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Ralf Boscheck\*

# European Water Infrastructures: Regulatory Flux void of Reference?

## The Cases of Germany, France, and England and Wales

*This article outlines the structure of, and the challenges facing, the water industries in several European countries and describes their respective experiences with technocratic infrastructure management, delegated supervision of private concessions, and price-cap regulation. It then addresses common concerns related to operating efficiency and pricing to point to the dearth of comparable data, which limits meaningful benchmarking of productivity and infrastructure conditions, thwarts regulatory and managerial supervision and hampers the identification of some global norms. Attaining that reference calls for an independent, central body able to shed light on national performance and stakeholder interests.*

Between 1900 and 1995, global water withdrawal increased by a factor of six, i.e. more than twice the rate of population growth. Even though current consumption of 4,000 cu.km represents only close to half of the amount readily available to humans, that resource is unequally distributed around the globe and already seriously compromised by wastage, pollution, deforestation, land degradation and falling water tables. Population growth and socioeconomic developments rapidly expand water demand and require new resources to be tapped at increasing financial and environmental costs. If current trends persist, by 2025 at least 3.5 billion people or 48% of the world's population are expected to live in "water-stressed" conditions, that is, experience severe water scarcity and gravely strained aquatic ecosystems.<sup>1</sup> Recent efforts to identify solutions focused on European best-practices in water resource management, particularly on approaches to charging for water and infrastructure investments, managing stakeholder concerns and allocating responsibilities among public and private parties.<sup>2</sup> But here, too, there is no ready answer. Paying Europe's highest average water charges, German consumers look for market-led alternatives to the country's traditional model of communal infrastructure management. Similarly, recent price hikes and contract scandals caused the French public to demand yardsticks for judging water concessions. Finally, current reviews of privatization and regulatory interaction in England and Wales often

end up debating the legitimacy of returning to public asset ownership and management contracts. But what is the reference?

In principle, institutional and regulatory arrangements are to permit water to be priced to cover costs, convey its scarcity, and drive long-term efficient consumption, conservation and investment decisions. In practice, however, this clear but abstract economic advice is often only of limited use. National or regional water systems reflect specific climatic, demographic and topographic situations and are the product of the particular cultural, political and social fabric of the society they serve. Both sets of factors may not only make it difficult to treat water as an economic good but also to benchmark a given supply scheme or suggest a model to be followed. Yet in the absence of common standards or comparable performance data, any case assessment only offers highly conditional perspectives and any comparison of regulatory structures is relegated to the realm of economic ideal types – hardly the best basis for reform.

Addressing these concerns, this article first sketches a continuum of formats for organizing water supply. Next it outlines the structure and challenges of the water industries in Germany, France, and England

<sup>1</sup> I. Shiklomanov: World Water Resources, St. Petersburg 1999; United Nations: World Freshwater Resources, 1999.

<sup>2</sup> J. Briscoe: The German Water and Sewage Sector, World Bank Report, February 1995; R. Boscheck: The Nature of Regulatory Contracts – the Case of the Water Industry in England and Wales, IMD Working Paper, Lausanne 2000.

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and Wales and describes their respective experiences with technocratic infrastructure management, delegated supervision of private concessions, and price-cap regulation. The subsequent part focuses on common concerns related to operating efficiency and pricing to point to the dearth of comparable data, which limits meaningful benchmarking of productivity and infrastructure conditions, thwarts regulatory and managerial supervision and hampers the identification of some global norms. Attaining that reference calls for an independent, central body able to shed light on national performance and stakeholder interests.

### The European Water Industry: Background

Currently, more than 27 billion cubic meters of water are distributed annually to Europe's industry (56%), agriculture (20%) and households (24%). National shares reflect differences in climatic conditions, level and type of economic activity, population size and consumption habits. Industrial users differ widely with respect to the quantity and quality of water they require. Although labor saving appliances, such as washing machines and dishwashers, presently fuel domestic consumption, the development of water-efficient technologies for showers, toilets and the like is expected to offset this increase in demand. The European Union's water consumption over the last decade has grown by 2%; this average hides major increases and decreases in consumption (1980-97) as in Spain (+14.7%), France (+36%) and the UK (+33%), on the one hand, and Denmark (-16%) and Germany (-15.5%), on the other.<sup>3</sup>

Even though nearly 98% of European households are connected to running water – by international standards a very high degree of connectivity – further infrastructure investments are required to refurbish and replace aging pipe work, increase system capacity and ensure supply and operating efficiency. In addition, political pressure and concern about drinking water quality has translated into EU purity standards at levels which are still unmet by any of the Member States. The 1991 Urban Wastewater Directive made proper collection and full-treatment systems mandatory for an increasing number of communities. With only 57% of sewage currently being treated across Europe, the directive called on towns exceeding 20,000 inhabitants to have waste water treatment in place by the year 2000; communities below that population threshold will have to do so by 2007. At the same time, industry has to step up its pre-treatment effort at the source of pollution, so as to reduce processing requirements for receiving

plants and minimize costly variations of incoming waste water. Finally, in addition to banning sludge disposal at sea by 1998, the 1991 directive set in motion a process of developing strict regulations to cover the land-filling of waste and hazardous waste incineration. Due to the growth in sewage treatment, the volume of sludge nearly doubled by the year 2000, adding to already massive cost pressures due to regulatory compliance. By June 2000, the EU Commission began escalating legal proceedings against member states for infringing environmental standards; its communication on "Developing a New Bathing Water Policy" of December 2000 signaled the emergence of more stringent norms in line with its new Water Framework Directive.

Since the beginning of the 1990s, European water utilities invested in excess of € 45 billion annually to enhance the efficiency and compliance of their waste and clean water infrastructures. In the case of Germany,<sup>4</sup> traditionally a comparatively high-level investor, meeting current EU standards alone is estimated to cost an additional DM 300 billion and, at annual investments of DM 10 to 15 billion, would take 20 to 30 years to accomplish. During the same period, 1% of the German pipe network, that is 3,950 km, is expected to require rebuilding annually. Given that 70% of the German infrastructures were built during the last 50 years, these investments appear rather modest compared to other European economies. Mobilizing the required finance, European utilities will need to improve operational efficiencies, cross-subsidize public budgets and commercial product lines or increase revenues from higher water charges and outsourced activities. Privatization is attractive as it offers the needed financial resources and may result in market-driven efficiencies and a "covert" opportunity to introduce cost-sufficient pricing policies.<sup>5</sup> Still, only England and Wales have so far moved towards selling off water assets and centrally

<sup>3</sup> Data is calculated based on statistics supplied by the International Water Association at <http://www.iwahq.org.uk>.

<sup>4</sup> See H.R. Imhoff: *Deutscher Gewässerschutz im europäischen Umfeld*, in: GWA 6/94, pp. 428-433. For annual investment estimates see M. Schmitz: *Abwasser: Quo Vadis Deutschland?*, in: *Umwelt Technologie Aktuell* 1/98, p. 4-12. For an age profile of the German water infrastructure see *ATV-Information, Zahlen zur Abwasser- & Abfallwirtschaft*, Hennef 1996, p.8.

<sup>5</sup> Numerous full and partial privatization schemes currently increase the level of international participation in national water supplies. Consider the cases of the Vivendi-RWE joint venture in Berliner Wasser Betriebe and its extension to Budapest's waste water project, or Thames Water's involvement with EDP in the Cascais concession in Portugal. Different finance schemes support the high-profile concessions in Brussels, the Delfland, and Sofia (modeled after the UK Private Finance Initiative) and in Poznan, Brdo-Modrice and Santa Maria da Feira (backed by the EIB).

Table 1  
European Water Cycle – Key Data

	Raw Water Sources (Surface, Spring, Ground) in % <sup>1</sup>	Geo-graphic Distribution Fresh Water Connected (%), No. of Supply Areas <sup>1</sup>	Annual Water Delivery (million cu. meters)	Sectoral Withdrawals (%) Dom./ Ind./Agr.	Sewage Connected/ Treated (%) (%)	Leakage Rates (%)	Employees/ 1000 inhabitants	Meeting EC Water Standards			Prices for Drinking Water - Range (Euro 2001) <sup>1</sup>	Prices for Drinking Water - Average (Euro 2001) <sup>1</sup>	Sludge Disposal (%) Ag/La/ In/ Sea <sup>2</sup>
								(Percent of Drinking Water)	Bathing Water-Sea <sup>2</sup>	Bathing Water-Fresh <sup>2</sup>			
Austria			628		76/100								
Belgium			579	11/85/4	58/45			95	92	56			80/18/2/0
Czech Rep.			589	na	65/93								
Denmark	1; 0; 99	85; 3,186	379	30/27/43	95/95	9	0.30	na	95	95	0.125/0.825	0.4	48/22/22/8
England & Wales	75; 30; 0	99.6; 2,552	6,959	20/77/3	96/87	29	0.53	99	82	na	0.5/1.4	0.85	54/15/3/28
Finland			354		79/100								
France	43; 0; 57	99.3; 27,639	4,350	16/69/15	65/40	25	0.55	90	90	79	0.06/1.82	1.00	na
Germany	63.6; 7.8; 28.6	97.7; 13,000	4,961	10/70/20	93/97	8.8	0.57	80/85	80	47	0.91/1.98	1.42	30/52/8/10
Greece			na	8/29/63*	40/18			na	95	100			15/85/0/0
Hungary			560		48/43								
Italy	20.7; 32.2; 47.1	98.2; 13,000	5,900	14/27/59	89/25	27	0.58	<50	86	87	0.10/0.65	0.35	30/67/2/1
Ireland			400*	16/74/10	66/70			na	100	100			23/28/0/49
Luxembourg			39	42/45/13	98/97			na	/	85			50/50/0/0
Netherlands	28; 62; 10	99.9; 36	1,136	5/61/34	98/99	3	0.52	80	64	85	0.40/1.25	1.35	53/29/10/8
Portugal			na	15/37/48	80/26			70	83	45			11/28/0/61
Romania			2,025		49/61								
Spain			3,372	12/26/62	66/na	na	0.66	na	96	64	0.005/1.25	0.20	na
Sweden			720	na	86/98			na	na	na			na

<sup>1</sup> Umweltbundesamt – ecologic, 1998 Forschungsbericht 29621427.

<sup>2</sup> European Commission: Quality of Bathing Water, 1994.

<sup>3</sup> Ag/La/In/Sea stand for Agriculture, Landfill, Incineration and Sea Disposal; Waterfact 1993 and interviews.

<sup>4</sup> World Resources, Table 22.1. <sup>5</sup> SOMBAP 1988; IWSA Congress in Copenhagen 1991; NRA.

Sources: IWSA, October 1995, 1997; WHO International Drinking Water Supply and Sanitation Decade, 1992; EC Commission: Updating of statistical data about sewage works, February 1990; Bundesverband der deutschen Gas- und Wasserwirtschaft, BWG, 1998.

regulating private operators of integrated river-basin systems. And even here, recent regulatory reforms and corporate initiatives may end up reverting the pattern of asset ownership and governance. Other economies are experimenting with more restrained forms of private sector involvement and decentralized methods of regulatory control. However, in some instances, as in Grenoble and Debrecen, previously privatized operations returned to public management.

### Governance Concerns and Types of Industry Organization

Due to a range of consumption, investment and production characteristics, water services are typically seen to require public provision or at least

very close regulatory control. The policy concerns are complex:

- The essential nature of water may make it ethically indefensible to make consumption exclusive; difficulties in monitoring the use of groundwater from underground aquifers certainly make it rather expensive. But with consumption affecting the quantity and quality of water available to others, market and non-market coordination calls for water rights to be established and enforced. The question is, on what basis? In Europe, such claims have traditionally been allocated on the basis of land ownership, rationed use or community membership, (so-called “riparian”, “appropriation” or “community” rights), or as common property ultimately under state or community control.<sup>6</sup>

**Table 2**  
**Regulatory Formats and the Pattern of European Institutional Choices**

Weighted Average of European Water Management Systems, based on EURAU Classification

	63.5%					20.5%			16%	
	Government Department	Public Enterprise (PE)	PE & Corporatized & Commercial	PE & Service Contract	PE & Management Contract	Leasing Contract	Concession Contract	Built, Operate Transfer	Private Ownership & Operation	Community Self-help Buyer Integration
Asset Ownership	Public	Public	Public	Public	Public	Public	Public	Public	Public	Private/Common
Investment Planning	Public	Public	Public	Public	Public	Public	Public	Public/Private	Public/Private	Public/Private
Regulation	Parent Ministry, Economic, Quality, Environment Regulators, NGOs		Parent Ministry, Economic, Quality, Environment Regulators, NGOs		Parent Ministry, Economic, Quality, Environment Regulators, NGOs		Parent Ministry, Economic, Quality, Environment Regulators, NGOs		Parent Ministry, Economic, Quality, Environment Regulators, NGOs	
Financing Fixed Assets	Public	Public	Public	Public	Public	Public	Private	Private	Private	Private/Common
Working Capital	Public	Public	Public (Revenues)	Public (Revenues)	Public (Revenues)	Private	Private	Private	Private	Private/Common
Operations & Maintenance	Public	Public	Public	Private	Private	Private	Private	Private	Private	Private/Common
Managerial Authority	Public	Public	Public	Public	Private	Private	Private	Private	Private	Private/Common
Bearer of Commercial Risk	Public	Public	Public	Public	Public	Private	Private	Private	Private	Private
Basis of Private Compensation	n.a.	n.a.	n.a.	Fixed Fees	Incentive Contract	Incentive Contract	Incentive Contract	Incentive Contract	Incentive Contract	Incentive Contract
Typical Duration	No limit	No limit	No limit	Less than 5 years	Less than 5 years	Less than 15 years	Less than 30 years	Between 25 and 30 years	No limit	No limit

- Investments in pipeline networks offer distant and risky paybacks but immediate and wide-ranging benefits. With societal gains exceeding private returns, private investments do not reach the social optimum, unless subsidized or at least motivated by publicly enforced, cost-sufficient pricing. The public's approval of a given funding method thereby may affect the locus of investment decisions and the status of the infrastructure.
- The scale of the sunk investments may make the resulting "natural monopoly" virtually non-contestable and invite abuse by the incumbent. However, exposing the incumbent to potential competition in part of its market may also prove futile. Even an efficient naturally monopolistic operator, offering water to urban centers as well as remote rural locations, will be unable to defend itself against focused entrants allowed to cherry-pick some unbundled service and undercut the incumbent's average price. Here, competitive entry

would be socially inefficient and monopolistic supply preferable as long as "as-if" competitive behavior could be enforced.

Regulatory options for dealing with these situations range from broadly decentralized control of private undertakings, subject to antitrust and price-regulation, to public asset ownership, ministerial guidance and budgetary control. Between these nodes, institutional formats differ in how they allocate ownership, funding obligations and operational and commercial responsibilities among public and private parties, and the type of regulatory, statutory or contractual rules used to hold management accountable. Table 2, summarizing the most recent EUREAU survey of EU Water Infrastructures,<sup>7</sup> shows that more than 60% of the European industry is presently managed under some form of direct public operational control; the rest relies to a larger degree on private risk-taking in operating public assets. Only 16% of the industry is currently owned and operated by private undertakings. The table also details

<sup>6</sup> Private property of surface water is typically limited to small quantities; only France and Spain recognize private property of ground water. However, tradable water rights exist in the UK.

<sup>7</sup> EUREAU: Water Management Systems in the EU Member States in 1996, Brussels 1997.

functional implications for the major institutional options.

Most European countries utilize a combination of these formats to deal with issues of operational efficiency and asset management, water pricing and funding, as well as broader stakeholder and regulatory concerns. On the one hand, privatization in England and Wales resulted in 10 integrated private corporations that follow central economic, quality and environmental regulation and guarantee most of the water supply; local authorities commonly have no role to play. On the other hand, Denmark affords the largest degree of regulatory decentralization and industry fragmentation. Around 2,900 private, non-profit cooperatives submit to a mix of public and private regulation and supply to as few as 185 consumers. Recent initiatives to consolidate the Danish industry, similar to those in the Netherlands and Switzerland,<sup>8</sup> will increase operational efficiency and discretion, but also the need for broader public industry regulation. In between these extremes, France and Germany both treat water supply as a largely municipal affair but differ in terms of regulatory "precautions". While French municipalities are not permitted to install their own private law corporations and must identify the most competitive independent private contractors, mandatory tendering is far less common in the German system that largely relies on semi-autonomous municipal enterprises and prices subject to cost-plus municipal standards or federal cartel monitoring. These distinct patterns of industrial organization may explain differences in tariffs and consumption levels, infrastructure conditions and financing requirements, and the willingness of domestic water service providers to expand their geographic and service base. In each case, current EU regulatory reforms, investment requirements and the need for politically acceptable water prices cause fundamentals to be reassessed.

### The Case of Germany

Europe's largest drinking water reserves, lowest leakage level, second lowest per capita consumption, and leadership in the development of ecological water technologies and integrated river-basin management are the main characteristics of the German water industry. For some, Germany offers "a modern model of public infrastructure provision" reflecting its "tradition of subsidiarity and municipal and associational self-government", that is "possibly the best counterpoint to the (domination) of large private enterprises as in the case of France or England and

Wales".<sup>9</sup> For others, the concomitant fragmentation of the sector causes inefficiencies in operations, resource allocation and investments that are sustained by a "new form of municipal feudalism" run by bureaucracies, associations and lobbies with no incentive to reduce costs or promote privatization to meet tighter budgets.<sup>10</sup> Both perspectives interpret identical data about the industry's structure, current performance and future challenges.

### Structure

The German federal government formulates national water legislation,<sup>11</sup> which is adopted by the Länder into regional laws to guide the supervision of local water resource associations and waste water treatment cooperatives. Although physically and administratively separated, water supply and waste water treatment are the responsibility of municipalities, which may delegate them to independent service providers. Nevertheless, municipalities always retain the obligation to supervise the treatment of sewage directly. (West) German water supply has been consolidated from about 15,000 undertakings that existed in 1969 to currently less than 7,000 companies. More than 35% of these are organized as part of the public administration with more or less budgetary independence (Eigen- und Regiebetriebe); another 30% are public sector entities incorporated as joint stock or limited liability companies (AGs or GmbHs) which own their facilities and have access to capital markets like any private commercial entity. An additional 15% of water supply is organized on the basis of performance and service contracts with a mix of private and public service providers. The remaining 20% of the water market is accounted for by supra-municipal cooperatives that operate their own facilities as a pool (so-called Zweck-, Wasser- und Bodenverbände). Given infrastructure costs and an expected shortage of high quality water sources, pooling and supra-regional supply are expected to become more prominent. With the exception of large,

<sup>8</sup> Since 1975, the number of Dutch water companies was cut from 111 to currently 22. Similar initiatives are to reduce the number of currently 3,000 water companies supplying 7 million inhabitants in Switzerland. See H.P. Klein: Welche Organisationsstruktur ist zukunftstauglich?, in: Kommunalmagazin 4/2000, pp.11-14.

<sup>9</sup> B. Barraque: Europäische Antwort auf John Briscoe's Bewertung der deutschen Wasserwirtschaft, in: gwf-Wasser/Abwasser 6/98, pp.360-366, here p. 360.

<sup>10</sup> J. Briscoe, op. cit.

<sup>11</sup> Key federal legislation includes the Gesetz zur Ordnung des Wasserhaushalts (WHG), the Abwasserabgabegesetz (AbwAG) as well as the Trinkwasserverordnung (TrinkwV).

cooperative waste water organizations covering the vast urban zones along the river Ruhr (the Ruhrverband) sewage treatment in West Germany is dealt with by municipal building departments (Stadtwerke). By comparison, the fifteen Wasser- und Abwasserbetriebe (WAB), which were in charge of waste water treatment in the former GDR, have since then been privatized and are being split up along the lines of the Western model to form limited liability service providers to municipalities.

### Performance and Challenges

Water supply companies determine water charges in conjunction with supervisory bodies to cover total costs. Prices set by public utilities, in accordance with the Kommunalabgabegesetz, cover water consumption, an appropriate return on own and outside funds, and a reserve to maintain the real value of assets. Water prices charged by utilities subject to private law are controlled by means of company law contracts and are subject to price monitoring by the Federal Cartel Office. Water prices for industrial users may be lower than for private households if lower delivery costs can be reflected in volume discounts or preferential time-of-use rates. Given the principle of cost-based pricing, the costs of water supply, varying with hydrological, topographical and demographic conditions, differ up to 1,200% within Germany. Furthermore, cost-based pricing and the need to balance budgets each year have traditionally pushed German utilities to demand the highest water charges within the EU; they have also allowed the utilities to raise capital on the open market to fuel investments. Conversely, waste water authorities depend solely on tight municipal funding, which is possibly one of the reasons why sewage treatment has been far less open to technological innovations, new products, methods and suppliers.

Currently, 98% of the West German population is connected to fresh water and 92.1% to public sewer treatment; in the eastern Länder, only 70% of the population is connected to sewers, which provide a generally lower level of waste water treatment. By the year 2000, the country had invested ECU 120 billion for clean water supply and the restoring and upgrading of sewage and treatment facilities. Eighty percent of this amount was split 50:50 between West and East German sewage projects. Given the level of investment required, and the limits to financing by further increases in water charges, observers expect the number of Build, Operate, Own, and Transfer (BOOT) schemes to increase significantly. German

contractors like Thyssen, RWE or E.ON, although experienced in these local "Betreibermodell" operations, already witnessed the entry of international competitors like Thames Water (now RWE), Anglian Water, Suez Lyonnaise des Eaux-Dumez (now Ondeo) and Compagnie Générale des Eaux (now Vivendi).<sup>12</sup> By August 2001, the German federal government reconfirmed its intention to liberalize the water supply sector irrespective of some unresolved concerns over assessing efficiencies, prices, and regulatory control. Critics pointed to the lack of suitable operational references to motivate and guide that step.

### France

Although private management of water services in France dates back to at least the early 18th century, increased urbanization and tightening budgetary constraints accelerated the process of privatization from the 1960s onward. By the end of 1999, the estimated share of the French population receiving drinking water and sewage services from private undertakings was 75% and 40% respectively.<sup>13</sup> To some, the French system provides a compelling model of delegated regulation, localized adaptation of a national approach to integrated water resource management and effective, market-led infrastructure provision. To others, decentralization has weakened economic and environmental regulation and diffused enforcement powers vis-à-vis the three major private water companies jointly "organizing competition" of 95% of the private water supply and sanitation services.<sup>14</sup> With water prices growing six times faster than the consumer price index between 1991 and 1996, and private companies charging up to 44 times the water price of comparable public service providers,<sup>15</sup> French consumer organizations and public authorities called for the introduction of a "water observatory" and strengthened regulatory control. In October 2001, a largely diluted legislative bill, proposing a shortening of concession contracts

<sup>12</sup> For instance, Eurawasser, a joint venture of Lyonnaise des Eaux and Thyssen won a 25-year concession to run Rostock waterworks requiring it to invest an estimated DM 450 million for reconstruction. In another case, a joint venture by Vivendi and RWE won operational control over Berliner Wasser Betriebe, which soon after began to stake its own global claim, among other things by winning a major concession for the privatization of the Budapest water infrastructure.

<sup>13</sup> This compares to a 30% private-sector share in French drinking water supply (per volume) in the mid 1950s. D. Haarmeyer: Privatizing Infrastructure: Options for Municipal Water Supply Systems, 1992, <http://www.rppi.org/ps151.html>

<sup>14</sup> Cour des Comptes: La gestion des services publics locaux d'eau et d'assainissement, Rapport Public Particulier, January 1997.

<sup>15</sup> "Profit Stream", in: The Economist, March 29, 1997, pp.70.

and an "haute conseil des services publics de l'eau", had its first reading in parliament. But with elections scheduled for June 2002, the initiative is expected to be of little short-term consequence. Hence, the precise nature and extent of institutional and regulatory reform remain far from clear.

### Structure

At present, the French National Water Acts of 1964 and 1992 continue to outline the country's water regulation. In addition, the decentralization laws of 1982 and 1983 limit the role of the State to water law enforcement (withdrawal and discharge authorizations) and the assurance of public health and safety and compliance with technical standards and budget and competition control. Beyond this, the state employs two principal redistribution mechanisms to achieve "user solidarity". At the national level, the National Fund for Rural Water Supply (FNDAE) levies taxes to subsidize water infrastructures in sparsely populated areas. At the level of each of the six large river basins, a self-financing Water Agency (Agences de l'Eau), linked to the Ministry of the Environment, implements policies decided by regional River Basin Committees and levies charges on water withdrawal and discharge to subsidize municipal investments in water resource management. The pollution tax is a flat fee and not levied on agricultural run-offs.

The actual provision of water services is governed by ca. 36,000 communes, which either manage operations themselves as local Regies or inter-municipal water associations, or contract out varying degrees of management responsibility to private operators. Close to 75% of water resources are privately managed as concessions given to local, mixed-capital companies (SEML), or to fully private operators. In either case, the length of the contract varies between 12 and 30 years, subject to the required investment volume. The municipalities own facilities, including the assets financed by the concessionaire as part of the arrangement. Water charges are fixed by the contract, subject to automatic adjustment rules and re-negotiation possibilities. Typically, French water prices are set as a flat rate plus a connection charge (potable water) based on fresh-water volume (sewage services), or the amount of industrial effluents that require above-average processing (industrial sewage).

### Performance and Challenges

Both the clean water and waste water markets are dominated by Vivendi which holds 43% and 22% of

the respective segments; the second and third positions are held by Suez (Ondeo) (22%/16%) and Saur (10%/4%). Recently, French franchise-bidding procedures have come under scrutiny. In some cases, mayors have been accused of charging private companies high "entry fees" to bolster municipal budgets and avoid raising taxes, while in turn allowing concessionaires to overcharge throughout the duration of the contract (usually beyond the mayor's electoral mandate). One controversy erupted in St. Etienne, where a court disallowed a 30-year deal between the commune and a consortium of Vivendi and Suez, which included payment of a FFr 1.13 billion entry fee and a 76% water price increase. These findings led to the passage of legislation in 1993 forbidding the transfer of money between the water service budget and the general commune budget. In other cases, it was found that incumbent companies had abused their dominant positions at contract renewal. Refusing to communicate wholesale prices to other companies bidding for parts of the concession, Suez, for instance, had effectively prevented competitive tendering and forced a renewal of the arrangements in 13 communes in 1997. Still, the verdict presented by the French Conseil de la Concurrence<sup>16</sup> in 1998 points to a lack of comparable data and reference and the danger that inevitable rule of reason judgements increase regulatory discretion and legal uncertainty. The resulting potential for legal challenge has been said to complicate contract negotiations and thereby slow the domestic expansion of French water companies. The recognition of the need for closer supervision and more effective competition comes at a time when France's compliance with stricter EU water norms calls for massive investments in clean water and sewage treatment facilities and inconspicuous tariff increases to fund them. As France seeks a tighter control over concession contracts it may offer a conceptual reference for assessing proposals to mutualize water assets in England and Wales; but, as will be argued below, there is little base for any operational comparison.

### England and Wales

The approach to water infrastructure management taken in England and Wales relies entirely on the privatization of assets, integrated river basin

<sup>16</sup> The contracts affected Ville-Moisson-sur-Orge, Les Ulis, Morsang-sur-Orge and Grigny and an "Intercommunal Syndicate" representing 7 communes. See *Décision no. 98-MC-04 du Conseil de la concurrence en date du 12 mai 1998, Annexe 94.*

management and centralized but shared industry regulation. The country's water experience has received reviews similar to those of other UK utility reforms. To some, Tory privatization policy had succeeded in reversing Labour's nationalization of utilities, and their use as providers of cross-subsidies and hidden taxes.<sup>17</sup> Regulators had followed governmental guidance in channeling entrepreneurial behavior and, through "light-touch" price-cap regulation, had mimicked market-incentives to reduce monitoring needs, boost productivity and infrastructure conditions, and broadly cut user tariffs.<sup>18</sup> To others, Labour's recent reforms merely added "bells and whistles" to a system in need of fundamental overhaul, if not retreat from privatization. In this view, UK utility privatization had been plagued by severe "design failures" resulting in inadequate industry structures and reduced market reference, regulatory inconsistencies and vague statutes that sheltered excessive regulatory discretion from legal challenge and agency supervision. Problems of anti-competitive and fraudulent abuse of price-cap regulation were unlikely to be overcome by extending data to boards or wider appellate review.<sup>19</sup> Clearly, these positions mark the opposite extremes in a long-standing debate on UK utility regulation.<sup>20</sup> The discussion has recently been rekindled by proposals to mutualize the ownership of water assets and thereby possibly trigger the most drastic reorganization of the water industry since its privatization in 1989.

### **Structure**

The passage of the 1989 Water Act by Parliament led to the privatization of 10 regional water and sewerage companies (WaSCs) to undertake integrated water-related activities within the catchment area of major rivers. In addition, 29 water-only companies (WoCs) were given statutory responsibility to supply nearly 20% of the total fresh water to areas not covered by "integrated river-basin management" (IRBM). The Act also provided that sector regulation was to be shared between the Drinking Water Inspectorate (water quality), the National River Authority (environmental standards), and the Office of Water Services (economics), but did

not detail their respective tasks, methods, or patterns of interaction. Like other utility regulators, the director general of OFWAT opted for price-cap regulation. He did so on the basis of initial price limits set by Ministers for a sector whose aggregated market value, established around privatization, reflected merely 10% of the replacement value of underlying assets. In addition, he was given a rather unique primary regulatory duty: "to secure that companies are (...) able (in particular by securing reasonable returns on their capital) to finance the proper carrying out of their functions".<sup>21</sup> Only subject to this, OFWAT was to concern itself with the interests of customers and ways to facilitate (rather than promote) competition. Clearly, the privatization of waterworks had been aimed at privatizing substantial and uncertain investment requirements. For nearly a decade, the sector's regulatory methods and processes, but most visibly its overall performance, reflected this need. All along, there also had been concerns for the balance of utility bills and capital returns and the broader sharing of benefits and costs.

### **Performance and Challenges**

By the year 2000, a total of £ 36 billion had been spent to tackle a sizable backlog of capital investments built up under public ownership to improve deteriorated infrastructure and environmental conditions in line with EU commitments. Compliance with drinking water standards was approaching 100%, and targets for first and secondary sewage treatment had largely been achieved. Financing had come primarily from increased water charges amounting to an average household bill of £ 245, that is 40% in real terms above the 1989 level. Non-household bills had trailed these prices unless preferential "large-user tariffs" had been negotiated. Companies' efficiency improvements, to the extent projected at periodic price-cap reviews, had contributed to sharing the burden. However, companies' "out-performance" of these agreed regulatory targets had generated exceptional returns on capital and dividends. Relative to the regulatory target rate of 7% p.a. real, the sector had earned an average annual return on regulatory assets of 11.5%.<sup>22</sup> Relative to a 3%-5% p.a. real dividend

<sup>17</sup> For an overview see D. Helm, T. Jenkinson: *Introducing Competition into Regulated Industries*, in: D. Helm, T. Jenkinson (eds.): *Competition in Regulated Industries*, Oxford 1998, Oxford University Press, pp. 1-22.

<sup>18</sup> See National Economic Research Associates: *Incentives & Commitment in RPI-X Regulation*, London 1998; F. Neto: *Water privatization & regulation in England & Wales*, in: *Natural Resource Forum*, Vol. 22, No.2, 1998, pp. 107-117.

<sup>19</sup> J. Kay: *The Future of UK Utility Regulation*, in: M.E. Beesley (ed.): *Regulating Utilities*, London 1996, IEA.

<sup>20</sup> For earlier but rather similar discussions see J.M. Keynes: *Liberalism and Industry*, in: J.M. Keynes: *Collected Writings*, Vol. XIX, 1927, pp. 644-646; I. Bussing: *Public Utility Regulation and the So-called Sliding Scale*, New York 1936, Columbia University Press.

<sup>21</sup> *Water Industry Act 1991*, restated in National Audit Office: *The Work of the Directors General*, 1996, p. 226.

growth anticipated in the 1989 privatization prospectus, the industry's average growth was around 14%.<sup>23</sup> Furthermore, as Plcs pass on only a portion of the dividends received from regulated operations, the real value transfer can only be presumed in view of the sector's level of cross-subsidies fueling diversification into unregulated operations or its high standard of executive pay.<sup>24</sup> Still, in February 2000, leaking pipes continued to cause environmental hazards and the loss of a considerable share of total distribution inputs.

Considering the above in its 1999 five-year price determination, OFWAT trimmed average charges to customers by 12.3%, as of April 2000, reducing annual household bills by £ 30. Relative to earlier announcements, the extent of the price cut had been reduced by 0.8% to account for increased capital expenditures following the intervention of the environmental minister. A large share of the industry's £ 15 billion investment program was to be financed by reduced operating expenditures. Unless companies outperformed the underlying efficiency targets, operating profits would be cut by £ 800-850 million. Anticipating regulatory change, share prices had already fallen by an average 30% during the period 1998-1999, causing the once attractive water sector to under-perform the FTSE All-Share Index by 55% and to trade at about 40% discount to its combined regulated asset base.

As a reaction, during 2001 nearly all of the 10 water and sewage companies in England and Wales were considering options for separating the running from the owning of their infrastructures.<sup>25</sup> Even though the previous regulator Sir Ian Byatt had rejected plans by Kelda, owner of Yorkshire Water, to sell its water assets to a customer-owned mutual company, his successor, Mr. Philip Fletcher, later cleared a fairly similar restructuring plan for Dwr Cymru and initially expressed his hope that this type of restructuring would not set a precedent.<sup>26</sup> Proponents of the

approach argue that selling assets to companies entirely funded by debt promises lower costs of capital in meeting the stringent investment targets and tough price limits set by OFWAT in 1999. But it also appears that once an increasing share of the sector is financed almost entirely by debt, the rest would have to follow, because at price reviews OFWAT would have to set allowable returns against the cost of debt rather than a blend of debt and more expensive equity. Facing a growing number of proposals for debt-financed buyouts, restructurings or acquisitions,<sup>27</sup> at year end, Mr. Fletcher appeared less committed to his previous position and informed that "it is not for the regulator to dictate the structure of the industry."<sup>28</sup> Meanwhile, OFWAT, troubled by the uncertain impact of changed financing on management incentives, is calling on the government to introduce its long overdue legislations to promote trading in abstraction licenses and competition among actual and potential operators. Are England and Wales abandoning their model of water privatization to move towards the French system of municipal asset ownership and competition among private operators? Would this constitute a victory or a failure of the private model? And, particularly given the French experience, what is the relevant performance reference that would help address fundamental governance concerns?

### **Comparing Performance**

EU regulatory reforms, increasing investment requirements and the need to present politically acceptable water prices cause market participants and national authorities to reconsider industry and regulatory structures and performance. But Europe's largest water systems do not offer a simple reference. To the extent that systems operating in Germany, France and England and Wales present some aspects of "best-practice", they do so only in highly idiosyncratic ways. Broadly different institutional contexts, diverse policy objectives and the lack of comparable data prevent any meaningful benchmarking and relegate the often-suggested competition among regulatory models to the realm of economic modeling. In fact, as outlined below, the absence of common standards to compare crucial performance indicators such as operating efficiency or pricing casts doubt on

<sup>22</sup> Based on OFWAT's out-turns for 1993/1997. 1998 and 1999 average returns were around 10.5% reflecting annual growth rates in operating profits of 5% and asset capital values of 10%.

<sup>23</sup> The 1996/1997 average real dividend growth for the industry was 15%; Thames Water and Yorkshire Water share repurchasing drove growth up to 22%.

<sup>24</sup> By 1995, the WaSCs had already written off an estimated £ 700 million in goodwill related to diversification. For a discussion of the self-administered pay raises and boardroom packages see S. Ogden: Corporate Governance in the Privatized Utilities, in: K. Keasey et al. (eds.): Corporate Governance, Oxford 1997, Oxford University Press, pp. 252-278.

<sup>25</sup> See R. Boscheck: Asset Mutualisation & Governance – the Case of Dwr Cymru, IMD Working Paper, Lausanne 2002.

<sup>26</sup> M2Press WIRE, 10/11/2000, at <http://www.presswire.net>.

<sup>27</sup> As, for example, in the cases of Portsmouth Water, AWG (owner of Anglian water) or Mid Kent Water.

<sup>28</sup> A. Taylor: Water Regulator to Allow Funding From Debt, in: Financial Times, November 28, 2001.

the viability of national regulatory and managerial supervision, let alone a given system's ability to provide a general model to be followed.

### Operating Efficiency

Assessing a water system's level of operating efficiency presupposes an understanding of technology choices, investment and employment levels, as well as optimal ranges of capacity utilization in line with maintenance, reinvestment and service standards. But these standards barely exist within, let alone across, European countries. For example, the slow consolidation process in the highly fragmented German water industry appears to follow some notion of minimum efficient scale of operation. But that understanding is neither clearly revealed to the public nor is it used to identify standards for unbundling activities or services. In addition, differences in topography and specific supply and demand characteristics are typically held to limit the value of benchmarking the operating performance of semi-autonomous, public operators. Private sector references are restricted to the quasi-public Gelsenwasser AG<sup>29</sup> or patchy inferences made from recent concession agreements. Furthermore, while annual performance audits, undertaken by WIBERA, a German subsidiary of PricewaterhouseCoopers, are not open to methodological scrutiny, assessments by the German cartel office are sporadic and largely case based. As a result, the level of data insulation is such that, in the absence of counterfactual evidence, interpreting performance amounts to a near-pointless citing of circumstantial data that discredits the "uninitiated" and quiets critique.

Along these lines, a recent World Bank review of the German water sector, admonishing excessive staffing levels, expensive investment choices, the absence of a discussion about the relative costs and benefits of high environmental standards and the therefore extremely low leakage rates, was easily pushed aside as largely "impressionistic", "ill-informed" and "grossly exaggerated".<sup>30</sup> Clearly, a more credible defense of the sector's relative performance would have referred to conditional but broadly generalizable standards of (among others) headcount per 1,000 connections, efficient piping material per application based on lifetime costs, or optimal leakage targets based on cost-benefit analyses (rather than the notion of "environmental duty"). But not even in France or England and Wales are these standards available.

France's tightly oligopolistic market structure and largely non-transparent bidding processes cause

observers to impute efficiencies based on consolidated global earnings rather than the operation of a given concession.<sup>31</sup> Meanwhile, OFWAT's new financial benchmarking model, Aquarius III, is set to project revenues, infrastructure and maintenance costs for all water and sewerage companies in England and Wales. But the regulator is also calling for legislative changes to directly market-test capital and operating expenditure as data inputs for its price-cap regulation. Unless OFWAT intends to use the bidding process to identify crucial performance and productivity criteria, one may ask on which basis competitive bids will actually be formulated. A list of technical and financial performance measures, recently recommended by the International Water Association (IWA),<sup>32</sup> may serve to create the necessary level playing-field – a fact, however, that could also limit its chance for pan-European adoption.

### Pricing

In theory, water prices should reflect costs in line with usage. In practice, pricing policies often address much broader concerns, including the financial sustainability of operations, economic and regional development objectives as well as the realization of some level of social equity. Hence, comparing water prices requires differences in costs, subsidies, profits, taxes and charges to be identified and traced to objective drivers and causes. Cost conditions alone will vary based on, first, the origin, quality and quantity of raw water and the responsibility for protection of source water; second, the state of the infrastructure and the resulting leakage rates; third, the cost of labor and procured materials; and fourth, the quality of water and the level of service (interruptions and pressures) provided. Financial charges to be considered depend on sources of finance and policy

<sup>29</sup> Founded by a consortium of local municipalities and industrial enterprises in the 19th century, Gelsenwasser AG is a joint stock company with 22% of its shares directly publicly owned by local municipalities and an additional 28% indirectly owned by public sector industries in the area.

<sup>30</sup> J. Briscoe, *op. cit.*, reporting for the World Bank, showed, among other things, that German water works employ 10 (rather than 7) employees for 1,000 connections; use high quality, lined vitrified clay sewerage pipes (rather than simply standard plastic pipes) and achieve leakage levels as low as 12.8%, (compared to 25% in France, for example). For a critique of the World Bank finding see U. Linden: Stellungnahme zur Veröffentlichung von J. Briscoe "Der Sektor Wasser & Abwasser in Deutschland", in: *gwf- Wasser/ Abwasser* 1/96, pp.41-42 (Dip.Ing. Udo Linden is Member of the Board of Gelsenwasser AG); see also B. Barraque, *op. cit.*

<sup>31</sup> See D. Haarmeyer, *op. cit.*

<sup>32</sup> A. Lambert, W. Hirner: *Losses from Water Supply Systems – Standard Terminology and Recommended Performance Measures, The Blue Pages*, IWA, October 2000, pp. 1-13.

**Table 3**  
**Water Charges**

Year	Drinking Water Prices DM/cu. meter		Average Annual Bill DM		Capita/ Household	Cost Recovery	Drinking Water Quality	Service Quality	Cost of Raw Water	
	Range	Average	Per Household	Per Capita						
Denmark	95	0.25 – 1.65	0.80	n.a.	55.00	n.a.	+	+	+	-
Germany	96	1.81 – 3.96	2.85	255.00	140.00	1.8	+	+	+	0
England & Wales	95	1.00 – 2.80	1.70	270.00	115.00	2.3	(0/+)	0	(0/-)	0
France	94	0.12 – 3.63	2.00	260.00	105.00	2.5	0	0	0	0
Italy	92	0.20 – 1.31	0.70	220.00	75.00	2.9	-	-	-	-
The Netherlands	95	0.80 – 2.55	2.70	340.00	135.00	2.5	+	+	+	0
Spain	92	0.01 – 2.50	0.40	n.a.	n.a.	n.a.	-	-	-	+

+, 0, - mean above average, average and below average, respectively.

Source: ecologic-Forschungsbericht für das Umweltbundesamt 29621427.

objectives (for example the level of cost recovery, renewal rates, depreciation methods). Finally, price quotes may reflect metered unit consumptions, some estimated average consumption per household, or various methods and reasons for tariff differentiation. Ultimately, in each case the community pays for maintaining the water infrastructure. Yet, given that the choice is when (now or in the future), how (user charges or taxes) and to whom (extent of cross-subsidization) to present the bill, national systems may not be easily compared.

In 2001, German water prices continue to be the highest in Europe both for drinking water and sewage disposal. National drinking water and sewage rates averaged DM 3.50/cu.meter and DM 4.80/cu.meter respectively. Since 1990, supply and disposal costs have risen by 60% and almost 80% respectively while the cost-of-living index rose by just under one quarter. The World Bank traces these prices to the alleged absence of any public discussion about the merits of very high environmental standards, and a presumed general lack of attention to economic efficiency and costs. The industry itself defends its charges as active demand management based on the full costing decreed by law, reflecting lower capacity utilization levels of high fixed cost operations relative to many comparable industries in other countries, the absence of subsidies, and broadly higher service levels.<sup>33</sup> Neither side furnishes a yardstick for comparison. Yet, any international benchmarking, for example with France and England and Wales, is also only of limited value.

Since 1991, the typical French household's water bill has increased by 87%, 6½ times faster than the

consumer price index. Similar to the German case, prices vary significantly although not subject to location but depending on whether suppliers are public or private. Yet, the fact that in 2001 private supplies were 16% to 44% more expensive than public ones may be interpreted in very different ways. It could be either due to collusive bidding practices driving up private companies' cost estimates, or reflect the concessionary's improved service levels, actual accounting for depreciation or inability to continue the politically motivated under-pricing of the previous public supplier. Reform initiatives, intended to create the needed national reference, are currently delayed in the French parliament.

Similarly, the evolution of water prices in England and Wales largely reflects the mechanics of price-cap regulation, the operators' informational advantages relative to regulators and the opportunity for third-party price reviews. Clearly, OFWAT's renewed interest in making appointments more contestable and setting up a new econometric benchmarking tool signals the regulator's need for better references – if only to deflect public criticism. Incidentally, Hall and Lobina compare the profit margins of the ten integrated water companies in England and Wales with international players. They find that profit margins

<sup>33</sup> With 80% fixed costs, U. Linden, *op. cit.*, traces differences in operating scale and costs to differences in (for example) US and German consumption levels of 300 vs.140 litres/day respectively. M. Schmitz, *op. cit.*, rejects the comparison with Dutch and Irish water prices, as these either do not include sewage charges or are largely paid out of taxes. B. Barraque, *op. cit.*, compares German and French water prices for equal size municipalities and reasons the resulting 15-20% premium of the former with reference to general living expenses, higher treatment costs due to higher pollution and higher population density. See also J.C.V. Pezzey, G.A. Mill: A review of tariffs for public water supply, Environmental Agency, UK 1998.

in the UK are typically three or even four times as great as the margins of private and public water companies in France, Spain, Sweden or Hungary. The profit margins of Vivendi's UK operations, averaging 36.9%, are far higher than in any other of the company's global endeavors. In fact, even though Vivendi only owns a few smaller water-supply-only companies in the UK, these operations accounted for nearly all its 1997 worldwide profits outside France.<sup>34</sup> And yet, by which standard is one to judge this suggestive use of data?

Hence, Table 3 may be viewed as providing a first cut at creating a more meaningful price/performance benchmark. Based on an extensive price review undertaken by ecologic on behalf of the German Ministry of the Environment,<sup>35</sup> it represents European drinking water charges in DM/cu.meter and the average annual bill in DM/year and provides a qualitative evaluation of a given country's level of cost recovery, drinking-water quality, general service quality and cost of raw water. The impression created very much seems to reflect the interest of the commissioning party: high price countries tend to have high cost recovery and better infrastructure and service quality. And yet, even though water prices were detailed and traced to the aforementioned cost drivers and policy variables, market information on charges and fees is not sufficiently precise to allow for direct comparison.<sup>36</sup> In addition, the qualitative assessment merely highlights the problems in accurately comparing water prices subject to diverse policy objectives and hence the need to place performance comparisons in the context of a broader policy debate.

### Creating the Needed Reference

In the absence of comparable performance data, assessing the effectiveness and efficiency of a given water supply system or even suggesting its emulation amounts to expressing an unfounded opinion about (e.g.) the presumed merits of price-cap regulation, the benefits of self-administration by associations, or the

efficacy of decentralized private concessions based on continuous bidding. Such difficulty in making credible and legitimate inferences however can only partly be explained by Europe's diversity in policy objectives and, presumably related, fundamentally different tariff structures and charging methods. Rather, the lack of central data collection and incompatible measurement practices shelter national systems from market testing, offer potential windfall gains across the broader regulatory community, and may therefore be self-sustaining.

Hence, searching for the best model of water resource management may actually require the creation of a neutral third-party reference, empowered to set up common statistical methods, collect and evaluate data, and provide a broader informational base to national political and regulatory decision-makers and interested parties. The structure may be modeled after the French National Water Data Network, intended to inform on France's approach to integrated water resource management, and may benefit from OFWAT's unparalleled modeling experience. Given that, at the time of writing this article, the precise structure of OFWAT's new statistical reference, *Aquarius III*, is yet to be determined, it may be advantageous to seek broad inputs from within and outside the EU in an effort to finally share that model. To the extent not yet imposed, statutory reporting requirements would need to ensure the availability and quality of data and could be partly motivated by feeding back anonymous benchmarking reports. However, to ultimately benefit from more decentralized regulatory control, it is of foremost importance to maintain institutional independence and neutrality and the broadest level of stakeholders' data access. Only then will European systems be able to tackle the three principal issues identified by the World Bank as typically contributing to the poor performance of water supply facilities: inadequate data on operation and maintenance, poor management of water supply facilities, and unclear patterns of political interference.<sup>37</sup> Only then will stakeholders have the base to discuss the costs and benefits, and therefore, the desirability of various policy objectives – from ensuring efficient supply, sustainable infrastructures, long-term efficient and equitable resource management, to broader social goals. And only then could these systems be potentially considered for emulation elsewhere.

<sup>34</sup> D. Hall, E. Lobina: Employment and profit margins in UK water companies: Implications for price regulation proposals. Public Services International Research Unit, November 1999.

<sup>35</sup> ecologic: Vergleich der Trinkwasserpreise im europäischen Rahmen, Forschungsbericht 29621427, 1998.

<sup>36</sup> For instance, ecologic points out that "(t)he analysis has shown that calculating water prices based on cubic meter alone may be misleading given rather different methods for estimating water consumption in various member countries. The method of comparing annual bills per capita has been shown to be superior and should be developed further."

<sup>37</sup> World Bank: Water Resource Management, Washington, D.C. 1993; see also World Bank: Water Allocation Mechanisms, Washington, D.C. 1997.