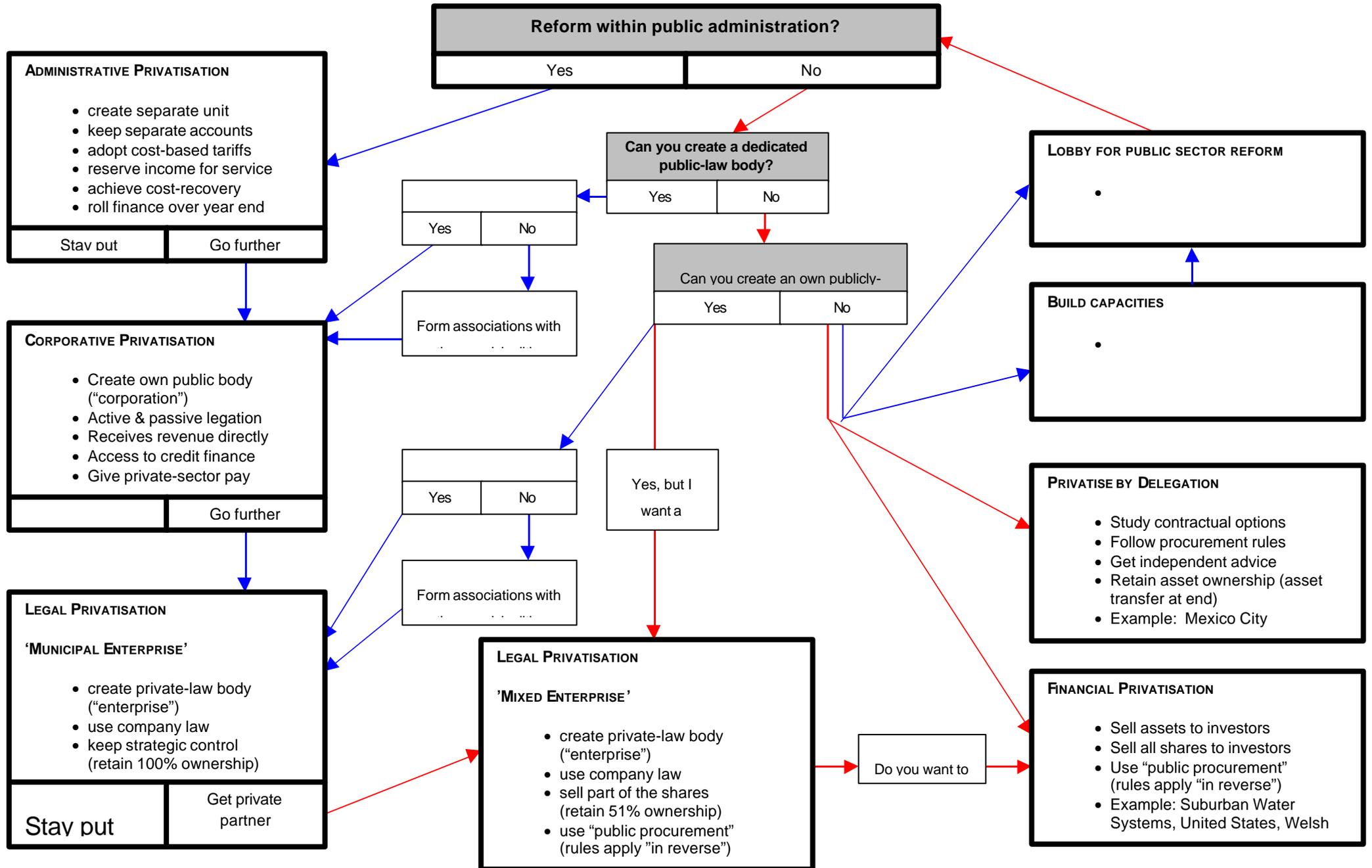
The majority of OECD countries employ Legal and Administrative forms of PSP. Delegation is often found in cases where administrative PSP is present. Financial PSP is the exception, predominately found in England and Wales, and used to a limited degree in the US, Australia, and Norway. In the Eastern European Countries, Mexico, and Turkey, Legal PSP in the form of Mixed Enterprises is often the preferred form of PSP, given traditions of state centralisation, dependence on foreign investment and aid, and nascent regulatory

frameworks. Very few countries employ a combination of delegation, administrative, and legal PSP (Spain, Belgium, and Italy). In these cases, regional traditions or ambiguous case law appear to be the reason behind such radically different forms.

3. Selected case studies

The path to reforming municipal water services requires public authorities take into account three critical factors: (1) the organisation of water services (local or regional); (2) the speed at which the reform must take place (incremental changes or radical restructuring); (3) the degree of local control over water assets.

FIGURE 1: A FRAMEWORK OF PRIVATE SECTOR PARTICIPATION IN WATER SERVICES PROVISION



The framework that governs the creation of public and private law corporations is highly significant. Where municipal water services can be organised as public law bodies, the choices are typically limited to Administrative and Corporative PSP given that there would be few additional advantages offered by other modes of PSP. Should the municipality lack the capacity or resources to achieve this on its own, the option to form associations with other municipalities may then permit some economies of scale to be reached. In the rare event that municipalities are unable to form a public-law body, but can create a publicly owned private-law body, the options include legal PSP as a municipal, public, or mixed enterprises.

Figure 1 (located in the Appendix) illustrates the numerous options available to municipalities seeking to reform the public provision of water services by introducing some form of PSP. It is important to note that in these cases municipalities or territorial corporations own 100% of the assets.

Where municipalities are unable to form dedicated public or publicly owned private law bodies, the choices are limited to pursuing either financial PSP (i.e. full privatisation) or PSP by delegation. When delegation or financial PSP are not options, one would expect municipalities to lobby for public sector reforms that would facilitate the creation of dedicated public-law or publicly owned private law bodies, or to seek additional help from public sources to build capacities and to improve service.

Municipalities will also consider other criteria when seeking to reform public services. For example, social or political considerations may deem it important to maintain public participation and local involvement in water management decision-making. Increased PSP also implies decentralising public services. The type of decentralisation chosen may therefore depend on the context of public policy institutions and political decision-making processes existing in a given country. In established federal systems, with well functioning state and local level governments, devolution is built into the relationship that governs public policy naturally (e.g. **US, Germany**). In cases where the devolution of authorities is still embryonic (e.g. **Mexico**), or where political institutions are highly centralised (**UK, France**), deconcentration will be the preferred form of decentralisation. Deconcentration does not typically require changes to the existing legal structure governing relationships between national and sub-national units, since it is merely a transfer in capacity, and not a transfer of authority for public policy creation. Administrative, Corporative, and Legal PSP (and occasionally, Delegation PSP) are viable options to this end. While any of the types of PSP have the potential to raise customer satisfaction (should they be successful in meeting cost and quality criteria), introducing local decision making and agenda setting usually requires a path towards devolution, not deconcentration.

The following five case studies will consider the experiences of water service providers with different forms of PSP. Each case provides an overview of the structure and organisation of a country's urban water services, followed by the social, environmental, and economic contexts in which these services are provided. Most importantly, the cases are illustrative of different paths to reforming municipal water services and highlight specific elements of private enterprise characteristics that can be incorporated into public services. Three of the country cases (France, Germany, US) are representative of stable water management systems, i.e., policies and reforms are pursued incrementally. The Mexican and Welsh examples, on the other hand, illustrate the process involved when seeking to change management and operations more radically, i.e., from one form of PSP to another.

3.1 France

The French water supply sector is organised along municipal and inter-municipal lines. These structures provide water-related services and generally choose between direct management and delegation. Private operators provide an estimated 75% of all customers with service and approximately 60% of all municipalities have chosen delegation of water

service as their operational form. The large multinational companies dominate the domestic French market with regard to both municipal contracts and customer share. There are around 50 smaller private companies operating at the local and regional levels. Competition for contracts is not only limited to private operators but may also include regional and local public structures. For example, the City and District of Amiens sells bulk supplies of water to neighbouring communes, as well as delivering water to final users in another city not included in the district (Barraqué, 2002).

Since the enactment of decentralisation laws of 1982-1983, there is no longer national water tariff regulation. Under administrative PSP, the municipality has the ability to set rates on a yearly basis. Where there is PSP by Delegation (under contract with an outside operator), prices are set for the duration of the contract and are not determined on a yearly basis. In both cases, public participation in establishing tariffs is indirect, conducted by elected public officials responsible for public budgets (Kraemer, 1998). At a regional level, the Prefect, indirectly and on the basis of protecting the public interest, may refer cases of price increases to an administrative tribunal for legal review. However, on average, the proportion of unpaid water bills is under 0.3%, so there is no legally established basis for setting tariffs based on social considerations. In recent years, there has been an active political movement to abolish the practice of disconnecting users on the basis of non-payment; in some cases, social welfare agencies (on a case by case basis) will provide 3 month relief to vulnerable groups under the auspices of a "droit à une aide" (Smets, 2001).

The Water Laws of 1964 and 1992 provide the legal framework for the provision of water services. This includes a system based on the polluter-pays principle as well as a framework for water charges to improve water quality and prevent deterioration (IISD, 2002). At the national level, responsibility for defining the general rules regarding withdrawal and discharge and public health guarantees fall under the jurisdiction of the Ministry of the Environment (including L'Observatoire de l'Eau, responsible for water price trends and quality of water resources and services), and the Ministry of Health (drinking water quality). The national government is responsible for ultimately creating new solidarity taxes run by the Agences de l'Eau and the National Fund for Rural Water Supply (FNDAE). The Agences de l'Eau, covers the country under six different river basin groups, and along with the financial regulator and the Ministry of the Environment, function as the executive organs that manages water resources territorially. They collect revenue from consumers' water bills (as well as non-connected premises) and in exchange provide investment aids to municipal and industrial infrastructure programs (OIEAU, 2002).

Decentralisation Laws in 1982 and 1983 further demarcated the State's role as an enforcer and guarantor of public health and safety. It is the responsibility of the municipality or a collective of municipalities (syndicates) to provide water services, including drinking water. To date, there are 15,244 water supply services for 36,763 communities (OIEAU, 2002). Municipalities have the option to turn over water supply management to private companies, with the most common forms of delegation being "affermage" and "concessions". In order to improve the transparency of delegation contracts, the 1993 Sapin Law established a tender requirement for private operators. Tender must occur at first delegation as well as at the end of a contract to ensure further delegations. Contracts may then be awarded to the "best value" tendered, public or private. In addition, the 1995 Barnier Law limited the maximum duration of water and sewerage concessions to 20 years. There is currently a law being proposed to reduce this limit to 12 years.

France has traditionally maintained a principle of "equality of customers", meaning "the same price under same conditions". So while municipalities are not forced to set up services, once they do so, they must serve all inhabitants (Barraqué, et al. 2001). There is no minimal universal service obligation to date, but it is not a common practice to disconnect services to those who cannot pay. In most settings, it is the responsibility of social services agencies to handle cases of non-payment.

According to the Local Democracy Law, passed in February 2002, a Consumer Consultative Public Services Committee can be created for all utilities serving more than 3000 people, and must be created in communities with 10,000 or more residents. This also applies to associations that contain at least one community with 10,000 residents and inter-communal co-operation between public establishments serving at least 50,000 residents. This Committee is responsible for providing a forum where accounting, technical choices, and prices are discussed, with the aims of introducing a greater degree of transparency. Price and related customer service matters are not subject to direct regulation, but are indirectly regulated by elected municipal officials responsible for local budgets.

Legislation requiring information to be made available to the public is contained in the Law of Openness (78-17), Law on Public Inquiry (83-630), Decree 81-324, and the Water Law (92-2). These laws provide for public inquiry for new water management plans, water quality, environmental impacts, administrative information held by public authorities (Santos and Rodrigues, 1998).

The central government and the Prefects at the district level, are responsible for legislation and enforcement of environmental and health standards. Economic instruments and benchmarking are also employed with the aim of implementing these standards. For example, the Agences de l'eau through the provision of investment aids are in a better position to give economic incentives for more sustainable environmental uses of water than is the Ministry of the Environment. Similarly, the municipalities can fix prices directly with operators as long as they respect the rules of balanced budgets (compulsory for operations budgets and subject to derogations for the investment budget)

Box 2 Administrative PSP: the case of Amiens

Amiens is both a city (population 138,000) and the head of a district that includes 17 suburban communes. Water and sewerage services are provided on the basis of a "régie simple" (direct labour), this includes meter reading and bill recovery. While water service provision in Amiens forms part of the department of city services with no financial autonomy or legal standing, it engages in a form of Administrative PSP by contracting out billing and accounting services to a private company. It was decided in 1989 that water services could actually contribute to the city's self-financing. There are now two separate accounts kept in the general budget -- one for water and one for sewerage. These are commonly referred to as "annex budgets". Water service income derives from water sales to customers (86.3%), water meter rentals (7.4%), and city conducted public works (3.9%). The water annex budget often contributes to the Amiens commune main budget, especially in times when no large investments are being made. Water and sewerage incomes are greater than costs of both services and are used by the municipality to lower the debt of the general budget. French accounting rules stipulate that a service under direct labour cannot maintain an independent cash flow. Amiens therefore benefits from good economic management that reduces the debt and limits the need to seek outside support in the form of loans to support reinvestment. This also provides the city with more autonomy regarding financial decisions. Recently new accounting rules issued by the central government legitimise depreciation and renewal provisions under public accounts. This makes direct procurement more sustainable and enables municipalities to compete with other forms of delegation.

Amiens has also undertaken the development of an additional well that has been entirely self-financed. This contributes to the diversification of resources and introduces stability into drinking water availability. The city implemented a lead pipe replacement program between 1992-96, replacing on average 1050 connection per year. This was in response to a controversial lead problem with the drinking water that came to public attention in 1991. There is an active local environmental movement, "Verts de Picardie" that maintains a

public awareness campaign against lead poisoning. Water prices in Amiens area are considered reasonable when compared to other cities with equivalent populations, approximately 1.80 Euro/m³ with a national average of 2.78 Euros/m³ (*Le Havre Survey*). Nonetheless, for consumer advocates, the drinking water quality-price ratio remains a point of contention. They have sought legal remedy in an administrative court, and would like to see surpluses from water operations transferred directly back into the water budget. Low water prices have not led to over-consumption: per capita volumes are 65m³/year or 178l/day, including connected industry and services.

3.2 Germany

Many water service arrangements in Germany take the form of municipal enterprises. Companies act like private companies, but are actually publicly-owned by the municipalities. Municipalities occasionally seek private input in carrying out their duties, in the form of private participation in capital. To date, there are approximately 6000 undertakings -- 96% of which are community owned; 3% are of mixed ownership; and 1% are private. All undertakings must achieve full-cost recovery, including capital expenditures. Municipal enterprises of this type are active only in 'core' activities of water supply (or sewerage). The rules of public procurement are applied according to EC and German law.

Excessive water use is discouraged by some companies through the application of progressive charges (i.e. raising the charge rate as volume increases). These charges are established under the framework of the KAG (Kommunalabgabengesetze), and are levied by the community owned utility or mixed enterprises -- but not by the private operators. Private companies must set prices according to private law. (In practice, these too are often set according to KAG formulae) Charges and prices tend to be based on metering and/or a combination of basic charge, plus usage charge). Customers have an indirect role in setting tariffs via representation on local city councils and utility boards, regardless of the private or public legal status of the utility. VAT is charged on the services.

In 1988 the State of Baden-Württemberg instituted a "water penny tax", in an attempt to address the problem of failing to take environmental externalities into account when setting water prices. By exercising the constitutional right of State-level control over water resources, Baden-Württemberg and other states, such as the City State of Hamburg, are trying to use water resource taxes as a complement to traditional direct regulation (by prohibition and prescription).

It is illegal to disconnect water services as a means of ensuring repayment of bills. Since responsibility for payment in most cases rests with the property owner and not the tenant, it is highly unlikely that renters would be faced with the immediate threat of having water services disconnected. There could be exceptions to this, especially since desires to extend metering have led to reforms of rental laws that mean tenants are now the direct customers of the water company. Nevertheless, there is an established consensus that disconnection of services poses an unnecessary threat to public health and social welfare benefits to assist vulnerable groups should be provided. So while the utility does not provide any discounts, credits, or relief to those who cannot pay for water, social services assume responsibility for providing income support on an individual basis.

There are three primary levels of competence with respect to water management: Federal, State, and Municipal. Federal framework laws require implementation through state water laws, as this must take into account local and regional conditions and policy priorities. Legislation, institution, and organisation vary from state to state; however, within the large states enforcement and legislation on water is typically divided into 3 levels of authority: Supreme Water Authority, Upper Water Authority, and Lower Water Authority. The most

senior officials responsible for water management in the States are the water directors. They have established a co-ordination network that promotes the exchange of information, pooling of resources, and the harmonisation of administrative procedures and water laws across states. There is a central guiding principle that holds the various institutional arrangements together--water should be managed as part of the environment. Although at first glance, there appears to be a high degree of decentralisation (which is logical, given the federal context), there is a significant degree of integration sectorally, as well as the process of water legislation and policy formulation.

Waste water treatment, water supply, the development and maintenance of local water bodies are a matter for self government (Selbstverwaltung). This implies that local authorities, inter-municipal co-operation (Zweckverbände) and water user associations (Wasserverbände), organisations for industry or agriculture, and private persons all form part of the institutional structure of water management. Water quality management is well integrated into environmental management through these local actors, since environmental management is purely sectoral.

The Federal Information Act permits public access to environmental information held by public authorities. Public access to information is strengthened by the Federal Water Law (1990) and the Land Water Act, with the former providing for public inquiry into major discharges to water.

Box 3 Legal PSP/municipal enterprises: the case of Hamburg

The Hamburg Wasserwerke (HWW) is one of the oldest public water service provider in Europe. With close to 2,000,000 customers, it ranks as the fourth largest water company in Germany (HWW, 2002). HWW is organised as a municipal enterprise with a subsidiary company, the Hamburg pool company (Bäderland Hamburg) which runs 23 public pools. In addition, the company is involved in consulting matters in the field of water management and redevelopment of contaminated water sites via a subsidiary company (Consulaqua). Additional water supply activities are carried out in co-operation with a power supply company (Schlesweg). Both companies founded Holsteiner Wasser GmbH in 1993, with the aim of acquiring a new water supply system in the regional area Pinneberg, north of Hamburg.

Since 1986, the goal of the HWW has been to maintain a strategic commitment to the safeguarding of sustainable water supply (EAUE, 1998). The HWW has concentrated on ground water resource protection and the introduction of an "economic use" of drinking water to promote sustainability. HWW has a high degree of extraction flexibility through an interconnection system.

The installation of water meters in dwellings was regarded as an appropriate instrument to stimulate water savings and more economical use of water. HWW targeted multiple dwellings, equipping apartments with water meters in the hopes of changing consumption patterns.

Between 1986-89, the company implemented a demonstration project to study the effects of water consumption with and without meters and other water saving devices and techniques. After a three-year period, consumption data were collected for 967 households (data was for both before and after meter installation). The result of the meter demonstration project indicated that there was an average savings rate of 15% with the conventional meters alone; this figure jumps to 25% savings in those households with new meters (including additional water savings devices) (EAUE, 2002). After these

results, the City and company decided to introduce water meters to the entire distribution area.

The introduction of metering required not only technical innovations to be put in place, but

also significant legal modifications (particularly with regard to rent laws and existing water supply regulations). Prior to the metering program, the water company could only enter into contracts with property owners to provide services. As a result of amendments to the rent laws, tenants are now the direct customers of the water company. The introduction of meters also required a change in the building code and related laws. At present, the Building Regulations of Hamburg make meter installation obligatory. This regulation applies retroactively and owners were given a ten-year transition period (1994-2004) to comply with the code. For multiple dwellings, recourse was made to national regulatory standards. These amendments were needed to establish that water meters can be treated as a modernisation measure. Costs for meters can therefore be covered by rent increases, and the appropriate scope for action is regulated by the German Civil Code. Each water meter installed received a financial bonus of 51.10 Euros, paid for by the City of Hamburg until 1992. After 1992, HWW provided financial support to customers for meter installation.

The installation of city-wide meters was also accompanied by an aggressive water savings campaign over the course of 7 years. Public relations activities were conducted at fairs and exhibitions, customer information papers were distributed, teacher education incorporated conservation techniques into the curriculum, and information centres were set up.

3.3 United Kingdom (England and Wales)

English and Welsh water management is characterised by strong central control, limited powers for local authorities, statutory public consultation, and extensive private provision of services. The water industry in England and Wales was completely privatised in 1989 (Water Act). Approximately 10 water companies were privatised, and 25 already private water-only companies were brought within the framework of the regulatory system. There has since been extensive merger and acquisition activity in the water sector, and as of 2000, there are over 20 water companies. The concentration of water suppliers has also been accompanied by substantial diversification of these companies into non-water service related activities.

These legislative changes also created an economic regulator supported by the Office of Water Services (Ofwat). Ofwat is responsible for setting price-caps at five-year intervals, establishing standards of service, investigating consumer complaints, and monitoring company performance. Ofwat is also responsible for approving all charge schemes and protecting vulnerable customers. The majority of the information required to carry out its duties on the basis of annual returns are based on returns filed by the regulated companies. The "June Return" requires information relating to key outputs, non-financial measures, regulatory accounts, and financial measures. In addition, Ofwat relies on the services and input provides by independent reporting, auditing, and valuation professionals to gauge comparability between companies, statutory accounts, and land prices.

Customer services regulated by Ofwat relate to operational, drinking water quality, environmental, and service performance (Ofwat, 2002). Frequency and duration of supply interruptions and incidence of low pressure are evaluated under operational performance standards. The customer service indicators most commonly used are: speed of response to complaints and billing inquiries, meter reading, and ease of telephone contact. Aside from the regulation that occurs at the time of licensing or renewal, each utility provides compensation to customers in the form of a cash payment should they fail to meet the services standards stipulated under contracts.

The national government sets drinking water quality and environmental standards. Wherever an environmental obligation is imposed, the Drinking Water Inspectorate and the Environmental Agency contribute to a judgement by the Inspector General on whether or not prices need to be raised in order to meet environmental targets. The DWI and EA are also vested with enforcement powers that allow them to prosecute non-compliant companies. All companies must meet environmental and health standards as outlined by EU Directives and

the World Health Organisation. Should customers prefer higher standards, these can only come about through explicit authorisation.

Customer interests are represented indirectly by Customer Service Committees (CSC) at the regional level -- in other words, at the water supply company's level of operation. Ofwat is responsible for establishing, financing, and maintaining the CSC, as well as for appointing members in consultation with local governments. The CSC duties include investigating customer complaints and representing local customers. The Water Voice (previously known as the Ofwat National Customer Council) brings together the ten regional CSC chairmen and facilitates input at the national level. The ONCC is responsible for providing information to the media and the government regarding customers' interests.

The Water Industry Act of 1999 prohibits companies from disconnecting domestic customers for non-payment of charges. In the event of non-payment, water companies may arrange a payment plan with the customer directly or use normal civil debt recovery procedures (i.e. using bailiffs to recover money or goods, seeking payment from a debtor's employer, seeking payment from a bank or building society account, or preventing the sale of the house or land until a debt is paid (DEFRA, 1998)/(Welsh Water, 2002). In a recent High Court Decision relating to the use of Budget Payment Units (in essence 'pre-paid' electronic cards that can be attached to meters and that transfer credits to the unit), it was decided that companies may not sever water supply in the event that credits run out.

At the time of licensing, in 1989, each company was given an Instrument of Appointment, imposing conditions which the Director General of Water Services must enforce. Included in these conditions are requirements for the company to provide a code of practice for customers, outlining services, charges, billing arrangements, and complaints. Also included is a Code of Practice relating to providing payment counselling in the event of inability to pay (ECLAC, 2000).

The public's access to information is guaranteed through various regulations and acts (e.g. Environmental Protection Act (1990), Environmental Information Regulations (1992), and Water Resources Act (1991)). These usually require that there be a public register of application for consents, conditions, water samples, incidents, licences, protection zones, orders, and authorisations. Environmental information held by authorities is also to be made public (Santos and Rodrigues, 1998).

Box 4

Corporate PSP: the case of Glas Cymru/Welsh Water

Welsh Water was a regulated water company, privately owned by investors, serving over 1.1 million household customers in much of Wales and some adjoining areas of England. In November 2002, Glas Cymru acquired Welsh Water. Glas Cymru was formed as a dedicated public law company limited by guarantee, with the sole aim of acquiring and owning Welsh Water. It is owned and controlled by 50 members and organised as a non-profit entity. Board Members act as shareholders, but are accountable directly to the Welsh National Assembly. They receive no dividends and hold no financial interest in the company. Glas Cymru is subject to the same regulatory procedures and framework as all other water companies. Financing of assets currently stands at one-third of all revenues (Glas Cymru, 2002). Additional financing must come through the issuance of bonds.

Financial surpluses must be re-invested into operations. No ordinary dividends are issued.

Since Glas Cymru's members serve without traditional shareholder incentives, there are several features present that aim to introduce public accountability and efficiency incentives into Board decisions. The Board is held publicly accountable for performance not only through legislative review, but through the use of benchmarks, published annually by regulators. Benchmarking is also used to link Director and Manager pay to the rest of

the water industry. Customers have an indirect interest in efficiency, since Glas Cymru must distribute financial surpluses in the form of bill reductions. Finally, the company must comply with reporting and best practices obligations required of listed companies on the London Stock Exchange.

Customers do not own Glas Cymru (it is not a "mutual"), the logic being that this protects them from any financial risks or liabilities in adverse trading conditions (essentially a form of ring-fencing). While the company's by-laws prohibit diversification into other activities, outsourcing day-to-day operation of assets and customer services has increased under Glas Cymru from 60% to over 80%.

Pursuant to the 1999 Water Act, disconnecting users on the basis of non-payment is illegal, as is the installation of 'trickle valve' systems in households with unpaid bills (Smets, 2000). In the event of non-payment, customers may directly establish a repayment schedule with their utility, usually through an instalment plan and not through rate reductions. Utilities also exercise the right to pursue debt collection through legal channels. Vulnerable populations may request that the Social Service Department or the Benefit Agency intervene on their behalf. In these cases, the water company usually does not proceed with local claims. In addition, the Benefits Agency provides direct payments to the water company for those individuals that currently receive income supports. Low-income working families and disabled persons also receive a tax-credit used to offset utility bills. With certification from a general practitioner, special rates are offered for customers that are disabled or suffering from prolonged illness. There is some cross-subsidisation from higher-income to lower-income users as a result of recent changes in tariff setting policy; companies must now offer discounts for larger lower income families, as well as pensioners (who have the choice to opt for charges based on average household use and not on the basis of meter readings) (DEFRA, 1998).

3.4 United States

Water supply in the US is provided by over 60,000 drinking water companies nation-wide, and is highly fragmented by nature (Kzykhodjeva, 2002). Of these, 60% are municipally owned and the other 40% are privately owned. Large municipal utilities provide service to over 228 million customers, while private companies serve only 15% of the population. There are various forms of private sector participation, but financial PSP and administrative PSP are the most common forms (EPA, 2002). Corporative PSP is increasingly being promoted, in order to encourage financial discipline, as well as greater transparency and public accountability.

Customers of regulated public utilities can have their water services terminated as a result of non-payment. The utility assumes responsibility for notifying customers of shut-off schedules and making arrangements for payment. Utilities must provide customers with several warnings prior to collection or termination and customers may always dispute charges at the State Public Utility Commission. Depending on the specific utility, there is on average a 45-day period between the first notice of delinquency and the actual shutting off of water. In the case of regulated public utilities, individual utilities may decide to provide financial counselling, forgiveness for arrears, payment discounts, income-based payments, or flow restrictions. A common practice in California, prior to 1992, was to offer a discount on water services to customers that fell into lower income categories (established on the basis of size of the household and yearly income). The "Lifeline" program provided discounted rates for customers on the first block of water allotted, with all subsequent blocks charged at metered rates. However, according to the California Water Association, only two utilities currently offer the lifeline rates (Seaside Community in Monterrey; Southern California Water in Morongo Valley).

Unlike telephone and electricity services, there is no national government subsidisation or assistance in paying for water bills. The exception to this is found in cases where the water service provider is not investor owned. One of the most well know cases of rate structures that attempted to address social and environmental concerns is the Los Angeles Tariff Reform of the 1990s (OECD, 1999). The Mayor's Committee on Water Rates proposed the abolition of a minimum charge, cash payments to low-income customers independent of water usage, and the establishment of water blocks based on household need and not only metered use. Different seasonal rates were also proposed and the new rates became effective as of 1995.

Water supply quality is subject to federal, state, and municipal regulation. At the federal level, regulatory jurisdiction is vested with the United States Environmental Protection Agency (USEPA). The Federal Safe Drinking Water Act (SDWA) establishes nation-wide drinking water regulation by setting the maximum levels for harmful contaminants allowed. It also plays a role in construction, operation, and maintenance of operating systems.

State Public Utility Commissions have responsibility for regulating (private) water utilities' rates, service, water quality, and operational utilities. Government-owned water systems, cities, and districts are self-regulated. Department of Health Services (by state) are responsible for implementing and monitoring drinking water quality standards.

A considerable focus of regulation in the US is based on ensuring public access to information. This is especially the case when considering utilities that operate as financial PSP undertakings. USEPA also serves an important function in publishing information on service quality performance. By requiring utilities to provide consumers with annual drinking water quality reports ("Consumer Confidence Reports"), it introduces a simple and inexpensive measure that complements its other regulatory mechanisms.

Box 5 Financial PSP: The case of Suburban Water Systems

Suburban Water Systems is one of the core regulated water utilities owned by Southwest Water Company. It provides service to approximately 300,000 people in a 41 square miles area of the Southern Californian San Gabriel Valley. Groundwater comes from mains, and 13 wells in the Main San Gabriel Basin and the Central Basin. Well water is chlorinated and often supplemented by water from Covina Irrigating Company, California Domestic Water Company, and the MWD (Metropolitan Water District of Southern California). One of Southwest's fastest growing businesses is the outsourcing of water sources and sub-metering contracts. Southwest has maintained an active presence in contract operation of utilities since 1985 when it began to diversify its operations.

Southwest has been particularly successful in maintaining relatively stable water prices. Between 1996-2002 service charges for the Whittier-La Mirada Service Areas increased from a base of USD 9.60 to USD 9.90. During the same time period quantity charges per 100 cubic feet ranged from USD 1.034 to USD 1.093 (Suburban Water Systems, 2002). Some tariff areas witnessed reductions, particularly those located at higher elevations. This is the direct result of a company policy that requires 10% of gross revenues from active projects and 30% of passive projects conducted in service areas be passed back to the consumers in these areas in the form of price reductions. This was made possible following a state ruling in 1999 that sought to lower the costs of raising capital for regulated public utilities by permitting them to offer additional services not directly related to water supply. Suburban, for example, now provides facility space and properties for antenna leasing, passing back 10% of the gross revenues to water customers, thus those customers located in service areas at higher elevations have directly benefited from the diversification of services.

Suburban (like all other utilities that are investor owned in California) is subject to formal economic regulation by the California Commission. Rates are determined on the basis of a

metered rate schedule that consists of a service charge and quantity rate. Service charges are designed to cover 50% of the utility's fixed costs. Meter costs do not reflect 100% fixed costs; they are meant to cover variable costs and the remaining 50% of the fixed costs. Under normal circumstances (i.e., no severe water shortage) quantity rates do not vary. Under shortage conditions, two or more quantity block rates are established with the aims of encouraging conservation. For these areas quantity rates increase with increased water consumption. There are also customers that receive a flat rate, with charges based on property size. However, following legislation in the 1990s all new service connections must be metered.

Rate increases are determined by formal applications in three or more year intervals. Utilities are permitted to factor in both historical costs (from the past 6 years) and projected costs (4 years). In a general rate case the Commission may take months to consider revenues, expenses, financial outlook, and quality. Public Participation Hearings and evidentiary hearings are permitted. Customer complaints regarding billing practices and prices may be included in evidentiary hearing and in many cases customers may formally challenge a water company's threat of disconnection by requesting arbitration. An administrative law judge presides over all hearings. After all hearings the Judge issues a decision for comment and the Commission issues a decision accordingly. The entire process takes around ten months. The California Commission permits water companies to file offset rate increases or decreases after the actual changes in costs are known. In each water district there are also monthly water board meetings open to the public where rates, water quality and customer service issues may be presented (Suburban Water Systems, 2002).

The EPA regulates water quality standards at Suburban. The DHS enforces the EPA quality standards and sets limits for substances that may affect health or aesthetic qualities of water, including MCL, Secondary MCL, Primary Drinking Water standards, and Regulatory Action Levels. An examination of Suburban Water Systems' annual water quality report revealed that all reported substances were below detection levels.

3.5 Mexico

The area traditionally known as Mexico City corresponds to the north central area of the Federal District (DF). The DF covers an area of 1,504 square kilometres and has an official population of approximately 8.5 million inhabitants (INEGI, 2000). Water connection levels stand at 98% (to house or common distribution faucet in the neighbourhood), with the balance of residents obtaining water from tank trucks or private vendors. Almost 72% of water used is drawn from well fields that tap the aquifer throughout the Basin Of Mexico. There are over 1,000 registered wells in the combined area of the DF and the State of Mexico. Imported water contributes to about 26% of supply and the same raw water sources supply metropolitan service areas in both the DF and State of Mexico. The DF service area includes close to 11,000 kilometres of distribution lines (CNA, 2002). The ratio of unaccounted for water is relatively high, even when controlling for the level of development of the country. In 1997, Mexico City alone experienced 37% of physical losses in large part due to undetected leaks in the primary network and land subsidence phenomena (Haggarty, et al 2001).

The protection of ground water quality is of utmost concern, given the size and population of the DF and its dependence on the aquifer for close to 3/4 of the drinking water supply. There are serious problems associated with hazardous wastes generated by the significant industrial production in the region (over 45% of all industrial production in Mexico takes place in the DF). Risks associated with water contamination from agricultural pesticides are also considerable. The Ministry of Health is responsible for certification of drinking water and issues standards regarding, requirements for water supply system, transportation of drinking water sources and sampling. The DF water department is responsible for performing all

water quality analysis. As of 1993 testing at household taps in 1,270 neighbourhoods through out the 16 districts, showed potential micro-biological contamination, including high organic nitrogen. Re-chlorination stations within the distribution network provide added disinfection, although this creates problems with chlorine residual levels. The fourth leading cause of infant mortality in the DF is related to infectious gastro-intestinal diseases. Sickness and mortality rates are especially high in the south-eastern zones of the DF (National Research Council, 1995)

Most water used in the DF is for domestic purposes (approximately 67% of all users). An increasing block structure tariff schedule is used; however, given the limited number of metered users (only 53%), and difficulties associated with bill collection and enforcement, many users pay a flat rate, based on historical water use. Ideally, the DF attempts to achieve cost-recovery; in practice, the tariff policy seeks to recover operating and maintenance outlays alone (Haggarty, et al. 2001). There is a form of cross-subsidisation between non-domestic users (including industry) and domestic users, with industrial and commercial users subject to an increasing block rate with more charges per cubic meter at higher consumption level, even though domestic users constitute the same percentage of largest users (National Research Council, 1995). This is in large part due to more extensive metering of large business enterprises and the difficulties and high costs associated with installing, reading, maintaining, and billing of domestic meters.

Many charges are designed to take public needs into account, regardless of the operating costs; for example, such as the extraction charges for the aquifer set by the CNA, are established at lower than private rates and require congressional approval. The government of the Federal District, vested with the authority to use financial measures to ensure affordable water, has a tradition of using water charge discounts and granting arrears forgiveness for those that have difficulty paying their water bills. For example, late payment charges and fines for arrears generated between 1995-1998 will be forgiven after customers regularise their situation after one instalment (Saade-Hazin, 2002). In addition, there is currently a program in place that provides a 50% discount to retired residents over the age of 60. It is important to recognise that even though in the 1930s federal health legislation banned the complete disconnection of residential users for non-payment, the Federal District Financial Code authorises reduction of service to minimum "vital levels" in the event of non-payment.

Use of the regional water planning councils are thought to be an appropriate institutional setting through which users may have their voices heard. The councils are designed to provide a setting for open debate on issues such as water pricing, rights, conservation measures, and infrastructure development.

The management of the water distribution system prior to the 1992 reforms was fragmented across three sets of institutions and there was no single water authority responsible for managing water supply. The Direccion General de Construcion y Operacion Hydraulica (DGCOH), 16 political districts, and the Treasury combined were responsible for management of the city's water system. There were specific concerns with sectoral performance under this management system, namely, consumption levels were exceptionally high, by both developed and developing country standards. This was in large part due to high physical losses, lax billing, and tariff levels that covered only 28% of operating expenses and investments, excluding debt and interest. Labour productivity was also poor by international standards, with an average of 13.4 employees per thousand connection (Haggarty, et al, 2001). These factors combined with political circumstances, (namely, national public sector reforms that decentralised water regulation to the state level, and general elections that had uncertain outcomes for the ruling party taking place in a year's time.) have made reform difficult to achieve (National Research Council, 1995).

In July 1992 the Comisión de Agua del DF was established. This agency was to assume responsibility for the administration, operation, and maintenance of infrastructure in the DF. While most of its responsibilities overlap with the pre-existing agencies, in theory, it should be the primary agency responsible for water services.

Box 6 Mexico,DF: The case of PSP by delegation

In October 1992 the Federal District opened a bidding process for private participation in the management of water distribution. Within one year, four 10-year contracts were awarded to private consortia with the aims of renovating and improving drinking water supply. There are 16 districts, divided into 4 zones, with each operator running 4 districts (responsible for operations and commercial aspects of distribution but not production). The district retains ownership of infrastructure as well as control over policies.

This is a 3-stage contract and that entitles the contractor to negotiate separate contracts at each phase. During phase one, companies are responsible for creating a census, updating customer registers, installing meters, mapping the distribution system, and evaluating the condition of the system. Phase 2 requires the implementation of a billing and collection system. In the third phase, contractors may purchase and distribute bulk water from the District and assume responsibility for commercial activities. Between phases the CADF has the right to postpone or cancel projects. The first two phases have been structured on a fee for service basis. The third stage would be linked to actual tariff collections (ECLAC 1998) (National Research Council 1995). The third phase has not yet taken place given delays in the implementation of the previous phases. The general contract expires in 2003 and it is hoped that operators will seek renewal.

The selection process involved meeting pre-qualification criteria (a majority domestic presence in the consortia, minimum capital of 3.2Million USD, and experience in urban infrastructure provision in Mexico or internationally) and submitting price lists for each of the required actions in the 16 districts. The number of zones that the bidder would be awarded was not disclosed, nor was information given beforehand on which zones the consortia would be responsible for in the event they were awarded a contract. Bidders were guaranteed a minimum of two zones upon receiving a contract. They were asked to provide unit prices for each of the specified tasks in the three phases. In order to determine their bids, bidders had to establish a basket of risks and responsibilities related to the number of actions for which they would not be able to charge a fee and adjust their direct costs accordingly. The government used a method of net-present value of the costs of actions for different numbers of zones and different allocation of zones to bidders. A computer simulated model was used to identify the best configuration of zones when matched to private partners (Haggarty, et al. 2001).

The reform was successful in improving information about the water distribution system through the creation of an electronic map for overall planning and a customer census that could identify unregistered connections and meters for most customers. In addition, approximately 1.2 million meters were installed and as of 1998 64% of customers (up from 53%) were billed on a metered basis (Haggarty, et al, 2001). An additional 16% were billed on the average of the metered use of metered customers in their zone, this in large part due to a financial code that stipulates that once metering reaches 70% in a given zone, the remaining non-metered customers can be billed on the average metered use in that zone. Cost recovery was slightly improved from 64% of operating costs to 71%, in some part limited by the lack of a payment culture. It is important to note that since the water system forms part of the government budget the DF Treasury handles all loans and charges that are required for additional investments and charges. Operating costs have not decreased as a

result of the reforms and little has been done to alter the incentives for customers to encourage greater water conservation. The over-exploitation of the aquifer was reduced but it is believed that this had more to do with the failure to meet expanding demand. The over exploitation of the aquifer will continue to be a long-standing problem and this generates many negative externalities, particularly with regard to the damage sustained to the public infrastructure from subsidence and higher pumping costs caused by lower water tables.

There were, however, difficulties encountered with the implementation, particularly since the implementation of the first two stages experienced substantial delays associated with the mayoral elections of Mexico City, a currency devaluation, and contract disputes. The regulatory environment proved to be insufficient, especially since there were severe co-ordination problems between the four public organisations in the water sector. In addition, tariff setting was hampered by the low number of actual meter readings, cross-subsidies, and high inflation that occurred post devaluation.

The water quality still remains poor and service interruptions in the south-eastern and southern portions of the city frequently occur. There are high concentrations of manganese in the ground water and water delivered often has high sediment content. The cost to future generations and surrounding communities in terms of forgone resources will manifest themselves through higher prices for water in the future or diminished quality of life.

4. Summary of case study results

In the case of Amiens, France, we find an example of *Administrative* PSP that has been successful in meeting standards of financial efficiency --even on occasion contributing to the city budget. Full cost recovery is achieved, prices are actually lower than the national average (including comparisons with private operators), and long-term investments are being made to ensure adequate water resource supply. Amiens illustrates the potential for publicly owned local water operations to meet environmental and social objectives when the appropriate legal framework, mechanisms for public consultation, and enforceable standards are in place.

The Hamburg case provides an example of a private-law company in public ownership of the city with a *Legal* form of PSP that has chosen to combine efficiencies with other municipalities. It too has been successful in achieving full-cost recovery, and in keeping water prices at stable levels, even as it embarks on many innovative conservation programs. Hamburg has also had a high level of success in meeting its social and environmental objectives: minimum service levels are provided to all users, vulnerable customers receive social services assistance in meeting utility bills, public participation in tariff setting is carried out locally. Drinking water standards are met, and water conservation is promoted through the introduction of water saving devices and consumer education campaigns. Most remarkably, the implementation of what could have been a contentious social issue (extending metering to all households by reforming rent laws) was met with a high degree of acceptance given the consultation and participation of all levels of government as well as political and social leaders (i.e. teachers). This demonstrates the importance of co-ordinated action when managing social transitions, i.e., from expanding access to greater conservation.

Suburban Water Systems, a subsidiary of the investor owned regulated company Southwest Water, is the example of a financial form of PSP. Of particular interest here is the regulatory framework that encourages stable prices and a high level of customer access to service quality. Financial PSP requires special safeguards against monopoly abuse. The Rate-of-Return method of price regulation has been successful at minimizing price increases for users while still maintaining adequate investment in infrastructure and good quality drinking water. It is also important to note, that given the prevalence of consumer protection interest groups and the significance of the media in the US, the "Consumer Confidence" Reports have been instrumental in encouraging companies to comply with the Federal Environmental Protection

Agency. This applies to clean up efforts as well as compensation schemes that are based on legal liability for damages arising from poor water quality. In addition, the existence of a well functioning and independent judicial branch is necessary when addressing incidences of monopoly abuse. Rate of Return calculation used by regulators to set tariff levels is increasingly focusing on efficient water use and conservation (seasonal, increasing block, and lifeline rates). Of particular concern, nonetheless, is the continued neglect in meeting minimum service levels, especially since this is directly linked to questions of affordability. Vulnerable groups have no statutory protection and suffer often as a result of disconnection. The situation of low-income groups is particularly aggravated by the lack of social welfare benefits to help offset utility costs.

The Federal District of Mexico initiated a series of service contracts with private sector partners in the early 1990s. It was a unique attempt to introduce PSP by delegation since four private sector operators were chosen to carry out services, and each contract was to be implemented in three stages over a ten-year period. On one hand, the public authorities sought to introduce competition among contractors in their initial bids for service contracts. On the other hand they also needed to minimise the risk of contract failure and the high transaction costs associated with public bidding for all stages. The multiple contractor multiple phase option was chosen at the time since it was hoped that it would be a time-saving device to start as many of the short-term projects as soon as possible. Had all the contracts been awarded to a single company, there would have been a need to go through a lengthy process of legal tender. The reforms have introduced a greater potential to meet future goals of conservation and affordability, namely through the expansion of metering. While minimum service levels are still far from being up to acceptable standards in all districts in the city, there has been an improvement in the operation and employment of customer service centres and billing. This case has also shown the difficulties of implementing any reform given a type of PSP that requires supervision, without a clearly demarcated regulatory framework. PSP by Delegation does not necessarily require formal regulation; it does however require a clear delineation of the supervisory duties of responsible public institutions, something that was lacking in the Federal District. The Federal District, however, explicitly attempts to assist vulnerable groups through the use of discounts and normalisation of arrears. Economic regulation in the form of maintaining different tariff levels, especially with regards to extraction charges, while not necessarily promoting environmental objectives, does help keep water prices in a more affordable range. One should nonetheless exercise caution when drawing conclusions regarding the use of PSP by delegation to build capacities in the DF, the reform is still very much a 'work in progress'.

The Glas Cymru (Welsh Water) case demonstrates a novel approach to *Corporate* PSP, the formation of a member-owned public body. What was previously a classic example of a financial PSP utility has since been turned into a not-for-profit limited guarantee company that has no officially designated shareholders, but instead controlled by a group of personalities appointed by the regional Welsh Parliamentary Assembly. Particularly noteworthy is the use of benchmarking for Board Member and executive pay and the separation of ownership from operation (example of the need to insulate consumers/community from risk associated with private investment). This form of private sector participation has shown that it can meet economic efficiency targets. When coupled with a responsive customer service approach, lower prices, and social welfare assistance for vulnerable groups, this approach can enjoy considerable social acceptability. The transfer of assets back to the local community enjoyed widespread support in the communities served in large part due to the national sentiment that sought to re-assert the right to more regional decision making (devolution of authority to Wales).

In summary, the experiences mentioned above indicate that in the cases where *Financial* PSP and PSP by delegation are used, it is important to have established regulatory frameworks that protect consumers from monopoly abuse in the form of low service quality

and high prices. Since there is little or no direct or indirect involvement on behalf of users in the modification of tariffs, it is essential that attention be paid to improving representative political institutions that can intervene on behalf of consumers. While traditional legal systems should in theory provide recourse for customers, given the high costs of reaching agreement, this may be of little practical use in actually protecting consumers' right to access, especially in cases where disconnection of water services is allowed.

Where administrative, corporative or municipal enterprises are the norm, regulation must not exist in the formal sense. Local control is inherently present given the fact that the municipality (or municipal associations) own the assets related to water service provision. A national tariff policy is not necessary to ensure prices that are economically viable. In fact, in the cases observed, all meet full cost recovery criteria given flexibility of decision making and planning. The most common form of ensuring accountable practices comes through indirect political control, namely through the direct election of public officials to municipal and regional office responsible for water management. Nonetheless, these forms of utility management still must consider the affordability of services especially with regard to vulnerable groups, and this in all cases is being met by the existence of a generous social welfare system.

Maintaining a degree of collective political control requires public officials to ensure that the following attributes are in place, especially if pursuing mixed enterprise or financial form PSP that transfers partial or full ownership of assets to private actors:

- General legal framework: constitutional rules establishing the jurisdiction and authority of national, regional, and municipal governments.
- Water resource and environmental laws: Water right allocation, protection mechanisms, resource conservation, and pollution control agencies must set clear and enforceable standards.
- Specific legislation defining the role of PSP, as well as mechanisms for public scrutiny and consultation.
- Ability to issue individual contracts or licenses, and a clear demarcation of company law as applied to different private operators in public services.

The last two points relate directly to how individual countries chose to introduce competition the water supply provision. Currently there is great diversity in OECD countries regarding the intensity and scope for competition in water service provision. Generally speaking, one can identify three distinct **vectors of competition** that may or may not be subject to local control and/or formal regulation: *surrogate competition among investor owned utilities; competition among private operators for right to temporarily exploit natural monopolies; and, competition in markets for water related goods and services.*

As is the case in England and Wales (and to a certain extent in the US) there is no direct competition among the investor owned utilities, including no competition for customers or for supply areas. Regulators evaluate the relative performance of several utilities on a comparative basis. This form of regulation is best suited to cases where there are multiple utilities so that there can be a meaningful statistical evaluation. The regulators also require that the operation of natural monopolies be set up as separate profit-centres and publish separate accounts. The objective being to limit the likelihood that private operating companies will reduce competition in the form of providing other water goods and services in unregulated areas. In the case of the UK, the "Anglo-Saxon" model is based on centralised public policy making and centralised supervision. This implies limited municipal public policy input, and requires independent regulatory supervision. In this context, financial PSP requires the presence of an active social welfare system to address affordability issues for vulnerable groups, since citizens have no direct role in influencing tariff decisions, and licences are awarded on a long-term basis.

In France, unlike in the UK, competition exists between operators, potential or otherwise. Where as in the UK separate accounts are kept to maintain a distinction between operation in the regulated versus unregulated areas, in the French case regulation is maintained throughout the bidding process, although not so stringently after the granting of concession. This is similar to the case of the Federal District where competition took place at the time of the bidding for the contracts. The Mexican case, however, also introduced competition though benchmarking by designing a 3 stage/phase contract. By requiring operators to re-negotiate contracts at each stage, economic regulation could be introduced on a more frequent basis. The "French Model" builds in competition for monopolies through the use of contracts. This takes place in the context of market concentration. Municipal input is permitted, but citizen or consumer influence is limited. While PSP through delegation gives municipalities considerable flexibility, the only basis for public participation in tariff setting comes through indirect representation at the municipal and regional levels.

In Germany, there is direct competition among some municipal operators, even though all operators have a local monopoly, which is only rarely threatened. This comes in the form of competition for water-related goods and services. For example, the Hamburg Wasserwerke not only supplies water to the city-state of Hamburg but also (through the use of subsidiary companies) engages in the running of public pools, redevelopment of contaminated sites, and consulting services in water management. The market is characterised by numerous small to medium size firms that have seek to provide services to the increasing number of integrated Querverbund (infrastructure systems). As a result of the dominance of local actors, comparisons of performance are not carried out by external regulators but in the form of self-enforcing regulation by the operator or by an external consultant. The "German model" is based on the principles of **industry competition and democratic control through decentralised, autonomous municipalities, and localised decision-making.**

4.1 Evaluating Water Governance

When evaluating the effectiveness of meeting social and environmental objectives in urban water management it is important to see how municipalities and private actors alike contribute to "good governance". Good governance entails:

- pursuing an efficient allocation of resources
- establishing and enforcing the highest water quality standards
- pursuing integrated water resource management
- increasing stakeholder participation
- avoiding irreversible policy decisions
- taking into consideration both the willingness and ability of users to pay for water

Operational efficiency is a necessary but not sufficient condition for efficiency in environmental protection. Efficient operations are more likely to be cost-effective in attaining environmental policy objectives and obtain better results with any given amount of financial resources. Cost-effectiveness is also related to resource effectiveness, as increased consumption of material resources tends to go with increases in cost.

It is widely held that the appropriate manner to ensure an efficient allocation of water is to apply the principle of full-cost recovery. Water supply and sewerage fixed costs are high, ranging from 70-90%. Pricing structures should reflect this by having fixed charges that cover at least the fixed costs associated with providing water. For example, in cases where consumption has reached a sustainable level, a high level of fixed charges could be

reasonable. Efforts to prevent future increases in consumption could be addressed by implementing increasing block tariffs (Brackemann, 2002). However, sustainability is a concept that goes beyond the narrow issue of how best to funnel financial resources from capital markets into water supply systems. It refers to the ability of human society to function in harmony with natural resources. One should therefore evaluate how well different forms of PSP contribute to the sustainability of water use patterns.

To begin with, water abstraction from ground water should not exceed on average over time the rate of renewal; water abstraction from surface water should leave enough water for ecological functions and other sustainable uses of resources; **Material intensity** also informs us as to the ability of a particular institutional arrangement to meet sustainability criteria. Namely, overall resource consumption must be minimised.

When applied to PSP and regulation of urban water supply the following question arises: which forms or types of management, public and/or private establish incentive structures that favour sustainable development? The tendency to believe that private enterprises will fail to meet sustainability criteria is not without grounds. Given the capital intensive nature of the water service industry and urban water services, namely that they are engaged in cost-plus activities, and the profit motive guiding decision making structure of the firm, there is a strong disincentive to reducing resource consumption and/or material intensity in design and construction of technical systems. A good example of this is found in the US and UK where rather than invest in low cost preventative measures to protect water sources, the preferred course of action is to invest in capital intensive treatment to safeguard drinking water. This does not apply to operators of urban water services functioning without a profit motive as is the case in Germany, where excess profits must go back to general public coffers and not utility or managers.

Another conceptually similar issue relates to **water productivity**. When compared to other forms of economic activity, water services provision has a high proportion of fixed costs. Given the large difference between average and marginal costs, there is a strong incentive to *encourage* water consumption and discourage conservation. The logic being: any reduction in water consumption or sales would have to be followed by a commensurate increase in water prices, otherwise fix costs (such as depreciation and debt service) could not be met. This creates a dilemma especially with regards to re-distributive effects and social and political objectives. Any attempts to promote conservation will be met with resistance to higher water prices.

There are two ways out of this dilemma. The first is attempt to increase the *ability to pay* by raising or supporting household incomes (through subsidies, tariff structures, social transfers). The second is to ensure that public perception of water services and operations remains supportive, that means increasing the *willingness to pay*. In other words, if the public believes that higher prices and charges will be used for private gains from monopoly rents, then raising water prices will remain highly unpopular, regardless of the degree of support for environmental protection or the actual price levels. Similarly, opposition to higher prices is often linked to the frequency of rate increases and not necessarily levels. In the Netherlands drinking water is usually provided by public water companies and water boards and prices are quite high when compared with other European countries, but have remained stable. The prices that consumers pay reflect costs that internalise strict environmental standards and to date Dutch water quality surpasses standards set by the government and the EU (Dalhuisen, et al., 2000)

Important factors that can influence the willingness to pay are linked to concepts of local control and equity. Local control, either in the form of public ownership of assets or democratic accountability, plays a role in increasing the public's responsibility towards protecting local water resources. Such 'closeness' to the issue is important in maintaining transparent and accountable practices. This is the opposite of the 'foreign investment

syndrome' witnessed to date in attempts to introduce forms of mixed enterprise or financial PSP that have turned out to be highly contentious politically and rejected socially. Finally, it should be pointed out that while progressive tariffs, social welfare supports, and cross-subsidies all serve to address the problem of affordability, they may have a dampening effect on the levels of willingness to pay by users, and could be perceived to promote 'free-riding'.

Water resource protection, particularly those used for drinking water supply, is a state responsibility. However, given variations in local circumstances, the role of water suppliers becomes critical to ensuring access and availability to safe drinking water. Whether or not water suppliers will be successful in promoting protection of water resources locally is contingent on three factors:

-First, the supplier must have an *interest to act*, i.e., a water supplier dependent on local water sources, when threatened by loss of operational independence in the event their sources become contaminated, is more likely to have a direct interest in mitigating the effects of the pollution.

-Second, the supplier must have *the capacity to act*, i.e., local water suppliers must have legal recourse and standing to directly challenge the behaviour of polluters.

-Third, the supplier should have the *autonomy to act*, i.e., local water suppliers must be free from outside interests, political or otherwise that shift incentive structures towards those that promote more capital intensive drinking water treatments. From a resource protection standpoint, it is preferable that the supplier of this essentially public good be organised along local production unit lines.

Finally, an additional indicator of efficient performance relates to the **presence or absence of joint operations in technical services at the local level**. Horizontal integration will have an impact on the optimal size and scale of operational units for urban water services as economies of scale at the operational level can be replaced by economies of scope and scale at the firm level. PSP that maintains 100% asset ownership in public hands has the potential to benefit from joint operations that introduce flexibility in management yet secure stable regional solutions to water management (see Figure 4.1) In Japan, some municipalities organise at the prefecture level and qualify for additional subsidies from Japanese Regional Plans. (Ministry of Finance, 2002). What is interesting here is that some of the larger urban areas have started to benefit from the economies of scale generated by forming associations with other municipalities. In Germany and the Netherlands the common practice of forming municipal or regional associations has enabled water customers to benefit from the accountability ensured by public/local control and the economic and environmental benefits of increasing capacities by pooling resources, i.e., reaching economies of scale.

Efficiency as defined in a strict micro-economic sense is hardly sufficient as a means to evaluate the provision of urban water supply. It fails to take into consideration the significant externalities relating to public health and hygiene not to mention matters of equity and redistribution. One important factor has to do with the presence of mechanisms for **democratic (either direct or representative) control**. This closely linked to the concept of devolution, where the goal is to maintain localised administration and management, responsive to local demands, with sufficient capacities to maintain and deliver public services. In Germany and Wales local elected officials consult with utility managers and regulators to set tariff rates; in addition, non-executive members of the board of the utility are also directly accountable to local or regional legislatures. In cases where the utility is public, as in France, elected officials are responsible for water management decisions and held accountable by regular elections. The use of appointed officials, either for regulatory agencies or to serve on water utility boards, is common in England and the US, and to a certain extent France at the regional level, and is a form of indirect democratic control.

Another factor has to do with the **independence and flexibility of the management**, particularly regarding strategic planning, investment, and development plans. This directly addresses the ability of water service providers to build capacities to a point where they may operate autonomously from higher levels of government, i.e., through the ability to raise finance or to participate in tariff modification. Flexibility to adapt to local changes in demand for services, be they related to quality levels or price, is most frequently found in cases where providers are not 'locked into' long term contracts or subject to lengthy regulatory processes. For example, Suburban Water Systems can adjust prices under ROR regulations that are not only based on the past six years historical costs but also on projected costs. They can also request special rate cases through public hearings in the event of unexpected increases in costs on a yearly basis. Self-enforcing practices within the context of a decentralised system, as is the case in Germany, have been particularly useful in promoting flexibility and maintaining autonomous decision making.

Both factors also allow one to consider the stability of the institutional arrangements, particularly since short term objectives (political interference) may not always be in line with long term objectives (returns on capital investments that take years to manifest). The case studies of water suppliers that rejected radical shifts in the model of water service provision (Amiens, Hamburg Wasserwerke, Suburban Water Systems) illustrate a good track record for meeting full-cost recovery, good quality drinking water, and stable prices. In contrast, the degree of uncertainty associated with contract renewal in Mexico City (given institutional changes accompanied by public sector and electoral reforms) makes it difficult to achieve economic, environmental, and social objectives.

A system relying on central distribution of funds for a large part of total expenditure is more likely to be more unstable than an equivalent system that matches revenues with expenditures within each operational unit. In addition one also needs to look for signs of under-capitalisation and long-term dilapidation. This has been the case in several of the Eastern European countries as well as Mexico and Turkey. One solution to this problem is to engage global capital markets or seek international development aid. To this end mixed enterprises or PSP by delegation are the preferred institutional forms to secure additional private financing (often comes in the form of joint ventures with large multinational companies or regional development banks). For example, in Turkey, there are several projects currently undertaken to address the problem of under-capitalisation of the water sector. In Izmir on the basis of development aid, there has been a Mixed Enterprise set up between two public bodies, the Japanese Ministry of Finance and the local operator.

5. Conclusion

Most countries concerned with reforming their water services provision have similar long-term objectives regardless of the degree of private sector participation currently in place: the necessity to provide drinking water that complies with established health standards; achieving full cost recovery; and increasing accessibility. In order to meet these goals, there are certain long-term objectives that should be met. These objectives apply to public and private utilities alike and ultimately contribute to the provision of drinking water that meets social and environmental objectives. The most significant objectives are as follows:

- Development of an adequate legal and regulatory regime that meet realistic social and economic standards, **while conserving adherence to established health and environmental standards.**
- Establishment and maintenance of institutions that have clear roles and responsibilities and most importantly, sufficient capacity to implement policies;
- Autonomous and self financed utilities;

- Services provided at the lowest possible cost to consumers;
- Services that are affordable and subsidies for the poor; this entails establishing progressive tariffs, guaranteed minimum usage, prohibition of cutting of water for non-payment, social welfare supports.
- Sound investment procedures;
- Consumer friendly (and responsive) services (Environmental Management Services, 2000).

The factors that influence the outcome of private-sector participation, and as the case would be in many instances, incorporating properties of private enterprise in publicly controlled management, are the *form* of PSP, the *competitive structure* of the sector, the *type* of private company involved, and the *regulatory regime* (Rees, 1998). For municipalities seeking to reform water service provision it is important to choose forms of PSP that contribute to the proper governance of water resources. This includes pursuing an efficient allocation of resources, establishing and enforcing the highest water quality standards, integrating water resource management, increasing stakeholder participation, avoiding irreversible policy decisions, and taking into consideration the willingness and ability of users to pay for services.

In France, Germany, Mexico, US, and Wales, we have seen examples of how different forms of PSP have contributed to good water governance. Regarding the efficient allocation of resources, one of the lessons learned is that it is possible for municipalities that maintain public control of assets and use Administrative, Corporative, or Legal PSP to successfully apply the principle of full-cost recovery.

When a municipality operates without a profit motive (Wales, Germany, France) the integration of water resource management has led to the implementation of policies that have reduced consumption and encouraged investments into low cost preventative measures to protect water resources.

Where municipalities are able to form associations with each other (as is the case under Corporative and Legal PSP), joint operations in technical services are possible, often contributing to increasing capacities as well as introducing public accountability through local control.

The presence of mechanisms for democratic control are found in cases where administration and management are localised and thus elected officials may either directly or indirectly participate in setting tariff rates. The use of appointed officials, either for regulatory agencies or for service on utility boards, is also acceptable as a form of indirect democratic control. In this case, it is essential to have well functioning consumer protection groups and/or independent regulators to prevent 'agency capture'.

Maintaining autonomous and flexible management is central to good water governance. The flexibility to adapt to local changes in demand for services (either price levels or quality standards), is most frequently found in cases where providers are not locked into long-term contracts or subject to lengthy regulator processes. While the formal Rate of Return regulation employed in the US has encouraged utilities to pursue investment and development plans that promote efficient and environmentally sound outcomes, in systems with decentralised publicly owned assets (Germany), it is possible to achieve this through self-enforcing practices.

Municipalities with Administrative, Corporative, and Legal PSP have also been able to promote the willingness to pay. This has been done by building confidence in water services

through improved customer services, being consistent in enforcing environmental and health standards, avoiding cross-subsidies or preferential tariff structures in the long run (foster perception of unfairness), and ensuring that when schedules are changed that they are set in a transparent, participatory manner, preferably at the local level.

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