INFORMATIONEN ZUR UMWELTPOLITIK

International Comparison of Water Sectors

Comparison of Systems against a Background of European and Economic Policy

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Editorial Remark for the English Edition

The study „Internationaler Vergleich der Siedlungswasserwirtschaft“ („International Comparison of Water sectors“ was published in German in 2003 (Informationen zur Umweltpolitik, 5 volumes, no. 153/1 to 153/5).

Vol. 1: Länderstudie Österreich (Country study Austria) – no. 153/1, 156 p.

Vol. 2: Länderstudie England und Wales (Country study England and Wales) – no. 153/2, 106 p.

Vol. 3: Länderstudie Frankreich (Country study France) – no. 153/3, 113 p.

Vol. 4: Überblicksdarstellungen Deutschland und Niederlande (Overview Germany and the Netherlands) – no. 153/4, 68 p.

Vol. 5: Systemvergleich vor europapolitischem und ökonomischem Hintergrund (Comparison of Systems against a Background of European and Economic Policy) – no. 153/5, 127 p.

The comparison of systems in Vol. 5 is based on the detailed information in the country studies (Vol. 1 to 4). For the publication at hand, Vol. 5 was translated into English by **Ms. Sigrid Szabó**. The English translation is published as Vol. 6:

Vol. 6: Comparison of Systems against a Background of European and Economic Policy – English Edition – no. 153/6, 139 p.

As Vol. 1 to 4 have not been translated, the aim was to make the English translation readable as a self-contained volume. Therefore, in Vol. 6 the numbering of chapters, tables, figures and footnotes differs from the German edition (Vol. 5), while the references to chapters etc. in the country studies remain unchanged.

All volumes can be ordered free of charge, separately or jointly, under the addresses given on the facing page.

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List of Abbreviations

A	Austria
a	Year
AAEV	Allgemeine Abwasseremissionsverordnung (General Wastewater Emission Ordinance), A
AFNOR	Association Française de Normalisation (French Standards Association), F
AGHTM	Association Générale des Hygiénistes et Techniciens Municipaux (association of municipal sanitary engineers), F
AK	Arbeiterkammer (Chamber of Labour), A
AMF	Association des Maires de France (Association of French Mayors), F
ARC	Association des Responsables de Copropriétés (association of condominium managers), F
BMLFUW	Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasser-wirtschaft (Federal Ministry of Agriculture, Forestry, Environment and Water Management), A
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety), D
BOT	Build, Operate and Transfer (plant management model)
BRGM	Bureau de Recherches Géologiques et Minières (geological and mining research office), F
B-VG	Bundesverfassungsgesetz (Federal Constitution of Austria), A
CAMS	Catchment Abstraction Management Strategy, E&W
CC	Competition Commission, E&W
d	Day
CCSP	Commission Consultative de Services Publics (public service consulting commission), F
CEMAGREF	Centre National du Machinisme Agricole, du Génie Rural, des Eaux et Forêts (national centre for agricultural machinery, rural engineering, water and forests), F

CEO	Compagnie des Eaux et de l'Ozone, F
CEP	Compagnie des Eaux de Paris, F
CFSP	Compagnie Fermière des Services Publics, F
CGE	Compagnie Générale des Eaux—Vivendi, F
C.I.EAU	Centre d'Information sur l'Eau (water information centre), F
CIRSEE	Centre International de Recherche sur l'Eau et l'Environnement (International Research Center on Water and the Environment), F
CMESE	Compagnie Méditerranéenne des Eaux du Sud Est, F
CNCV	Confédération Nationale du Cadre de Vie (national association for the living environment), F
CSC	Customer Service Committee, E&W
CSTB	Centre Scientifique et Technique du Bâtiment (Scientific and Technical Centre for Building Technology), F
D	Germany
DDAF	Direction Départementale de l'Agriculture et de la Forêt (departmental agriculture and forest office), F
DDASS	Direction Départementale de l'Action Sanitaire et Sociale (departmental health and social services office), F
DDE	Direction Départementale de l'Equipement (departmental infrastructure office), F
DGCCRF	Direction Générale de la Concurrence, de la Consommation et de la Répression de Fraudes (Directorate-General for Competition, Consumption and the Repression of Fraud), F
DGS	Direction Générale de la Santé (Health Directorate-General), F
DIREN	Directions Régionales de l'Environnement (regional environmental boards), F
DWD	Drinking Water Directive
DWI	Drinking Water Inspectorate, E&W
DWS	Drinking water supply
EA	Environment Agency, E&W
EDF	Electricité de France, F

ENGREF	École Nationale du Génie Rural, des Eaux et des Forêts (National Institute for Forestry, Agricultural and Environmental Engineering), F
EPCI	Etablissements Publics de Coopération Intercommunale (public bodies for co-operation between municipalities), F
EVN	Energie-Versorgung Niederösterreich AG, A
E&W	England and Wales
F	France
FAG	Finanzausgleichsgesetz (Equalisation Grant Act), A
FNCCR	Fédération Nationale des Collectivités Concédantes et Régies (National Federation of Concessionary Communities and Networks), F
FNDAE	Fonds National pour le Développement des Adductions d'Eau (national fund for the development of water catchment management), F
GDP	Gross domestic product
GQA	General quality assessment, E&W
GREF	Génie Rural, des Eaux et des Forêts (forestry, agricultural and environmental engineering), F
GSwV	Grundwasserschwellenwert-Verordnung (Ordinance on Groundwater Limit Values), A
HSC	Household service connection
HH	Household
I	Inhabitant/s
IFEN	Institut Français de l'Environnement (French Institute for the Environment), F
INSEE	Institut National de la Statistique et des Etudes Economiques (National Institute for Statistics and Economic Studies), F
KSchG	Konsumentenschutzgesetz (Consumer Protection Act), A
l	Litre
LAWA	Länderarbeitsgemeinschaft Wasser (working group of the German Länder on water problems), D
MATE	Ministère de l'Aménagement du Territoire et de l'Environnement (today: Ministère de l'Ecologie et du Développement Durable, Ministry of Ecology and Sustainable Development), F

MEA	Modern equivalent asset valuation, E&W
MISE	Mission Interservice de l'Eau (government policy implementation bodies at département level), F
n.av.	Not available
NAW	National Assembly for Wales, E&W
NIA	National income account
NL	Netherlands
NRA	National Rivers Authority, E&W
NWC	National Water Council, E&W
OFWAT	Office of Water Services, E&W
ONCC	OFWAT National Customer Council, E&W
ÖPUL	Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft (Austrian agri-environmental programme), A
ÖVGW	Österreichische Vereinigung für das Gas- und Wasserfach (Austrian Gas and Water Association), A
ÖWAV	Österreichischer Wasser- und Abfallwirtschaftverband (Austrian Water and Waste Management Association), A
PCV	Prescribed concentration or value, E&W
p.e.	Pollution equivalent
PMPOA	Programme de maîtrise des pollutions agricoles (programme for agricultural waste control), F
PMU	Pari Mutuel Urbain, F
pop.e.	Population equivalent
POS	Plan d'occupation des sols (local master-plan), F
PPP	Public-private partnership
PPPG	Policy and practice for the protection of groundwater, E&W
PSP	Private sector participation
RCV	Regulatory capital value, E&W
RMI	Revenu minimal d'insertion (minimum subsistence income), F

RNDE	Réseau National des Données sur l'Eau (French Water Data Network), F
RPI	Retail price index, E&W
RV	Rateable value, E&W
RWAs	Regional Water Authorities, E&W
RWE	Rheinisch-Westfälische Elektrizitätswerks AG, D
SAGE	Schéma d'Aménagement et de Gestion des Eaux (Water Development and Management Scheme), F
SAGEP	Société Anonyme de Gestion des Eaux de Paris, F
SATESE	Service d'Assistance Technique aux Exploitants de Stations d'Epuration (technical assistance for purification plant operators), F
SAUR	Société d'Aménagement Urbain et Rural, F
SCEES	Service Central des Enquêtes et Etudes Statistiques (Central Office of Statistical Surveys and Studies), F
SDAGE	Schéma Directeur d'Aménagement et de Gestion des Eaux (Water Development and Management Master-plan), F
SDAU	Schéma Directeur d'Aménagement et d'Urbanisme (Management and Urban Planning Master-plan), F
SDEI	Société de Distribution des Eaux Intercommunales, F
SEERC	Société d'Equipement et d'Entretien des Réseaux Communaux, F
SEREP	Société d'Etudes et de Réalisations pour l'Environnement et le Procédé, F
SEREPI	Société d'Exploitation des Réseaux d'Eau Potable Intercommunaux, F
SERIEE	Système Européen de Rassemblement des Informations Economiques sur l'Environnement (European System for the Collection of Economic Information on the Environment), F
SEVESC	Société des Eaux de Versailles et de Saint Cloud, F
SFDE	Société Française de Distribution d'Eau, F
SGDE	Société Guyanaise des Eaux, F
SI	Statutory instrument, E&W
SILCEN	Syndicat Intercommunal des Cantons de Levens, Contes, l'Escarène et Nice (inter-municipal co-operation project for water production and distribution), F

SLE	Société Lyonnaise des Eaux et de l'Eclairage, today: Suez-Lyonnaise des Eaux, F
SPDE	Syndicat Professionnel des Distributeurs d'Eau (association of water distributors), F
SPE	Société Parisienne des Eaux, F
SPZ	Source protection zone, E&W
SRU	Solidarité et Renouvellement Urbain (Solidarity and Urban Renewal Law), F
STP	Sewage treatment plant
SUDS	Sustainable drainage system, E&W
TrinkwV	Trinkwasserverordnung (Drinking Water Ordinance), D
TWV	Trinkwasserverordnung (Drinking Water Ordinance), A
UBA	Umweltbundesamt (Federal Environmental Agency), D, *or* Umweltbundesamt (Federal Environment Agency), A
UDI	Unité de distribution (distribution unit), F
UFC	Union Fédérale des Consommateurs (Federal Union of Consumers), F
UFG	Umweltförderungsgesetz (Environmental Assistance Act), A
VNF	Voies Navigables de France (French waterway authority), F
VwGH	Verwaltungsgerichtshof (Supreme Administrative Court), A
WFD	Water Framework Directive
WGEV	Wassergüte-Erhebungsverordnung (Ordinance on Water Quality Assessment), A
WHG	Wasserhaushaltsgesetz (Water Resources Management Act), D
WRG	Wasserrechtsgesetz (Water Act), A
WSC	Water supply company

1. Introduction

1.1 Background and objectives

Water is truly on everybody's lips—as a cool refreshment and, increasingly, as an object of intense discussions as well.

There are voices that accuse Austria's water sector of being less than efficient and in sore need of reform. The European and worldwide discussions regarding infrastructure privatisation and/or liberalisation have extended from energy and telecommunications to embrace the Austrian water management sector as well. Critics of municipal water management allege that public enterprises are unwilling to innovate, have little understanding of true cost structures or flexibility; these critics view extensive privatisation as a prerequisite of economic efficiency. The political discussion strongly reflects the interests and ideologies of the different actors of the water sector as well as international and European developments.

Those opposing the outsourcing of the water sector from organisational or ownership structures under public law argue that private enterprises are mainly striving for profit. Privatisation could result in higher regulatory and quality objectives being short-changed if they are not expressly embodied in law. Due to biased information provided by enterprises and insufficient capacities on the part of authorities, monitoring bodies, too, could be overtaxed by the task of safeguarding quality standards. Moreover, the efficiency boosts predicted to result from privatisation have not in all cases materialised, it is argued.

Drinking water as an essential, basic element of human nutrition is a good whose very highest quality and reliability of supply must be guaranteed, without compromises, for the future. A survey has shown that practically the entire Austrian population opposes the privatisation of water supply (Market Institut, 2001). Directly linked to water resource protection, wastewater disposal, too, is a key issue of environmental policy that requires efficient monitoring of the services rendered by providers.

The often highly emotionalised debate concerning the organisational structure best suited for water supply or wastewater disposal can contribute positively towards the identification of solutions only if it is supported by reliable information material, data and empirically verifiable correlations. As a rule, existing studies, compilations of information and data only cover sub-areas or aspects of the water sector (Rudolph et al., 1999). The Austrian situation is not dealt with at all in many European comparative studies (cf. e.g. Kraemer et al., 1998; Correia and Kraemer, 1997; Holzwarth and Kraemer, 2001).

For this reason, it is the objective of the present study to underpin the current discussion concerning Austria's water sector regime with a scientifically and empirically sound status-

quo analysis of the Austrian as well as of selected foreign systems, based on a comparative approach; in this, the focus is on the current situation, but also—where this is possible—on developments over the last 20 years. For this purpose, the highly divergent systems of water sectors and in particular the most pervasive organisational and corporate structures in Austria, France and England and Wales are juxtaposed, with complementary material from the Netherlands and Germany added.

In this, the study addresses the following questions: what are the real achievements of the different water sector systems? What are their strong and weak points? What are the links between legal framework, corporate structures and company size? How are costs, quality and corporate structures reflected in consumer prices? How do organisational structures, the enforcement of environmental provisions and customer satisfaction interact?

All this is to combat the Europe-wide dearth of information and data and hence to help create a better basis for the ongoing discussions. An in-depth system analysis is to permit conclusions and suggestions for action regarding the status quo and the development perspectives of the water sector in Austria.

1.2 Definition of thematic areas

In order to compare the structures of water supply and wastewater disposal in place in Austria, France and England and Wales as well as, to a degree, in Germany and the Netherlands, the following thematic areas are covered in the present work:

- Module 1 (M1): Natural and urban-geographic frame conditions;
- Module 2 (M2): Legal and regulatory frame conditions;
- Module 3 (M3): Spatial-technical organisation of the water sector;
- Module 4 (M4): Corporate and operating structures of the water sector;
- Module 5 (M5): Cost structures and financing of the water sector;
- Module 6 (M6): Tariffs and pricing for end consumers;
- Module 7 (M7): Quality criteria;
- Module 8 (M8): Interests of consumers and workers;
- Module 9 (M9): Ecological criteria.

Since the project draws on international experiences in order to further develop the water sector in Austria and hence to assess the situation above all from an Austrian perspective, the Austrian case study was assigned a bigger role than those describing France and England and Wales. Germany and the Netherlands were dealt with in a more concise overview.

The scope of the present study comprises the whole sector of water supply and wastewater disposal for household customers (also called “tariff customers”). Special contract

customers or industrial or agricultural self-suppliers could not be discussed in greater detail within the context of this study.

1.3 Methodology and approach

The present comparative study is based on case studies addressing the situation of the water sectors in the countries under review; the studies were carried out within the framework of this project. While the project contractors (IFIP and Ecologic) developed the case studies for Austria, Germany and the Netherlands on their own, local co-operation partners were commissioned with preparing the case studies for England and Wales and France (in English) (cf. Vol. 1, Chapter 1.6). In order to compile a comprehensive stock of data and information, relevant literature and Web pages were evaluated in depth and complemented by personalised phone-calls and interviews with key actors of the water management sector.

For the case studies of the individual countries, the project team—in consultation with the clients and co-operation partners charged with preparing the case studies—laid down a uniform structure for the various modules and defined the characteristics required for this publication. The co-operation partners accordingly developed their contributions to the country studies. The case studies for England and Wales and France were originally written in English, then translated into German and, where necessary, complemented, rearranged and abridged.

Where the scope of the different characteristics permitted this, horizontal thematic comparisons were drawn (Chapter 4, Synthesis), with due attention to the method employed to compare the various data. The information and data were thus juxtaposed qualitatively and, as far as possible, quantitatively. In addition to Austrian and international experiences, this evaluation also takes account of political and legislative developments at the European level. Due to the divergent data stock and reference values employed in the different countries, any direct comparison of data between countries often proves very difficult. The relevant key reservations are listed in Chapter 1.4; the case studies for the individual countries and the comparative Chapters equally call attention to the evident limits to data comparability.

Starting from this comparative evaluation of the experiences made in various European countries, the conclusions summarise the lessons learnt from the results to benefit the discussion and further development of the water sector in Austria. Special attention is drawn to contexts of relevance for the review and development of reform strategies.

With respect to the country studies covering Austria, France, England and Wales, the distribution of tasks between the partners IFIP and Ecologic was not along national, but along thematic boundaries (modules). With respect to the overview case studies, IFIP and IWAG were responsible for the Netherlands, while Ecologic covered Germany; the background analysis for the section dealing with European legislation and politics was

handled by Ecologic; the economic section, by IFIP. The conclusions and options for action were jointly developed.

1.4 Reservations

Since it proved impossible within the scope of the present study to collect primary data, the data were culled from publicly accessible statistical sources and other sources available to the project contractors or partners.

The present study and any interpretation of its results should be viewed against the backdrop of the following reservations:

- In many areas of analysis, there is a marked lack of primary data (especially economic data and data relating to quality). The available data are rarely standardised: in one and the same country, but even more so on an international scale, one is often confronted with different terminologies, calculation methods and, generally, with a very heterogeneous data structure, so that all interpretations of a comparison imply a high degree of uncertainty.
- Even if the information relating to cost structures were complete and comparable, it would still be possible only to a limited degree to infer the efficiency of different national systems from different cost levels, since the frame conditions, too, are highly divergent. There is little knowledge of the (quantitative) influence of settlement structures, hydrological resources, topography and other frame conditions on the water sector costs. In this connection, the benchmarking approach—which permits comparing the specific costs of plants or processes with similar frame conditions and identifying specific efficiency deficits—appears to be promising, albeit hardly practicable for comparing entire national systems.
- With respect to cost transparency in the water sector, there exists a marked backlog in all countries examined, above all in France and Austria. A relatively clear understanding of the real costs and cost structures is a basic prerequisite for the implementation of the polluter-pays principle embodied in the Water Framework Directive.
- A comparison of drinking water quality as “it emerges from the taps” was not possible in the present study, due to a lack of quality-related information. It is expected that the new Drinking Water Directive, which introduced the obligation to report on drinking water quality, will improve the data stock and enable future systematic comparisons on a European scale, also including the service quality in drinking water supply.
- Due to the volume of material covered and because of the restricted time and funds at disposal, the compilers were forced to limit themselves above all to secondary literature; where contradictions arose or data comparability seemed

unlikely, they were not always able to investigate at the level of primary or meta data in order to clarify or eliminate divergences.

- The national case studies and modules were edited by different collaborators, most of whom originate from the respective countries (see Chapter 1.6).

1.5 Structure

The study is composed of six volumes. The first three volumes are the country case studies for Austria (Vol. 1), England and Wales (Vol. 2) and France (Vol. 3). Volume 4 comprises the two overview studies addressing Germany (Vol. 4 part 1) and the Netherlands (Vol. 4 part 2).

Volume 6 at hand is the English translation of Volume 5, “Comparison of Systems against a Background of European and Economic Policy”. It presents the political and legislative frame conditions and the economic specifics of the water sectors in Europe. Against this background, a systematic comparison of the national case studies is offered in the form of a synthetic report that mirrors the structure of the case studies. On the basis of this systematic comparison, the conclusions then summarise the key results of the analysis and highlight perspectives for action.

1.6 Project team

The project team was composed of the contractors IFIP (1) and Ecologic (2) as well as of external co-operation partners (3). Additional consultants were involved to deal with specific questions.

The persons responsible for project implementation included:

1. On behalf of the Institute of Public Finance and Infrastructure Policy (IFIP), Vienna University of Technology, Austria (M3, M4, M5, M8):
    - The Head of the Institute, Univ.-Prof. Mag. Dr. Wilfried Schönbäck
    - Dipl.-Ing. Gerlinde Oppolzer
2. On behalf of Ecologic, Institute for International and European Environmental Policy, Germany (M1, M2, M6, M7, M9):
    - Dipl.-Ing. R. Andreas Kraemer
    - Dipl.-Ing. Wenke Hansen
    - Nadine Herbke
    - Dr. Peter Beyer, Attorney
3. External co-operation partners:

3.1 For the Austrian case study (Vol. 1):

- M3: O. Univ. Prof. Dipl.-Ing. Dr. Helmut Kroiss, Univ. Ass. Dipl.-Ing. Dr. Brigitte Nikolavcic, Institute of Water Quality and Waste Management (IWAG), Vienna University of Technology, Austria

3.2 For the English case study (Vol. 2):

- M2, M6, M7, M8, M9: David Hall, Emanuele Lobina, Public Services International Research Unit (PSIRU), UK
- M3: Univ. Ass. Dipl.-Ing. Dr. Brigitte Nikolavcic, Institute of Water Quality and Waste Management (IWAG), Vienna University of Technology, Austria
- M4, M5: Peter Bailey, Centre for the Studies of Regulated Industries (CRI), Bath Management School, UK

3.3 For the French case study (Vol. 3):

- M2, M6, M7, M8: Prof. Dr. Bernard Barraqué, Laboratoire Techniques, Territoires et Sociétés (LATTS), Ecole Nationale des Ponts et Chaussées (ENPC), France
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- M4: Emmanuelle Brunet, Laboratoire GEA, Ecole Nationale du Génie Rural, des Eaux et des Forêts (ENGREF), France
- M5: Régis Morvan, French Institute for the Environment (IFEN), France
- M6: Lætitia Guérin-Schneider, Laboratoire GEA, Ecole Nationale du Génie Rural, des Eaux et des Forêts (ENGREF), France
- M9: Dr. Sophie Cambon-Grau, Laboratoire Techniques, Territoires et Sociétés (LATTS), Ecole Nationale des Ponts et Chaussées (ENPC), France

1.7 Explanation of terminology employed

Since various terms are used in different senses in different countries, a number of key terms are defined as follows:

"**Tariff systems**" stands for pricing and/or charging systems.

"**Charge**" is used synonymously with "wastewater charge" and stands for the amount (bill) charged for wastewater disposal.

"**Price**" is used synonymously with "water price" and stands for the amount charged for drinking water supply.

In using these terms, no distinction is made of whether the wastewater charge or water price is set under municipal, public or private law.

"**Water sector**" is used synonymously with "water industry", "water supply and wastewater disposal" or "urban water management" (German: "Siedlungswasserwirtschaft"). The term "water industry" derives from the English terminology.

One "**pollution equivalent**" (1 p.e.)[1] means the organic biodegradable load having a five-day biochemical oxygen demand (BOD_5) of 60g of oxygen per day (Article 2 para. 6 of the Urban Waste Water Treatment Directive). In fact, the daily pollution quantities calculated per inhabitant vary according to the population's living standard. One pollution equivalent roughly represents the quantity and harmfulness of the wastewater caused by one person per day (Schulte, 1996).

One "**population equivalent**" (1 pop.e.) indicates the pollution of commercial and industrial wastewater compared to domestic wastewater (DIN 4045).

[1] "Einwohnerwert" (EW) in German.

2. Political and legislative frame conditions of water sectors in Europe—Current developments

2.1 Competition, services of public interest and public procurement

W. Hansen, R. A. Kraemer (Ecologic)

In the past 10 to 15 years, the European Commission has advanced the liberalisation and privatisation of the telecommunications, gas and electricity sectors; thus a significant part of the energy and gas markets was liberalised as a consequence of the Energy Directive[2]. With respect to the water market, too, the various possibilities of privatisation or liberalisation have been under—very intense—discussion at a European level for quite some time.

The champions of liberalisation mostly justify their position by extolling the expected efficiency increases, while their opponents continue to regard water supply as a service of general interest to be best discharged by the state. The latter group fears that the privatisation or liberalisation of the water sector might negatively impact water quality, supply reliability and health protection, while doubting the likelihood and extent of efficiency increases.

The discussion hinges on the competition issue. In Europe, the specifics of water supply have established it, being one of the traditional services of general interest, as a municipal responsibility. Thus competition, inasmuch as it exists, centres on the supply market, as opposed to in-the-market competition to win over end consumers. In addition, there exists a number of secondary markets concerning upstream activities and service provision as well as construction and engineering services for water supply. Moreover, the local authorities of some Member States (e.g. Austria and Germany) are free to meet their tasks of water supply and wastewater disposal through municipal or private enterprises of varying legal or organisational structures. For example, they may join forces in functional associations, delegate specific tasks to third parties or sell part of their assets (system competition).

In privatising and liberalising the telecommunications, electricity and gas markets, the European Commission inter alia made use of competition law. An analogous application of these regulations to drinking water supply would lead to exclusive concession, market-

[2] Cf. COM(2000) 580 final.

sharing or price maintenance contracts, laying down exclusive rights of water supply for water suppliers, to fall within the scope of application of the competition provisions, in particular of Art. 81 para. 1 and Art. 82 of the EC Treaty.

However, a number of recent judgments handed down by the European Court of Justice (ECJ) have strengthened the role of services of general interest, in particular in the fields of electricity and waste management, vis-à-vis free competition[3]. It seems particularly interesting in this respect that the ECJ has adopted a slightly more generous attitude in determining whether or not the application of competition rules legally or actually prevents public undertakings from discharging their tasks. According to the ECJ, any assessment should also take account of environmental concerns and recognise the economic practice of public undertakings[4] to offset less profitable sectors against more profitable ones[5]. Moreover, the state may, for reasons of environmental and health protection, require to have certain tasks handled by public bodies providing services of general interest[6].

While European competition law may therefore be applicable to national water supply in various areas, it is, however, conceivable that the necessity of providing services of general interest will limit its scope of application.

In addition to competition rules, great importance in safeguarding competition in the field of contract awarding is assigned to European contract award legislation. The European Commission has created a comprehensive legal framework for public procurement. The EU-wide organisation of tenders and the awarding of public contracts (for delivery, service provision, public works and public works concessions) is laid down in European provisions and rules in all cases where certain economic ceilings are exceeded (Directive 97/52/EC concerning the coordination of procedures for the award of public service contracts, public supply contracts and public works contracts, respectively). Special rules apply to certain grid-bound sectors and hence also to water supply (Directive 98/4/EC coordinating the procurement procedures of entities operating in the water, energy, transport and telecommunication sectors—"Public Procurement Directive"). The Transparency Directive aims at separate accounting practices of undertakings that enjoy special or exclusive rights or are charged with services of general interest for which they receive state aid (Directive 2000/52/EC amending Directive 80/723/EEC on the transparency of financial relations between Member States and public undertakings—"Transparency Directive").

In all, a conclusive statement regarding future developments is difficult to make. Liberalisation is an ongoing process that will not leave the water market untouched. At the moment, it is possible only to a limited degree to predict the future development of competition in the water supply sector. Thus several Directorates-General of the European

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3 Cf. ECJ C-393/92, Almelo, I, 1508; C-159/94, Commission v. French Republic, I-5815; C-158/94, Commission v. Italian Republic, I-5789; C-157/94, Commission v. Kingdom of the Netherlands, I-5699.

4 Cf. ECJ C-393/92, Almelo, I-1508, para. 49.

5 Cf. ECJ C-320/91, Paul Corbeau, I-2533, para. 18.

6 Cf. ECJ C-360/96, BFI-Holding, I-6821, para. 52.

Commission are currently evaluating the possible application of European competition legislation to the water market (DG Competition) as well as the extended application and transparency of public procurement in the water sector (DG Internal Market). At the international level, too, e.g. at the GATS (General Agreements on Trade and Services) negotiations, the possible exemption of water-related services from international competition rules is being discussed. Although the preamble of the Water Framework Directive, on an initiative of the European Parliament, clearly classifies water supply as a service of general interest (see below), the initiatives of the European Commission in the field of competition law must not be neglected when contemplating the further development of the European legal framework for water sectors. In this, it should be borne in mind that the European Commission is entitled, through the Council, to adopt legal acts pertaining to competition law on its own, i.e. without participation of the European Parliament and without (formal) participation of the Member States (Art. 86 para. 3 of the EC Treaty).

2.2 Water Framework Directive

Since the coming into force of the Water Framework Directive (2000/60/EC, WFD)[7] on 22 December 2000, the European Union disposes of the first uniform regulatory framework for water protection. The WFD is to be transposed into national legislation not later than three years after its coming into force (i.e. by 22 December 2003). The deadline for the first management plan and the first programme of measures is 2009.

2.2.1 Objective of the Water Framework Directive

It is the objective of the Directive to protect and/or improve the status of surface water bodies, including transitional and coastal waters (2015: good ecological status of all surface water bodies). In this, river basins are to serve as operative units, for which comprehensive data are to be collected and management plans are to be drawn up. The transparency necessary for implementation is to be created by involving the general public already in the development of the management plans and by stipulating an obligation to report (communication of the management plan).

2.2.2 Water supply is a service of general interest

In its recital No. 15, the Water Framework Directive classifies water supply as a service of general interest:

[7] "Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy"; OJ L 327 of 22 December 2000, p. 1-72.

"The supply of water is a service of general interest as defined in the Commission communication on services of general interest in Europe".

The 1996 Commission communication on services of general interest in Europe referred to in the WFD does not contain any substantial statements regarding water supply, but deals exclusively with the sectors of telecommunication, postal services, transport, electricity as well as radio and television; water supply is explicitly exempted from the application of the European competition rules[8].

Between the adoption of the Water Framework Directive in September 2000 and its coming into force after publication in October 2000, the new communication of the Commission on services of general interest in Europe was adopted on 20 September 2000[9], replacing the old version of 1996. The new communication does not explicitly mention water supply; in particular, it does not exempt water supply from the application of the EC competition rules while, however, implicitly referring more strongly than in the 1996 version to the extended application of European competition and internal market legislation to hitherto not yet deregulated sectors.

It is still unclear to what degree the reference made in the Water Framework Directive to the 1996 document will influence the frame conditions of water supply. On the one hand, the reference to the classification of water supply as one of the "other general interest services"[10] (as mentioned above) gives added political strength to the competences assigned to the Member States. On the other hand, categorising water supply as coming under the principles of Community regulations of services of general interest might also entail a strengthening of the internal market, as has already been the case in other areas. This would at the same time restrict national and sub-national, regional or municipal competences and practically reflect on the ownership structures of water supply as well.

2.2.3 Cost recovery

According to Art. 5 of the Water Framework Directive (WFD), the Member States are to undertake inter alia an economic analysis of water use in each river basin unit within a period of four years (i.e. until the end of 2004 at the latest). The analyses are to be regularly reviewed and, if necessary, updated. In keeping with Art. 9 para. 1 of the WFD, the Member States, in calculating water use prices and charges, shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to this analysis and in accordance with the polluter-pays principle.

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8 *"Making sure that everyone is provided with other general interest services, such as health, welfare, education, water and housing, is a matter of national or regional responsibility. [...]"* OJ C 281 of 26 September 1996, p. 12 left, No. 69.

9 COM(2000) 580 final.

10 *"Making sure that everyone is provided with other general interest services, such as health, welfare, education, water and housing, is a matter of national or regional responsibility. [...]"* OJ C 281 of 26 September 1996, p. 12 left, No. 69.

According to Art. 9 para. 1 of the WFD, the different forms of water use—disaggregated at least into industry, households and agriculture—are to make an *"adequate contribution to the recovery of the costs of water services"* by 2010; in this, the Member States are given ample leeway to take account of social, ecological and economic effects as well as geographic and climatic conditions.

The principle of the recovery of costs is expressed concretely in the communication of the Commission "Pricing Policies for Enhancing the Sustainability of Water Resources"[11].

2.2.4 Combined approach

In defining water protection measures, the Water Framework Directive provides for a **combination of emission standard approach and water quality objective approach** in order to attain the set goals efficiently and in a targeted manner.

In keeping with the **emission standard approach**, uniform requirements based on technical standards are laid down for discharges, irrespective of the condition of the receiving body of water.

In case of exclusive application of the **water quality objective approach**, protective measures—such as the improvement of wastewater purification processes of a treatment plant—are decreed solely on the basis of the condition of the receiving body of water. Thus the quality objectives for the body of water serve as a basis for determining the requirements to be met by discharges (BMLFUW, 1999a).

2.3 Drinking Water Directive

The new Drinking Water Directive 98/83/EC of the EU (DWD)[12] came into force on 25 December 1998, thus replacing the old Drinking Water Directive 80/778/EEC[13]. The legal and administrative provisions for implementation were to be enacted by the Member States within a period of two years after coming into force of the new Directive (by 25 December 2000). The Drinking Water Directive 98/83/EC defines water intended for human consumption as water, either in its original state or after treatment, intended for drinking, cooking, food preparation or other domestic purposes, regardless of its origin and whether it is supplied from a distribution network, from a tanker, or in bottles or containers, as well as water used in food-production undertakings. The Drinking Water Directive does not apply to natural mineral waters (these come under Directive 80/777/EEC) nor to water defined as a medicinal product according to Directive 65/65/EEC. Moreover, water from an

[11] COM(2000) 477 final.

[12] "Council Directive 98/83/EC of 3 November 1998 relating to the quality of water intended for human consumption", OJ L 330 of 5 December 1998, p. 32.

[13] "Council Directive 80/778/EEC of 30 June 1980 on the quality of water intended for human consumption ".

individual supply serving fewer than 50 persons or providing less than 10 m^3 per day (private wells) is exempted from this Directive.

In keeping with Art. 5 of the DWD, water, in order to be whole and clean, shall comply with the minimum requirements laid down in the Annexes (microbiological and chemical parameters) and must be free of any micro-organisms and parasites and from any substances which, in numbers and concentrations, constitute a danger to human health. The Directive stipulates compliance with the parametric values laid down in Art. 5 in the following passages (Art. 6 para. 1 of the DWD):

> *"a) in the case of water supplied from a distribution network, at the point, within premises or an establishment, at which it emerges from the taps that are normally used for human consumption;*
>
> *b) in the case of water supplied from a tanker, at the point at which it emerges from the tanker;*
>
> *c) in the case of water put into bottles or containers intended for sale, at the point at which the water is put into the bottles or containers;*
>
> *d) in the case of water used in a food-production undertaking, at the point where the water is used in the undertaking."*

It is a special feature of the new Drinking Water Directive that drinking water quality now must be monitored "at the point at which it emerges within premises or an establishment" (cf. a) above).

The Member States may permit derogations from the set parametric values, provided these do not constitute a potential danger to human health. Derogations shall not exceed three years.

According to Art. 13 of the DWD, the Member States shall adequately inform consumers regarding drinking water quality by publishing a report every three years[14]. Each report shall include, as a minimum, all individual supplies of water exceeding 1,000 m^3 a day as an average or serving more than 5,000 persons.

In addition to the report, the Member States are also obligated to submit a report to the Commission to document the measures they have taken or intend to take in order to meet their responsibilities according to Art. 6 of the DWD[15] and Annex I Part B Note 10 of the DWD[16].

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[14] The report shall cover three calendar years (the first report covering the years from 2002 to 2004) and be published within one calendar year of the end of the reporting period.

[15] These responsibilities stipulate that measures shall be taken in case of non-compliance with the parametric values.

[16] The Member States are to strive for lower values than those set out in Annex I Part B of the DWD with respect to the chemical parameters without compromising disinfection.

2.4 Urban Waste Water Treatment Directive

The Urban Waste Water Treatment Directive (91/271/EEC)[17] adopted in May 1991 regulates the collection, treatment and discharge of urban wastewater and the treatment and discharge of wastewater from certain industrial sectors (food industry). The requirements and time limits for the collection and treatment of urban wastewater are categorised depending on the size of the "agglomerations" (in the spirit of the Directive) in which the wastewater is produced. Moreover, they vary depending on the bodies of water into which the wastewater is discharged.

Principally, Directive 91/271/EEC stipulates that agglomerations > 2,000 inhabitants shall dispose of a collecting system in compliance with the Directive and with secondary treatment, i.e. biological treatment of the collected wastewater with special requirements concerning the parameters BOD_5, COD and suspended solids[18].

As it is assumed that domestic wastewater of big cities is the main agent polluting bodies of water, the Directive stipulates that agglomerations > 15,000 inhabitants update their wastewater treatment systems by 31 December 2000, while smaller settlements are granted another five years for this task.

2.4.1 Sensitive areas

According to Art. 5 of Directive 91/271/EEC, bodies of water that might become eutrophic (or bodies of water corresponding to one of the criteria of Annex II A) shall be identified as "sensitive areas" by 31 December 1993 at the latest.

For the wastewater of larger agglomerations that discharge directly or indirectly into "sensitive areas", more stringent wastewater purification standards and shorter time limits for the development of sewer systems and treatment plants apply. Thus agglomerations with a wastewater load in excess of 10,000 pollution equivalents (p.e.) in "sensitive areas" were to dispose of a sewer system and more sophisticated wastewater treatment already by 31 December 1998 (cf. Art. 5 of Directive 91/271/EEC). This means that the nutrients nitrogen and phosphorus must be removed in the treatment plants. In smaller agglomerations (2,000 to 10,000 p.e.), collection and secondary treatment of wastewater will be sufficient (even in "sensitive areas") as per 31 December 2005.

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[17] "Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment", OJ L 135 of 30 May 1991, p. 40; amended by "Commission Directive 98/15/EC of 27 February 1998", OJ L 67 of 7 March 1998, p. 29.

[18] Cf. Annex I Table 1 of the Urban Waste Water Treatment Directive 91/271/EEC.

2.4.2 Less sensitive areas

In justified exceptional cases, when “secondary treatment” demonstrably does not entail any improvement of the ecological status of a body of water, “less sensitive areas” may be identified, for which only mechanical wastewater treatment is required (Art. 6 in combination with Annex II of Directive 91/271/EEC).

2.4.3 Sludge disposal

Sludge disposal is regulated only very vaguely by the Urban Waste Water Treatment Directive; it *“shall be re-used wherever appropriate”,* and its disposal shall be subject to “general rules or registration”. Moreover, a ban on the dumping and disposal of sludge into surface waters as per the end of 1998 is stipulated as well (Art. 14 of Directive 91/271/EEC).

2.5 Summary

The European framework of rules and regulations concerning the water sector is characterised by a great number of environmental Water Directives, which were given a comprehensive umbrella in the form of the new Water Framework Directive. Moreover, European competition law, too, should be taken account of in connection with services of general interest and internal market regulations; in this, however, it is so far unclear whether and to what degree competition law will actually be applied to water supply and/or wastewater disposal.

3. Economic specifics of the water sector

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It is the objective of this theoretical chapter to describe the key **specifics of "water" as a good and of the water sector** as distinct from other goods and economic sectors. Moreover, the theoretical reasons for the expected market failure in case of a purely market economy-oriented water sector and the resulting **justifications given for state interventions** are presented. Analogously, the theoretical reasons for the expected state failure in case of a public water sector and possible precautions to prevent this, in particular outsourcing and partial privatisation ("public-private partnerships"), are described as well. Finally, this chapter deals with the opportunities of, and the limits to, liberalisation in the field of the water sector.

3.1 Water—A public good and/or a customary merchandise?

According to the definition in the European Water Framework Directive, water is not a "customary merchandise but an inherited good, to be protected, defended and treated with care." [Water Framework Directive 2000/60/EC, (1)].

Obviously, the characterisation of water as an "inherited" good is not to define it as an object under succession law, since this good is hardly ever transferred as such from testator to heir (as an "inheritance"); what is passed on, as a rule, are merely the rights to dispose of it (in particular rights of ownership or use of a source). However, sources share this characteristic with a great number of other goods.

At the most, the only "inherited" aspect to be taken into consideration when discussing water as a good might lie in the fact that it constitutes a natural resource that has always existed, albeit in varying physical conditions and varying degrees of suitability for use. The availability of the resource "water" is contingent on its cyclical re-formation and recovery following relatively protracted (i.e. extending over months and years, even over centuries and millennia) physical-chemical processes. Given favourable hydrological prerequisites and natural conditions of water abstraction, the natural processes of the water cycle will safeguard that the natural water resources are practically identical to the good "water" directly available to the consumer or producer. However, this type of availability typical of e.g. traditional water abstraction from a simple house well or from springs is characteristic only of a comparatively low share of water abstraction as a whole. Modern society with its typical settlement structures and lifestyles is dominated by methods of water abstraction and distribution that require sophisticated technologies. This presupposes the existence of complex organisational structures with clearly defined ownership rights and other rights of

disposal concerning both water sector assets and water as a good, which rights obviously differ from country to country. While natural water resources after their recovery in groundwater sediment layers or surface waters do constitute the natural "input" for making this good available (from the viewpoint of both technology and the laws governing ownership and use), they are not in any way "inherited" or bequeathed to an heir or heirs. Rather, water is acquired, i.e. purchased or received for use, from the owner of a source or water-bearing property by an agent authorised to dispose of a water supply installation, for the purpose of being fed into that installation, in the context of an economic transaction under the laws governing ownership and use[19]. Thus the expression "inherited" could be replaced by the following, more exact wording: "a good temporarily drawn upon, which largely re-forms by natural means and is essential for the survival of present and future generations". Moreover, this definition shifts the emphasis from the past to the future of this good, a fact of importance for its sustainable use.

Water definitely is "a [...] **good to be protected** [...]", especially due to a specific characteristic that distinguishes it from practically all other produced goods, i.e. the high degree to which it is subject to impairments of its quality (its vulnerability to qualitative impairment) in the context of the natural processes of its re-formation and recovery, which processes can be controlled, either not at all or only with great difficulty, under the laws governing ownership and use. This vulnerability of water to qualitative impairment is mostly a vulnerability to adverse external effects resulting from the production or consumption of other goods as well as from recreational and leisure activities (water pollution). The qualitative vulnerability of water constitutes a serious risk for human health and the ecological balance and forces the state to provide for special protection measures for the different phases of the more or less natural re-formation and recovery of water and its distribution to consumers.

Moreover, being practically the only irreplaceable nutritional element, water is "a [...] good to be protected [...]" due to a characteristic it partly shares with other goods, i.e. its openness to terrorist attacks involving high risk for human life, exacerbated by a special trait of water—its **non-substitutability**.

As a result of the three characteristics mentioned ("a good temporarily drawn upon, which largely re-forms by natural means and is essential for the survival of present and future generations", "vulnerability to qualitative impairment through human activities taking the form of adverse external effects of production, consumption and other activities" and "openness to terrorist attacks"), the Water Framework Directive 2000/60/EC infers that water must be "treated with care". However, this cannot be unequivocally derived from the characteristics mentioned above, since there exist several "basic regulatory options" (i.e. public or private regional monopolies with different regulatory regimes) and, within these, numerous alternative instruments, to bring about water sector structures that maximise welfare.

[19] Note: The right to abstract water is tied to the right to dispose of the respective property only in some countries, e.g. in Austria.

Do these three characteristics permit, or even impose, the inference that water is "**not a customary merchandise**"? This is undoubtedly true. But what about a positive definition going beyond the mere statement that water is a special good?

Is water a "**public good**", and if so, what precisely does this mean? According to standard texts on public finance[20], a "**pure public good**" is defined, firstly, by prohibitively high costs resulting from the exclusion, and/or by the non-excludability, of users unwilling to pay for this good from its consumption and, secondly, by the absence of any form of competition ("rivalry") of users in the consumption of this good ("non-rivalry between users"). Consequently, water is not a pure public good.

In addition to pure public goods, two types of goods featuring one characteristic of a pure public good (or, possibly, only partial presence of the same) may be distinguished: a "**club good**" (also called "toll good") is defined by the fact that there exists the technical and organisational possibility to limit access by users unwilling to pay by means of levying a fee (with or without cost recovery) without rivalry of users ensuing; in this case, it is immaterial whether any compensation for use of this good is levied, and how high this compensation is. Conversely, a "collective good" is defined by its necessarily public accessibility (i.e. the impossibility of applying the exclusion principle) and the existence of rivalry between users. In this sense, water is definitely no collective good as defined above. Furthermore, water can be viewed as a club good only where it is available in abundance, i.e. there exists no rivalry between users.

All three types of goods distinguished above were defined by applying one of the two following characteristics or both of them: non-excludability of users unwilling (or unable) to pay and non-rivalry between users. Thus a description of the character of water as a purely or partly public good could solely be derived for the hardly relevant case where it is available without rivalry between users. In all other instances, water must be regarded as a non-public good on the basis of the above definition criteria.

If, however, ownership of the means employed to abstract and distribute water is used as a criterion for definition, water provided through water sector installations owned by municipal or other public bodies must in fact be viewed as a "public good". Yet the direction of causality must be observed when determining the specific character of the good: it is viewed as a public good because it is provided by a publicly owned undertaking. What is lacking here is a justification of why water is provided by a publicly owned undertaking. To obtain this justification, what is called for is an analysis, not merely of the properties of the good per se, but of the properties of the installations for its *abstraction* or *distribution*.

[20] Cf. e.g. Rosen, Windisch, 1992, p. 127 ff; Atkinson, Stiglitz, 1980, p. 482 ff.

3.2 Organisational structures accompanying network-based natural monopolies

3.2.1 Natural monopoly in case of a privately owned distribution network *without* state regulation

Network-based supply and disposal systems may be characterised by a cost structure that inevitably entails the development of a monopoly ("natural monopoly"). There may be two reasons for this: on the one hand, the high fixed costs resulting from the installation and maintenance of, in particular, network-based facilities, combined with low marginal costs for the rendering of operating services, lead to the long-run marginal costs being lower than the long-run average costs. By increasing the capacity for service provision and the service volume, the cost advantage vis-à-vis potential other (smaller) providers can be continuously incremented, thus crowding, or even keeping, these competitors out of the market.

On the other hand, capital input that cannot be re-earned if a provider is crowded out of the market by competitors ("sunk costs") leads to a fight for the market "at any cost" in order to prevent crowding-out. It may be possible that such a price war entailing a whittling-down of prices down to the level of short-run marginal costs can be conducted with some success because the newcomer is unable to reduce the price of the (same) good offered by it to this low level without compromising its survival. This asymmetry in pricing conditions is above all marked wherever substantial initial investments, made by the established provider at an earlier date, are called for. In this price war, the former monopolist must be willing to accept a temporary loss which, however, will enable it to keep new players away and maintain its own long-term presence in the market ("non-contestable market").

If both conditions apply simultaneously, the simple opening-up of the market will most definitely not be sufficient to enable new players to develop an alternative stock of fixed assets.

If the monopolist strives for profit maximisation, it will set a price that generates a demand entailing a marginal revenue as high as the price itself. This price level is above the marginal cost level and therefore inefficient, as any price level above the marginal cost level implies that the marginal willingness to pay for additional performance units exceeds the costs incurred in generating these performance units (Pareto inefficiency). As a result, welfare maximisation is not achieved. Moreover, the price asked of consumers demanding services is above the marginal cost price, which is tantamount to "consumer exploitation".

A shortage of supply and hence a partial "prevention of consumption" on the one hand (by setting a price entailing a demand where the marginal costs of the last generated performance unit are lower than the price itself) and "consumer exploitation" on the other hand (i.e. prices above the marginal cost level) are the consequences of a private monopoly without state regulation.

3.2.2 Natural monopoly in case of a privately or publicly owned distribution network *with* state intervention for the purpose of enhancing welfare

The minimisation of welfare resulting from the existence of a natural private monopoly may be fought by the state by means of two alternative political strategies; i.e. either by means of state regulation of the private monopoly or by means of socialisation (nationalisation, communisation) of the private monopoly.

3.2.2.1 Natural monopoly in case of a privately owned distribution network *with state regulation*

Principally, it is possible to distinguish between three types of state regulation of monopolies:

1. **Regulation of prices** with the objective of bringing the price level closer (at least) to the level of the average costs or (at most) to the level of the marginal costs: in this approach, the state regulator lowers the price to a level that at least attains the average costs, thus reducing the difference between price and marginal costs. This does not entail a need for state subsidies. Alternatively, the regulator may lower the price to the level of the marginal costs (which are lower than the average costs). This necessarily generates an operating loss that must be covered by a subsidy, if the monopolist is not to close down. However, the raising of the tax money required for this purpose reduces net welfare, which is why this approach of marked price reduction is often waived. Price regulation tactics making use of average and/or marginal costs presuppose extensive information, which in reality is often unavailable (due to its asymmetric distribution).
2. **Regulation through rate of return**: if information about cost functions is limited or even lacking, the regulator will be forced to focus on other variables to measure its regulatory effects, in particular on the rate of return to capital by the monopolist.
3. **Regulation through quality**: in this case, the state regulator safeguards compliance with quality standards in service provision by means of information, prohibitions, mandatory requirements, checks and, if necessary, penalties. Service contracts are duly based on comprehensive specification catalogues.
4. **Other regulatory approaches**: in particular, these include the stimulation of competition for the market with subsequent awarding of a contract, for a limited period, to the best or lowest bidder (franchising, cf. the French model of “délégation”).

Due to incomplete and, in particular, unevenly distributed information, regulation is a difficult task whose success is not automatically guaranteed by the formal implementation of regulatory measures. The success of regulation may be impaired on the one hand if the

monopolist manages to take over the regulator. On the other hand, a highly proactive regulation approach may decrease the rate of return to capital to a degree where the monopolist will no longer be interested in keeping up its service range. If monopolies are regulated with different intensity in different countries, it must be expected that high-profit monopolies in one country, disposing of high investment financing potentials, will take over monopolies—in particular belonging to the same industry—in economically weaker (lower-profit) countries.

3.2.2.2 Natural monopoly in case of a publicly owned distribution network and a water management policy aimed at maximising welfare

Instead of state regulation of private monopolies, there exists the alternative of socialised (nationalised, communised) natural monopolies. Here, public legal entities act as the owners of the monopolistic undertakings.

The following section describes characteristic traits and maxims for action of players in politically-administratively dominated monopolies. Depending on the players and political frame conditions, these may be more or less highly developed:

- The management of the undertaking functions as an agent of the public legal entity (i.e. the principal) while other, in particular “politicised”, relations between them exist; the asymmetry of information between principal and agent tends to be marked.
- By exercising ownership rights in politically-administratively dominated monopolies, political objectives of the owner may be furthered, e.g. environmental policy, employment policy, but also party-political attempts to exert influence.
- The objective of profit maximisation is replaced by the objective of economic and political stability while maintaining preset quality requirements.
- Strong worker representation (high degree of staff organisation) is coupled with a management more strongly limited in its economic decisions than is the case in private monopolies.
- The consideration paid in tariff setting by the owner to the needs of monopoly customers is of political relevance.

Depending on the concrete situation, the following effects of these maxims for action on service provision must be expected to occur to a greater or smaller degree:

- The potential monopoly income is partly transformed into protected working conditions, high social benefits and politically desired and/or popular elements of service provision.
- There is a need for subsidisation. Recourse to the state budget encourages the dependence of service production on political decision-makers.

- Components of services provision that are not directly relevant for success (e.g. basic research) are rendered possible.
- With a high overall tax quota, service provision seems to be stable, the transfer volume is large.

3.2.3 Possibilities of, and limits to, liberalisation in the field of water supply and wastewater disposal in Austria (brief overview of statements)

1. There exist a number of market access barriers for potential applicants for the provision of water services in a given supply area:
    - Extant line networks with captive customers (compulsory connection) are predominant.
    - Purely or predominantly private providers of water supply services find little acceptance amongst Austrian consumers.
2. For reasons of water protection and the requirements of sustainable resource management, competition in drinking water abstraction is highly restricted.
3. For economic and technical reasons, competition in wastewater purification is highly restricted.
4. Drinking water and wastewater conduits remain a natural monopoly: firstly, technical progress in water transport does not entail substantial process innovations (contrary to telecommunications). Secondly, the development of several parallel networks is as a rule uneconomical. This leaves the natural monopoly largely uncontested.
5. The awarding of third-party access rights would be limited (as opposed to the situation for electricity, gas and telecommunications) to local or small regional areas and hence would hardly contribute to cost-cutting.
6. The right to levy charges is likely to remain with the local authorities, or price regulation—in case of a private monopoly—will become a regional competence (depending on the municipality and/or region).
7. The exit of current providers from the market is highly restricted, as the sale, rental and leasing of existing municipal facilities to private operators may be legally admissible but often hardly advisable from the political angle.

4. Synthesis

4.1 Methodology

The present synthesis juxtaposes the national systems examined and interprets them comparatively, both within the nine study areas and in the form of a synopsis of the different modules.

For this purpose and in keeping with the modular structure of the country studies, comparative tables were established to highlight individual characteristics. In addition, the explanatory texts emphasise significant differences between the national characteristics and draw attention to their (possibly limited) comparability. Depending on the scope of the individual characteristics, comparisons may be carried out at the cardinal ("*twice as high as"*), at the ordinal (*"more strongly developed than"*) or merely at the qualitative level.

Comparative tables on the ordinal scale

A direct comparison between countries, which also permits statements on the cardinal scale (e.g. *"by 20% higher than")*, is possible for those characteristics

- which can be described quantitatively;
- which can be measured on a cardinal scale; and
- where an adequate amount of sufficiently reliable national data is available for the different countries examined.

In particular, the data have to meet the following criteria, which were defined before initiating data research and have been respected by the project partners as far as possible:

- All currencies were converted into € and deflationed to 2001 in keeping with the national consumer price index, thus permitting an interpretation of the development over time in real economic values. Where possible, currency data directly referring to the technical infrastructure (pipelines, other installations) were deflationed by the national construction price index.
- All national data relating to the same characteristic were referred to the same technical units (e.g. pollution equivalents, % of nitrogen elimination).
- If no national data were available, individual samples were extrapolated, inasmuch as they could be considered representative, to the national level.

Moreover, further adjustments were called for in developing the comparative tables:

Often national data are only available for different years. To ensure comparability,

- differences not exceeding one year were neglected (as the values are assumed to be largely the same);
- in case of differences of several years, an interpolation was carried out to determine the value in the basis year (e.g. 1996 is taken as the mean value between 1993 and 1999), where the data situation permitted this and no important reasons precluded this approach;
- wherever no plausible interpolation seemed possible, the different annual data were accepted without modification while drawing attention to their limited comparability in the text.

Occasionally, the data stock in one and the same national case study proved contradictory due to different statistical sources. Wherever the differences were larger than negligible, the synthesis either states the margin of difference or continues to show and interpret the different results in parallel.

If certain data were available only in the form of individual samples that cannot be regarded as representative for the entire country (e.g. length of pipelines per inhabitant in the capital), these values were included in the synthesis while, however, drawing attention to the fact that these are individual samples of limited comparability.

Examples of quantitative comparative tables are e.g. Table 4-1: Geography and settlement structures (M1) or Table 4-4: Inhabitants connected to the public water supply system (M3).

Qualitative comparative tables

More than half of all characteristics examined cannot be described quantitatively. In particular, Module 2 (legal frame conditions), Module 8 (consumers' and workers' interests) and Module 9 (ecological criteria) mostly use qualitative descriptions and evaluations.

For these characteristics, too, a number of comparative tables were established. Depending on the concrete case, these are

- purely qualitative comparisons

  Example: Table 4-46: Overview of institutions representing workers' interests in connection with the water sectors in the countries compared (M8)

or, additionally,

- evaluations on the ordinal scale (slightly / moderately / strongly developed), thus permitting a comparison of countries of the "higher than / lower than" type.

  Example: Table 4-25: Current developments in corporate structures: A comparative evaluation (M4)

4.2 Synthesis of natural and urban-geographic frame conditions (Module 1)

W. Hansen, N. Herbke (Ecologic)

4.2.1 Geography and settlement structures

The following table contains a number of important data of the individual countries with respect to their geography and settlement structures (cf. Chapters 1.1.1, 2.1.1 and 3.1.1 of the country reports).

Table 4-1: Geography and settlement structures (M1)

Category		Unit	Austria	France	England & Wales
Territory		km^2	83,858	543,965	151,191 (UK: 241,752)
Number of inhabitants		million	8.11	60.7 (2001)	51.4
Population density		I/km^2	97	112 (2001)	340 (UK: 240)
Basis year			*2001*[(a)]	*1999*[(b)]	*1998*[(c)]
Inhabitants in agglomerations < 5,000		%	46	31	8
Inhabitants in agglomerations 5,000 – 100,000		%	25	24	52
Inhabitants in cities > 100,000		%	29	45	40
Basis year			*2000*[(d)]		*2000*[(e)]
Area use	Forest	km^2 (%)	36,059 (43)	179,508 (33)	13,414 (9)
	Farmland, grassland, private and market gardens	km^2 (%)	28,512 (34)	337,258 (62)	107,464 (71)
	Mountains (Alps in Austria)	km^2 (%)	9,224 (11)	n.av.	n.av.
	Bodies of water and wetlands	km^2 (%)	1,426 (1,7)	5,440 (1.0)	890 (0.6)
	Developed land / other areas	km^2 (%)	~9,224 (11)	n.av.	31,977[(f)] (21)
Annual mean precipitation over 30 years (1961-1990)		mm	1,170	800[(g)]	895

(a) Source: Statistics Austria, 2001b.

(b) Data refer to 58,519 million inhabitants in the basis year 1999; source: INSEE, 1999.

(c) Source: UBA, 1998.

(d) Source: Statistics Austria, 2001b: 37.

(e) Source: DEFRA, 2001: Table 8.1.

(f) Urban areas.

(g) Average value; source: Barraqué et al., 1997.

Table 4-1 (cont.)

Category	Unit	Austria	France	England & Wales
River basin areas according to Water Framework Directive (size, length)	km^2, river kilometre(h)	River areas(i) Danube (80,566 km^2, 350 km) Rhine (2,365 km^2, ~23 km) Elbe and Lainsitz (920 km^2, 15 km)	River areas(j) Adour-Garonne (115,000 km^2, 120,000 km) Artois-Picardy (19,600 km^2, n.av.) Loire-Brittany (155,000 km^2, 135,000 km) Rhine-Meuse (31,500 km^2, 7,100 km) Rhône-Mediterranean-Corsica (130,000 km^2, 84,000 km) Seine-Normandy (96,600 km^2, 66,000 km)	River areas(k) River Severn (n.av., 345 km)

(h) "River kilometre" in France refers to the entire length of all rivers in the river basin, in Austria and England and Wales only to the principal river

(i) Key river-courses: **Rhine**: Ill; **Danube**: Lech, Inn, Traun, Enns, March, Raab, Drau; **Elbe**: Lainsitz; kilometres stated do not equal river kilometres (Statistics Austria, 2001b: 34).

(j) Key river courses: **Adour-Garonne**: Garonne, Dordogne, Carente; **Artois-Picardy**: Sambre l'Escaut, Scarpe, Aa, Lys, Canche; **Loire-Brittany**: Loire, Sarthe, Indre, Cher; **Rhine-Meuse**: Maas, Moselle, Sarre, Nied; **Rhône-Mediterranean-Corsica**: Doubs, Saône, Rhône, Isère, Durance (plus smaller rivers on the island of Corsica); **Seine-Normandy**: Oise, Seine, Orne, Dive, Marne.

[(k) Comprehensive data were not available at the time of completion of the study; therefore only the longest river of England is named. Ed.]

There are marked differences in the territory size of the countries compared in the present study; e.g. France is about six times as big as Austria. Moreover, the present study analyses England and Wales, which cover approx. one third of the French national territory, as the only UK regions.

Population density varies strongly between Austria and France on the one hand and England and Wales on the other hand. While England and Wales is densely populated, with nearly 50% of the inhabitants living in agglomerations (> 100,000 inhabitants), nearly half of the population of Austria—which presents a generally low population density—inhabit rural regions (< 5,000 inhabitants). In France, urban and rural areas are more or less balanced, and population density is rather low, mirroring Austria.

With respect to **area use**, it is evident that Austria boasts the biggest share of forest land (50%), while the corresponding percentage is very low for England and Wales (slightly under 10%). In France and in England and Wales, a large part of the territory (62 and 70%) is used for agriculture. The share of bodies of water and wetlands is around 1% in all three countries. Being an Alpine country, 11% of Austria's territory is mountain land.

The Water Framework Directive (WFD) led to the definition of **river basin areas** throughout Europe. France boasts a long tradition of river basin management, which permits recourse

to existing institutions (e.g. Agences de l'Eau) in implementing the WFD. These bodies are still being developed in Austria and in England and Wales, which results in an incomplete data situation for the individual river areas.

4.2.2 Quantity of natural water resources

The following passage summarises the quantity of water resources (cf. Chapters 1.1.2, 2.1.2 and 3.1.2 of the individual country reports). The synthesis of the quality of groundwater and surface water resources was carried out in the context of the synthesis of ecological criteria (see M9, Chapter 4.10).

Table 4-2: Quantity of natural water resources (M1)

Category	Unit	Austria	France	England & Wales
Water resources				
Total	million m^3/a	84,000	191,000	129,800
Surface water	million m^3/a	56,000	n.av.	120,000
	%	67		92
Groundwater	million m^3/a	28,000	n.av.	9,800
	%	33		8
Resources in relation to territory	million $m^3/a/km^2$	1.00	0.35	0.86

Overall, the analysis distinguishes between the total available water quantity (water resources) and the actually used water quantity (see Chapter 4.2.3). In Austria, the groundwater share in total water resources is roughly one third, while the corresponding value for England and Wales is only 8%. No data are available for France.

Due to the ample Alpine precipitation volume, Austria boasts the richest water resources in relation to its territory. In France, this share is markedly (by approx. 60%) lower, in England and Wales, slightly so (by approx. 15%).

4.2.3 Water use for water supply

On the one hand, water is abstracted for water supply by exploiting a variety of sources (groundwater, spring water and surface water); on the other hand, water is used by different user groups (households, industry, etc.) (cf. Chapters 1.1.3, 2.1.3 and 3.1.3 of the individual country reports). The key water use data are shown in Table 4-3.

Table 4-3: Water use for water supply (M1)

Category	Unit	Austria			France			England & Wales		
Water resources used	mill. m^3/a			3,529			38,500			19,764
	%			4			20			15
Basis year				*1997*[a]			*1995*[b]			*1999*[c]
Water abstraction										
Total	mill. m^3/a			3,529			38,500			19,764
Groundwater	mill. m^3/a			1,032[d]			5,900			2,504
	%			29			15			13
Surface water	mill. m^3/a			2,496			32,600			17,260
	%			71			85			87
Basis year				*1997*[e]			*1995*[f]			*1999*[g]
Water use		Ground water	Surface water	Σ	Ground water	Surface water	Σ	Ground water	Surface water	Σ
Total	mill. m^3/a	1,032	2,496	3,529	5,900	32,600	38,500	2,504	17,260	19,764
	%	29	71	100	15	85	100	13	87	100
Households incl. small enterprises	mill. m^3/a	599	5	604	4,200	1,800	6,000	1,877	4,281	6,158[1)]
	%	99	1	17	70	30	16	30	70	31
Industry (self-supply)	mill. m^3/a	383	923	1,286	1,000	3,000	4,000	391	1,590	1,981
	%	28	72	36	25	75	11	20	80	10
Electricity supply (cooling)	mill. m^3/a	3	1,568	1,571	0	24,000	24,000	19	9,659	9,678
	%	0.01	99.8	45	0	100	62	0.2	99.8	49
Agriculture (irrigation)	mill. m^3/a	68	-	68	675	3,825	4,500	219	1,727	1,946[2)]
	%	100	-	2	15	85	12	11	89	10

(a) Source: Statistics Austria, 2001a.

(b) Source: written communication, Bernard Barraqué, LATTS-ENPC, 06/2002.

(c) Source: DEFRA, 2002: Table 3.23a.

(d) Including spring water.

(e) Source: Statistics Austria, 2001a: 361.

(f) Source: written communication, Bernard Barraqué, LATTS-ENPC, 06/2002.

(g) Source: DEFRA, 2002: Table 3.23a.

Since water resources are extensive and population density is low, only a very small share of Austria's water resources (merely 4%) is used for water supply, while in France and in England and Wales, the water volume used for drinking water supply amounts to 20 and 15%, respectively, of the resources.

For the **overall water supply** in all three countries, a share between 70% (Austria) and 85% (France, England and Wales) of the water resources used is met by surface water.

The reason for this high share of surface water lies in the substantial water quantities used for cooling in electricity supply (almost entirely originating from surface water bodies).

Conversely, the water supply of **households** by means of surface water is only 1% in Austria, while the corresponding figure for France is 30%. England and Wales constitute an exception, as 70% of all household water supply is provided by surface water. This distribution of drinking water resources explains the stringent legal requirements and monitoring of groundwater resources in Austria as well as the comprehensive monitoring network of surface water bodies in England and Wales (see synthesis for M9, Chapter 4.10.7).

Industrial water supply (covered by the public network) in Austria equals roughly 36%; in France and in England and Wales, only approx. 10%, of all water use.

The share of the entire water quantity used that is employed for irrigation purposes in **agriculture** varies markedly from country to country. While this share is approx. 10% in France and in England and Wales, only 2% of the entire water quantity used in Austria is destined for irrigation. It should be borne in mind that this demand is covered almost completely by groundwater in Austria, contrary to France and England and Wales, where surface water is chiefly used for irrigation.

4.3 Synthesis of legal and regulatory frame conditions (Module 2)

P. Beyer, W. Hansen (Ecologic)

The following chapter analyses the key common points and differences between the legal and regulatory frame conditions of the water sectors in Austria, France, England and Wales as well as in the Federal Republic of Germany. Specific references to the individual statutory documents were waived in this volume; instead, the authors suggest consulting the individual national chapters (country reports, Chapters 1.2, 2.2 and 3.2).

4.3.1 Legislation and enforcement

In the field of legislation, the highly diverse government structures result in massive differences between the centralised systems England and Wales and France on the one hand and the federal states Austria and Germany on the other hand.

While in England and Wales as well as in France it is the national legislative bodies to regulate the water sectors and hence to decide on the basic concept per se, Austria and the Federal Republic of Germany divide the legislative competences for the water sectors between the Federal Republic and the federal provinces, or Länder. However, in Austria the competence for water law lies with the Federal Republic, which thus decides the key legal requirements; conversely, in Germany the regulatory competence for water management is a traditional task of the Länder. The Federal Republic may only promulgate a framework law (Water Resources Management Act), which is implemented in the water laws of the Länder. A comparison regarding the implementation of water sector concepts in France, in England and Wales and, to a certain degree, also in Austria shows that this entails greater autonomy of the federal government, while in Germany key decisions need at least to be taken together with the Länder. This division of legislative competences renders e.g. the implementation of European Directives and new concepts more complex; inter alia, the lack of federal competences in Germany led to the defeat of a draft for an environmental code that would also have comprised the water sector.

In Austria and Germany, water law is enforced by the federal provinces or Länder, with the main tasks of water supply and wastewater disposal as well as, in part, also of water body management being handled by local authorities, whose role in England and Wales is comparatively small. This is firstly due to the extensive privatisation of the water sector, but also, and even more so, to the general division of tasks between national state, regions and local authorities.

In France, it is the prefects of the départements who enforce water law or monitor their enforcement by the local authorities. Local and municipal authorities play an important role in the field of actual implementation and handling of water supply and wastewater disposal tasks.

4.3.2 Administrative structure

Due to their federal systems, Austria and Germany have established water authorities and public service providers at three levels (federal republic, Länder/federal provinces and municipalities). The federal echelons handle top-level tasks, while the provincial (Länder) authorities are in charge of enforcement and monitoring of lower-level authorities and public service providers, including those owned by municipalities. Duly, the administrative territories governing the water sector coincide with the geographic boundaries of the Länder and of the municipalities.

Conversely, in England and Wales the administrative units in charge of the water sector were formed to reflect the extension of the river basins. Originally, these were regional water authorities; the supply areas of today's privatised water companies largely cover the river basins. As a result of privatisation, stronger surveillance and monitoring became necessary, and the enforcement tasks of the water authorities have shifted. Their role now lies primarily in monitoring private suppliers, in basic water management planning and in resource quality monitoring. These monitoring tasks can be subdivided into economic issues such as competition, water price fixing (OFWAT), water quality (DWI) and the monitoring of bodies of water, of discharges and of overall quantity management (Environment Agency).

In France, départements and regional bodies (DIREN) are commissioned by the central authorities to handle planning, licensing, monitoring and enforcement tasks on behalf of water management. An intergovernmental instance is provided by the Agences de l'Eau, which are exclusively responsible for water management financing ("water bank"). The Agences return their earmarked revenue to the different user groups by way of subsidies reflecting the scale of charges. The communities are strongly involved in key decisions through the administrative councils and comités de bassin. As in Austria and Germany, local authorities handle water supply and wastewater disposal tasks. However, many municipalities commission private undertakings for these tasks.

4.3.3 Ownership situation

While ownership of bodies of water analogous to land ownership applies in Austria, German bodies of water are principally part of the natural household. This hews more closely to the French concept of law, according to which water is principally classified as a common good. Yet in France, too, land owners hold certain ownership rights in bodies of water (cf. M2 in the French country report). The practical consequences of the legal differences are, however, altogether minor. Each legal system assigns certain water-related rights to land owners and abutters of bodies of water as well as to the community (such as abstraction rights up to a certain volume). However, in all systems the overall control of water resource use lies with the state.

4.3.4 Abstraction and discharge

In all legal systems examined, the abstraction of water from surface and groundwater resources is subject to a permit; the abstraction of small quantities by the land owner, by abutters or the community in general (e.g. for the supply of one household), as a rule, does not require a permit; in some cases, however, it must be notified. For example, Austria distinguishes between the use of public and private bodies of water, while France makes a distinction between state and non-state bodies of water. Generally, water uses which might compromise resources or third parties are subject to state-regulated permits in all systems. It is a remarkable feature of the German and Austrian legal systems that these permits or approvals are not so-called “bound decisions”, which would imply that the applicant is granted a title to water use if certain conditions are complied with; rather, the authority is assigned discretion in granting its approval. Thus it is the authority that manages the water resources.

4.3.5 Water supply financing

The levying of charges for water supply and wastewater disposal is regulated in detail by the statutes applying in the legal systems examined. In Austria, France and Germany, it is a competence of the state bodies in charge of the respective supply and disposal areas. In Austria and Germany, this corresponds to the municipalities and public supply associations. In France, it is likewise local authorities that set water and wastewater charges. Both in Austria and Germany as well as in France, there exists the possibility of privatising these tasks. In these cases, prices are fixed by means of a contract concluded between municipality and (private) operator. A special French feature lies in two further charges—for the Agences de l’Eau and the Fonds National de l’Eau –, which are added to the charges yet do not cover a specific service but are destined to finance the work of the Agences de l’Eau and the Fonds. In England and Wales, maximum water price caps are centrally determined by OFWAT for the individual supply areas, in keeping with a standardised calculation formula (see M6 of the country report for England and Wales).

In all systems examined, charge calculation is stipulated in detail by law and reflects the actual supply and disposal costs incurred, which also comprises maintenance of the installations (cost-of-service principle).

4.3.6 Co-operation and privatisation

All systems examined provide for legal possibilities for, and practical experiences with, co-operation, including private undertakings.

In particular in Austria and Germany, a variety of co-operation approaches have for many years been common at the municipal level and also extend to the joint operation of

installations in the context of associations. In France, too, recent reforms have created more legal possibilities for different forms of co-operation.

The possibilities to privatise water supply and wastewater disposal are graduated: true, full privatisation of water companies (water and wastewater) was introduced in England and Wales in 1989; yet while private companies are strongly involved in French water supply, installations, as a rule, have remained in the hands of local authorities. In Austria and Germany, there exist many different possibilities of involving private undertakings into the handling of water-related tasks.

The predominant model in France is lease and operate; i.e. ownership of the supply installations remains in the public domain, while the private partner operates and maintains the installation and collects water tariffs and wastewater charges as well as various taxes. Mixed models, where an undertaking is conjointly publicly and privately owned, are quite rare. This form of private-sector participation occasionally occurs in Austria and is widespread in Germany. In this case, the assignment of water supply tasks is subject to a variety of restrictions. As a rule, supply responsibility remains with the local authorities. Tax aspects, too, come into play here; e.g. Austrian municipalities enjoy tax advantages vis-à-vis private undertakings in the discharge of public tasks.

The example of England and Wales shows that the privatisation of tasks calls for different legal requirements in order to safeguard price control, monitor the undertakings, enforce environmental, quality and security standards and punish violations by undertakings.

All legal systems examined dispose of detailed rules and regulations for the awarding of public contracts to private parties; the relevant modalities should not present any fundamental differences due to the harmonisation of European contract awarding legislation. In England and Wales, private water companies are viewed as emanations of the state and hence are subject to the regulations for public procurement. Conversely, in France private undertakings are actually subject to relatively few checks with respect to the procurement of construction works and similar.

4.3.7 Political discussion

All countries examined are characterised by structural reform discussions; in this, the orientation and intensity of these debates and the main stakeholders differ markedly, in keeping with the highly divergent prerequisites and frame conditions.

For example, the system predominant in **England and Wales**—i.e. truly and fully privatised undertakings—is questioned neither by the political actors nor the general public. Rather, it was the private water companies that suggested most recent reform proposals. Despite minor differences, the reform proposals have two key elements in common: the infrastructure should be sold to a non-profit corporation or society (co-operative), which will finance the necessary capital through credits. Following the French model, long-term operating rights are to be transferred to private undertakings by means of concessions. The

reform proposals also provide for a separation of ownership of the water supply and wastewater disposal installations on the one hand and the operation of these installations on the other hand. These proposals result from intensified economic pressure private suppliers were put under as a consequence of certain measures taken by the Labour government since 1997 (windfall tax, stricter price caps, prohibition to suspend supply). Eleven years after privatisation, it seems as if the increase in value of the privately invested capital is no longer sufficient to meet all demands resulting from privatisation (Shaoul, 2000).

The system of **France,** where the local authorities are in charge of the water sector and where numerous municipalities delegate the operation of water-related installations to private undertakings on the basis of long-term concession contracts ("affermage" or operate-only model), is generally appreciated.

Nonetheless, political decision-makers in France are vehemently discussing the long-standing experiences made with water supply task privatisation. Many concession contracts will expire in the next few years. A legislative initiative taking account of the experiences made with the system and its weaknesses and suggesting proposals for improvement was launched in 2001 by the Jospin government and pursued, inter alia, the objectives of shortening the delegation and concession contracts from 20 to 12 years, strengthening public participation by upgrading water users' committees, heightening the transparency of public water-related services, in particular regarding water prices and wastewater charges, and introducing a charge on superfluous nitrogen use in agriculture.

This water law amendment was not adopted since the centre-right government that had emerged victorious in the 2002 parliamentary elections rejected the draft, chiefly because of the nitrate emission charge proposed in it. In January 2003, the Minister of the Environment announced that she planned to submit a new bill to Parliament in early 2004.

However, in practice concession periods tend to be on the decrease. While the maximum duration of a concession under law is 20 years, a study of the tender procedures adopted by a number of local authorities for the extension of their concession contracts, which was published in 2001, has shown that the average duration of concession contracts has come down from 15.7 to 10.9 years (see M2 of the French country study, Chapter 3.2.7).

Moreover, the local authorities are also entitled to adjust contracts on a regular basis (i.e. to balance them) in order to make sure that private operators will always act in the public interest. In the future, this will call for more transparency and responsibility on the part of operators as well as for improved technical competence regarding contract issues on the part of local authorities. True competition for concession contracts is currently observed in over 15% of all new tenders (written communication, Antoine Grand d'Esnon, Service Public 2000, 10 March 2003).

Finally, more and more critics demand full disclosure of delegation and concession contracts as well as of annual operating reports and accounts. This would not only facilitate political supervision within local authorities but also yield data for benchmarking purposes.

Another key point of discussion in France concerns the role of the Agences de l'Eau. In this connection, several actors have proposed the setting-up of a central government agency according to the British model. Several left-wing politicians view the Agences de l'Eau quite simply as some sort of private undertaking, also because they co-operate closely with private water companies and share common interests. The advocates of the Agences applaud their work and ascribe the problems of the English and Welsh system above all to its lack of local structures. The comprehensive experiences and achievements in river basin-related planning accumulated by the Agences over the past 30 years should in fact not be underrated. For example, they widely support infrastructure financing and balance the different water users' interests in river basins. Private undertakings would prefer to see the Agences as pure funding bodies. These discussions have motivated the Agences to postpone planned reform projects and to adopt a wait-and-see attitude for the time being.

Recently **Austria**, where the water sector—similar to Germany—is characterised by a variety of different organisational models, has been increasingly involved in discussions of existing structures. Issues such as liberalisation, privatisation and the sale of Austrian water have engaged both public and political debates. Similar to the German situation, these debates are often triggered by the liberalisation trends in other markets, the growing participation of private parties worldwide and shrinking municipal budgets as well as political discussions in other countries and at the European level. In particular, these discussions were advanced by a study on the optimisation of municipal water supply and wastewater disposal in the context of sustainable water policy developed by PricewaterhouseCoopers (PwC) on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water Management in March 2001. For example, discussions focus on intensifying competition in the water sector, on the possibilities for efficiency increases and cost cuts and on the extent of costs and charges. Some studies (PwC, 2001; report of the Examination Commission, 2001) call for structural changes in the sense of bigger units, for intensified hiving-off and true participation of private parties and for more extensive service tenders (according to the French model). The stepping-up of outsourcing activities and cost-cutting by means of a horizontal multi-purpose association (water-wastewater) are also debated. Several actors have opposed the implementation of the proposals made in the PwC study, while others doubt that these proposals can be implemented at all (Schimon, 2002; Hall / Lanz, 2001). The two Austrian water associations (ÖVGW, ÖWAV), the Green Party and the Social Democratic Party (SPÖ) are opposed to liberalisation and privatisation. Some representatives of the Ministry of Agriculture, Forestry, Environment and Water Management believe that water supply should remain a public task[21]. In late 2001, the Vienna Diet adopted a provision relating to the Viennese provincial constitution, which inter alia stipulates that Vienna's public water supply must be embodied in the constitution, hence practically blocking any true privatisation of its installations. This

[21] "In any case, there exists a 'principal recommendation' by the Ministry that local authorities should retain ownership of xxx water sector; however, what counts here is to optimise the operation of the existing installations", in the words of Mr. Stalzer, division head at the Ministry of Agriculture, Forestry, Environment and Water Management (APA Umwelt, 4 July 2002, quoted at [http://www.wasserwerk.at/archiv.htm]).

resolution constitutes a commitment of Vienna's political decision-makers to safeguarding the best possible supply of the Austrian capital with high-quality mountain spring water. However, this approach does not preclude delegation of this task.

In all, it may be said that the discussions in the three countries focus on different issues. However, in all three Member States there is a clear demand for greater transparency in the water sector. This includes transparent contract awarding procedures as well as in-depth information of the general public and participation in political processes. Furthermore, general political developments in Europe tend towards a separation of operation and ownership in supply and disposal installations. While this is already standard practice in France, recent developments in England and Wales move in the same direction. From the European angle, the most controversial issue probably is the obligation to organise tenders for water supply and wastewater disposal as concessions. In this context, what should be the role and function of local authorities?

The outcome of these discussions and the decisions taken at the European level will influence the water sector in all European countries. Intensified international competition for participation activities and hence growing participation of private undertakings in the water sector is a reality already today.

4.4 Synthesis of the spatial-technical organisation of the water sectors (Module 3)

B. Nikolavcic (IWAG, TU Vienna)

4.4.1 Drinking water

4.4.1.1 Percentage of inhabitants connected to the public drinking water supply system

In Austria, the share of inhabitants connected to the public water supply system attains approx. 88% and is hence markedly lower than in the other countries of the study, where public supply rates are close to 100%. The reason for this lies in the ready availability of (untreated) drinking water in areas characterised by scattered settlements, which results in numerous small-scale and very small-scale suppliers not covered by the statistics of the umbrella organisation ÖVGW.

Table 4-4: Inhabitants connected to the public water supply system (M3)

	Year	Connection percentage in %	Source
Germany	1998	98.6	Module 3 of national case study
England & Wales	2000	100	Water UK, 2002
France	2002	99.4	Module 3 of national case study
Netherlands	2002	100	VEWIN
Austria	1998	88.1	Statistics Austria, 2001

4.4.1.2 Water distribution—Water treatment

The total abstraction volumes and their allocation to surface water, groundwater and spring water are presented in Synthesis M1. In Austria, a large part of all water originates as groundwater or spring water. Only 1% is of surface water origin and thus requires corresponding multistage treatment. England and Wales and the Netherlands enjoy a less favourable hydrological situation; thus a considerable share of water in these countries must be abstracted from surface water (reservoirs and rivers). No detailed water classification according to the required treatment stages is available for the countries examined. There exists a list solely for France; however, this is limited to rural areas, excluding cities and towns.

There is a dearth of overview data on water pipeline networks; above all, there exist no comparable values. The total pipeline network length is known for France; in 2001, it was close to 800,000 km (without house connections).

Table 4-5: Water pipelines: Supply and distribution lines without house connections (M3)

	Year	Total length [km]	m/I	Note	Source
England & Wales		n.av.			
France	2001	800,000	13.6		IFEN, 2001
Austria		26,785	5.3	179 undertakings taken account of	ÖVGW (1999)

The network replacement demand depends on the expected useful life, the age distribution of the pipelines, the substratum, etc. No extensive data concerning the replacement demand are available. Water loss may serve as an indicator of the network status. This term stands for the water volumes that are fed into the network but leak out unchecked (due to pipeline defects or network leakages). Water loss is markedly higher in England and Wales and in France than in Austria. Since most English and Welsh households do not dispose of water meters, the stated value is an estimate. The English water companies aim at reducing water loss.

Table 4-6: Water loss, in % of delivered volume (M3)

	Year	Loss in %	Source
England & Wales	1999-2000	22	DEFRA, 2001
	1994-95	31	DEFRA, 2001
France	1998	30	M3 of national case study
Netherlands	1999-2000	6	VEWIN
Austria	1997	9.5	ÖVGW, 1999
	1995	9.3	ÖVGW, 1999

Table 4-7: Pipeline materials for water pipelines, in % of pipeline length (M3)

	Cast-iron	Steel	Asbestos cement	Synthetics	Concrete	Source
England & Wales	n.av.	n.av.	n.av.	n.av.	n.av.	
France	54	2	4	39		IWAG-TU[(a)]
Netherlands	13	3	33	50	1	VEWIN
Austria	32	4	28	35	< 1	IWAG-TU

(a) The values are estimates, no data are collected at the national level.

There is a lack of national data on pipeline networks. Thus estimates were carried out on the basis of individual data (e.g. the biggest cities) to assess network lengths, age distribution and pipeline materials used. The overwhelming portion of the networks feature synthetic pipes. In Austria and the Netherlands, the share of asbestos-cement pipes is rather high; in France, cast-iron pipes predominate. The age of synthetic pipes is obviously low, since synthetics have been in widespread use only since the 1950s.

The age distribution in the big Austrian cities (cf. Vol. 1, Chapter 1.3.3) reveals that the overwhelming portion of the networks is 50 or fewer years old. Currently, the replacement rate is 0.5-2% per year; in the long term, a replacement rate of approx. 1% per year is the goal (corresponds to an expected average useful life of 100 years).

In France, too, drinking water pipeline networks were largely built after 1950; some départements undertook their first important investments only in the 1960s. As a result, the networks are relatively young. No data on annual replacement are available.

For England and Wales, no statistical data on age distribution of pipeline networks are available. In the 1990s, the replacement rate of supply lines was roughly 0.7%, rising to 1.3% around the turn of the millennium. According to OFWAT, there exists no clearcut trend for supply lines.

4.4.2 Wastewater

4.4.2.1 Percentage of inhabitants connected to the public sewer system

The following table provides an overview of the percentage of inhabitants connected to the public sewer system. In Austria, no 100% connection rate to public sewer systems is aimed at for areas characterised by scattered settlements. Yet scattered settlements and individual plants without public sewer network connection are also obligated to perform efficient, state-of-the-art wastewater and sewage sludge disposal.

Table 4-8: Type of wastewater disposal, in % of the population (M3)

	Year	Public sewer network without STP	Public sewer network with STP	Domestic STP	Cesspool	Other disposal techniques	Source
Germany	1995		92.2				M3 of national case study
England & Wales	1997/98	9.6	86.4				DEFRA, 2002
France[(a)]	1997	11	70[(b)]	19			B. Barraqué
	1999	2.6	73.6	23.8			IFEN, 1999
Austria	1998	0	81.5	6.5	11.4	0.6	BMLuF, 1999

(a) The two sources are not directly comparable and must not be interpreted as a chronological development from 1997 to 1999.

(b) Or 77% according to the information provided by Statistics Austria (2001), Table 4-11. However, these data (70% or 77% sewer network and STP) do not tally with the p.e. (COD) balance contained in the national case study, Module 3, for France 1995, which claims that 22 million p.e. (i.e. 48%) of 46 million household p.e. are not treated in STP.

All wastewater discharged into the sewer network in Austria is treated in purification plants. In England and Wales as well as in France, approx. 10% of the collected wastewater is directly discharged into the sea untreated. The data for France are contradictory; the evaluation of the national case study and in particular the p.e. balance for 1995 indicate that the wastewater produced by a high share of the population (22 million) is not purified at all.

4.4.2.2 Sewer networks

The data situation regarding existing sewer networks is partly very unsatisfactory. Sewers are structures with a long product and useful life, which moreover are situated underground and thus impossible to inspect by mere visual checks. Often local authorities do not dispose of precise information about the exact position, diameter, material, age or conditions of their sewer networks. Furthermore, it is very difficult to classify sewers with respect to the replacement or investment demand, as no general approach to this problem has so far been adopted. For these reasons, no respective national data are available.

Table 4-9: Sewer network length and number of municipal sewage treatment plants (M3)

	Year	Total length in km	Total length in m per inhabitant	Rainwater	Separate sewer and industry	Combined sewer	Number of STP	Source
Germany	1995	399,201	4.9	19%	27%	54%	10,237	ATV, 1997
	1991	357,094		19%	25%	56%	9,935	ATV, 1997
England & Wales		n.av.	n.av.	n.av.	n.av.	n.av.	n.av.	
France	1998	250,000	4.2					M3 of national case study
Austria	2000	n.av.	n.av.				1407[(a)]	BMLFUW, 2001

(a) Only plants with at least 50 p.e.

Most sewer networks in big Austrian cities (60 to 70%) were built after 1950. It is assumed that the sewer networks in rural areas tend to be younger than those in cities. The situation in France is similar, as here, too, most network sections are under 50 years old. It may be assumed that in both countries only 20% of the population was connected to the sewer network in the postwar period.

No national data on the age of the sewer networks in England and Wales are available. The replacement rate in the 1990s was 0.26% on an average, which corresponds to an average expected useful life of nearly 400 years. Obviously, there is no way of realistically expecting such an average useful life!

4.4.2.3 Wastewater volumes and purification

The domestic and industrial wastewater collected in the sewer networks is introduced into municipal treatment plants; this holds true for the entire volume in Austria and for the overwhelming volume in England and Wales and in France. The following table describes the wastewater and pollution loads.

Table 4-10: Annual wastewater loads introduced into municipal treatment plants (M3)

	Year	Waste-water	BOD_5	COD	N	P	p.e.	Source
		mill. m³	t/a	t/a	t/a	t/a		
Germany	1995						117 mill.	Federal Statistical Office, 1999
	1991						116 mill.	Federal Statistical Office, 1999
England & Wales		n.av.						
France	1995	n.av.					36 mill.	M3 of national case study
Netherlands	1997		360,000	915,000	85,000	13,600		Centraal Bureau voor de Statistiek (CBS)
	1995		331,000	920,000	84,000	13,800		CBS
Austria	1998	995	260,463	496,325	44,836	6,886	11.9 mill.	BMLFUW, 1999
	1995		251,600	489,900	42,900	8,200	11.4 mill.	BMLFUW, 1996

The national data differ markedly with respect to the wastewater and pollution loads introduced; in countries with largely public disposal systems (Netherlands and Austria), the data situation is considerably better than in those with mostly private service providers.

The purification performance of municipal treatment plants is largely determined by their level of sophistication—i.e. whether they dispose of a primary (mechanical), secondary (biological) and tertiary (biological) purification stage. With the secondary and tertiary purification stages, it is possible to remove practically all organic substances (COD and BOD_5). The nutrients N and P, which entail algae growth (eutrophication) in the water, can only be eliminated by means of tertiary purification.

Table 4-11: Treatment of municipal wastewater 1980-1997: Percentage of inhabitants connected in %, differentiated by purification stages (M3)

Data in % of population	1st purification stage			2nd purification stage			3rd purification stage			Total		
Country	**1980**	**1990**	**1997**	**1980**	**1990**	**1997**	**1980**	**1990**	**1997**	**1980**	**1990**	**1997**
Germany	10.2	6.5	4.1	64.7	31.5	12.2	5.0	47.6	72.3	79.9	85.6	88.6
France										57	69	77
Netherlands	7.9	1.0	0.1	61.9	84	42.3	2.6	8	55	72.4	93	97.4
Austria	10	5	1.4	25	60	38.6	3	7	34.7	38	72	74.7
United Kingdom		8	9		62	61		13	18		84	88

Source: Statistics Austria, 2001.

In 1997, the year under review, the biggest Austrian cities (Vienna, Graz, Linz) did not yet dispose of the 3rd purification stage. No national data on the purification stages in France were available. In the UK, a large share of the population is only served by the 2nd purification stage.

The scrubbing efficiency of the treatment plants is roughly the same for Austria and the Netherlands and largely corresponds to the performance ceiling of conventional biological processes with respect to organic substances (COD and BOD). The nitrogen removal efficiency will increase in the coming years as a result of the adaptation of large-scale plants (Vienna, Graz) to the state of the art. Only two thirds of the remaining N loads of wastewater origin will then originate from treatment plant effluents, while about one third will come from diffuse sources (leaking cesspools, sewer networks, storm sewers).

Table 4-12: Purification performance of municipal treatment plants, expressed in % of substance elimination (M3)

	Year	BOD_5	COD	N	P	Source
England & Wales		n.av.				
France[(a)]	1999	88		47	50	Office International de l'Eau
	1995	86	72	39	37	Office International de l'Eau
Netherlands	2000	96		65	77	RIONED
	1999	95		78	61	RIONED
	1995	96		60	74	CBS
Austria	2000	95	88	63	82	BMLFUW, 2001
	1998	93	87	51	64	BMLFUW, 1999

(a) Only plants with more than 10,000 p.e.

4.4.2.4 Sewage sludge

Sewage sludge is a by-product of wastewater purification. The resulting sludge quantity is contingent on the pollution load and the scrubbing performance of the treatment plant. With increasingly high connection percentages to sewer systems and improved scrubbing performance levels, the total sludge volume will likewise increase. A low specific sludge volume per inhabitant is not an indicator of efficient water protection!

The utilisation/disposal routes for sewage sludge include utilisation in agriculture and landscaping or disposal in landfills (of sludge or of slag after incineration). Irrespective of the utilisation/disposal route, the organic part of the sludge is ultimately always decomposed to CO_2. The recyclables contained in the sludge (phosphorus, nitrogen,

organic material) can be used in agriculture as fertilisers and soil conditioners; if this is not the case, the sludge must be disposed of at higher cost. The Austrian benchmarking project has shown that sludge dewatering and disposal currently entails roughly half the operating cost of treatment plants (Lindtner et al., 2002).

Table 4-13: Sewage sludge production and disposal in municipal treatment plants, in tonnes of dry sludge, in % of the total volume and in kg per inhabitant and year (M3)

	Year	**Sludge, total** [t dry subst.]	**Agri-culture** [%]	**Landfill** [%]	**Incine-ration** [%]	**Other** [%]	**Dum-ping in sea** [%]	**Spec. sludge production** [kg/(I.a)]	**Source**
England & Wales	1999/ 2000	1.000,000							DEFRA, 2002
	1996/ 1997	966,000	48	11	17	10	14		DEFRA, 2002
	1992	878,000							DEFRA, 2002
France	1998	850,000	60[(a)]	25	15			14.5	M3 of national case study
Netherlands	1995	335,000	11	63	6	20	-	16	Duvoort-van Engers, 1996
Austria	1998	211,890	19	16	32	31	-	19[(b)]	BMLFUW, 1999
	1995	187,430	23	31	34	12	-		BMLFUW, 1996
	1991	160,000	22	41	37	-	-	18	BMLFUW, 1996

(a) Applies only to cities and towns.

(b) Source: Zessner, 2002.

According to statistics submitted by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, the share of agricultural utilisation of sewage sludge in Austria has markedly decreased over the past years (Zessner, 2002). While the total sludge volume is increasing, those quantities that were utilised in agriculture and those incinerated have remained largely unchanged in recent years. In fact, the sludge volume utilised in agriculture may have increased, as it might be assumed that a significant portion of the sludge volumes listed under “Other”, made available to third parties for composting, is used on farmland. In several federal provinces (Vienna, Tyrol, Salzburg), the utilisation of sewage sludge in agriculture is largely banned.

In France, a large portion of the sewage sludge produced is used in agriculture, both on farmland and pastures; it is not utilised in forests. The requirements for agricultural use are markedly less stringent than in Austria.

Equally, a significant share of the sewage sludge produced in England and Wales is put to utilisation in agriculture, chiefly on farmland, but partly also in forests. The requirements for its use, too, are markedly less stringent than in Austria.

In addition to the sludge volume classified for dumping in landfills, it may be assumed that a portion of the sewage sludge listed under “Other” for Austria is currently also dumped by way of composting/soilification. In Austria, the disposal method by way of landfill dumping is in fact being phased out due to the Landfill Ordinance.

When the Landfill Ordinance will come into force in 2004—assuming that the trend against dewatered sludge dumping will continue –, it is likely that the incineration of sewage sludge and the dumping of the residual material will be encouraged.

The French policy, too, proposes that only inert material be dumped in landfills; due to intense agricultural utilisation, the role of landfills was hitherto rather limited.

4.5 Synthesis of corporate and operating structures in the water sectors (Module 4)

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4.5.1 Undertakings, enterprises and workers

4.5.1.1 Corporate structure

The sizes of undertakings in the countries examined vary considerably (cf. Table 4-14 and Table 4-15). The average number of workers per water supply undertaking ranges from 0.4 in Austria (counting even very small, part-time waterworks) to 725 in England and Wales. However, it is size distribution within one country that is relevant. In France, 82% of the market is covered by three big corporations (Vivendi, Suez and Bouygues), while the remainder presents very small structures. In Austria, extremely small co-operatives play a big role because of their high number, although it is undertakings serving supply areas of at least 5,000 inhabitants that are most useful for international comparisons. In terms of staff size and inhabitants supplied, these are of a size comparable to the "average"[22] French undertakings, but smaller than their British counterparts by two orders of magnitude. The sales revenue per undertaking is lowest in Austria, another effect of its small-scale structure.

Table 4-14: Key economic coefficients and average size of water supply companies (M4)

Price basis 2001, values from 2001 as well as latest values	**Number of under-takings**	**Number of workers**	**Sales revenue [mill. €]**	**Average number of workers per WSC**	**Average number of I served per undertaking [1,000 I]**	**Average turnover/ undertaking [€ million]**	**Market share of 3 biggest un-dertakings (in terms of turnover)**
Austria, undertakings > 5,000 I in supply area	190	2,200	369	12.1	27.5	1.9	approx. 40%
Austria, all suppliers	7,600	3,100	n.av.	0.4	0.9	n.av.	
England & Wales	22	15,950	5,082	725	2,409	231.0	40-45%
France, 3 big groups (Vivendi, Suez, Bouygues)	3	10,792	4,654	3,597	15,333	1,551.3	82%
France, total	2,350	26,220	5,705	11	25	2.4	

Note: The "average" is the arithmetic mean; it does not provide information on the actual frequency of the specific company size.

Source: Module 4 of national case studies, calculated by IFIP, 2002.

[22] The "average" is the arithmetic mean. "Average" must in no case be understood as "typical", since in Austria and France just a few big undertakings exist side by side with numerous very small ones, so that undertakings with the average sizes stated here may be actually very rare or inexistent.

Table 4-15: Key economic coefficients and average size of wastewater disposal companies (M4)

Price basis 2001, figures for 2001 or last available year	Number of under-takings	Number of workers	Sales revenue [mill. €]	Average number of workers per undertaking	Average number of I served per undertaking [1,000 I]	Average turnover/ undertaking [€ million]	Market share of 3 biggest un-dertakings (in terms of turnover)
Austria [(a)]	250	2,565	491.9	10.3	22	1.5	n.av.
England & Wales	10	15,950	4,961.7	1,595	5,100	496.2	45-47%
France, 3 big groups (Vivendi, Suez, Bouygues)	3	17,608	3,807.6	5,869	9,600	1,269.2	82%
France, total	2,350	42,780	4,668.0	18	23	2.0	

(a) Without micro undertakings.

Note: The "average" is the arithmetic mean; it does not provide information on the actual frequency of the specific company size.

Source: Module 4 of national case studies, calculated by IFIP, 2002.

4.5.1.2 Number of workers and development of staff sizes in the water sectors

Table 4-16 and Table 4-17 juxtapose, in terms of supply coefficients, the current number of workers employed in the water sectors in three countries. Without taking account of differences relating to urban geography, any direct comparison may serve as an efficiency indicator only to a limited degree.

If we look at the number of workers per number of persons supplied, Austria as well as England and Wales occupy practically the same position regarding both water supply and wastewater disposal, with Austria presenting a higher share of sparsely populated, capital-intensive supply areas. France is characterised by a significantly larger relative labour force, in particular in wastewater disposal.

In terms of the drinking water volume supplied, too, the French water management system is the most staff-intensive, while Austria occupies a middling position, and England is at the bottom of the list. Regarding wastewater disposal, it seems that Austria—assuming that the staff figures quoted by Statistics Austria are reliable—gets along with the lowest staff figures[23] of all countries. Comparisons both by rated capacity of treatment plants and by wastewater volumes show that Austria makes do with fewer workers than the countries it is compared to.

In general, the tables provide no indication that the Austrian water sector system is highly staff-intensive on an international scale. Taking account of the above-mentioned reservations, this might with greater justification be said of France.

[23] The staff figures for wastewater disposal companies were taken from the company register maintained by Statistics Austria, which with respect to public undertakings is only in its initial stages.

Table 4-16: Absolute and relative staff figures in water supply (M4)

Country	Staff figures (2000 or last available year)	Workers per 1,000 connected I	Water volume for public drinking water supply [million m^3/a]	Workers per million m^3 of drinking water supplied per year	Sources
Austria	2,200 (a)	0.30	600	3.7	Statistics Austria, ÖVGW, Stat. NR 5/2001
England & Wales	15,950 (b)	0.30	5,933	2.7	DEFRA 2002
France	26,448	0.46	5,600	4.7	Brunet, ENGREF

(a) Mean value of different sources without workers of micro suppliers.

(b) Estimate: 50% of workers in the water industry.

Source: National case studies, calculated by IFIP, 2002.

Table 4-17: Absolute und relative staff figures in wastewater disposal (M4)

Country	Staff figures (2000 or last available year)	Workers per 1,000 connected I	Workers per 1,000 I rated capacity	Workers per mill. m^3 of purified wastewater	Sources
Austria	2,565	0.7	0.1	2.4	Statistics Austria, Stat. NR 5/2001 and company register
England & Wales	15,950(a)	0.32	n.av.	4.2	CRI, 2002 (M4)
France	43,152	0.80	0.5	n.av.	Brunet, ENGREF (M4)

(a) Estimate: 50% of workers in the water industry.

Source: National case studies, calculated by IFIP, 2002.

With the exception of England and Wales, the available data stock does not provide an overview of the personnel turnover rate over the past 20 years. According to experts, however, the increasing cost squeeze is likely to have had consequences on staff sizes in all countries compared (cf. Table 4-18): in England and Wales, this had immediate effects in the form of marked, similar drops in staff figures, both before and after privatisation. Conversely, in countries with traditionally strong representation of workers and a high share of public-entity employers in the water sector, such as France and Austria, the main focus was on enlarging the service range with the same staff sizes and on the decision not to fill vacancies once employees had retired. Everywhere, and in particular in England and Wales, there is a clear trend towards outsourcing, i.e. the purchasing of third-party services, which in a way camouflages the total number of workers in the water sector, since services formerly provided by water industry workers are now in part classified under different headings and different industries.

Table 4-18: Staff development trends in the water sectors (M4)

Country	Staff turnover trends since 1985		Reason	Note
Austria	+/- 0	No clearcut trend identified, probably relatively constant. Slightly on the increase in the wastewater sector since 1995.	A frequent strategy lies in enlarging the service range with the same staff sizes.	Different and insufficient data sources.
England & Wales	- -	Marked decrease in staff figures both before and after privatisation (approx. –3.5% p.a.).	Cost squeeze and increasing outsourcing of tasks.	
France	-	Slightly decreasing staff figures, chiefly due to leaving vacancies unfilled.	Trend to enlarge service range with identical or slightly reduced staff sizes.	Employment data available only for 1998.

Source: National case studies, compiled by IFIP, 2002.

4.5.2 Turnover situation of the water sectors

If the income of water supply companies, which largely corresponds to the charges collected, is related to the supply coefficients, it emerges that the highest specific turnover is achieved in England and Wales, while France holds the middle, and Austria the lowest position. Compared to the economy as a whole (GDP), water management in the other countries examined plays a more important role than in Austria. However, it should be stated at this point that the Austrian turnover figures are not very reliable.

Table 4-19: Absolute and relative turnover figures of the water supply industry (M4)

Price basis 2001	**Turnover, absolute (without micro suppliers) [€ million]**	**Turnover/ connected I [€/I]**	**Turnover/ worker [€ 1,000/I]**	**Turnover per m^3 of water abstracted [€/m^3]**	**GDP share**	**Turnover development since 1985 (average change p.a., real figures)**	**Source of turnover figures**
Austria 1995	430-470 [(a)]	62-68	196-216	0.72-0.8	0.23%	2.5%	Statistics Austria
Austria 2000 (estimate)	390-470 [(a)]	52-64	175-215	0.65-0.8	0.21%	1.8%	IFIP estimate
England & Wales, 2000	4,961.7	94.2	311	1.08	0.35%	1.8%	OFWAT
France 2000	5,705.4	80.1	218	1.02	0.41%	-	ENGREF

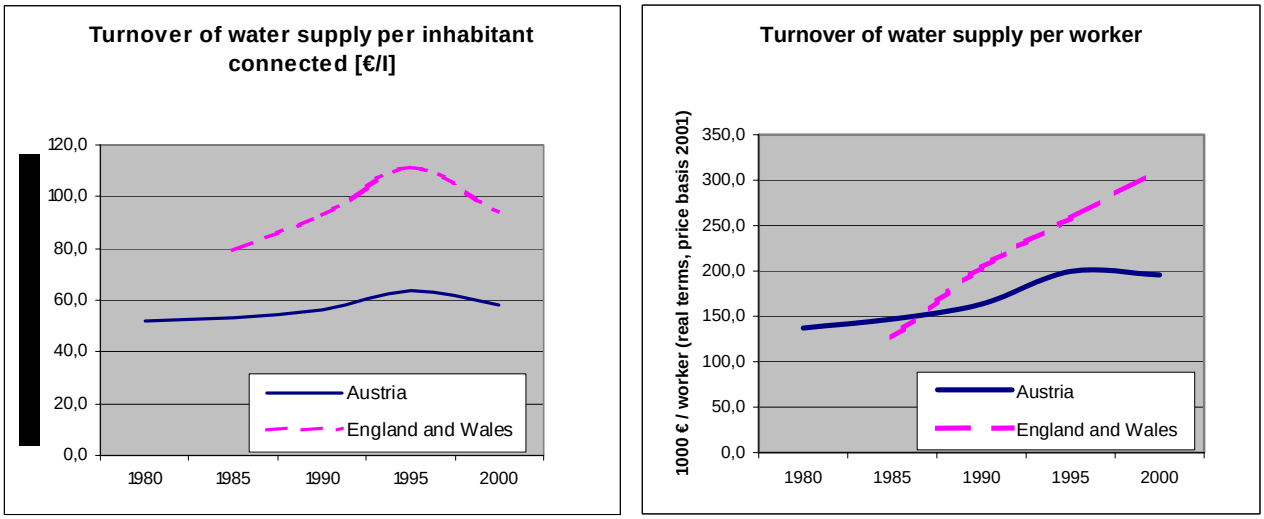
(a) According to Statistics Austria: € 431 million at 2001 prices. Since the water sector has not yet been covered statistically in its entirety, the real turnover value is estimated to be up to 10% higher.

(b) Estimated by IFIP based on Statistics Austria data, Service and Structure Survey 2001 (data captured incomplete) and ÖVGW (incl. small suppliers, can be compared to Statistics Austria data only to a limited degree).

Source: National case studies, calculated by IFIP, 2002.

Fig. 4-1 offers an impressive picture of the highly divergent turnover development per worker and per inhabitant served for Austria and England and Wales. While the slight

turnover decrease in Austria since 1995 is not altogether reliable (the 1999 values correspond to a different Statistics Austria survey than the time series until 1994), the marked turnover drop in England and Wales reflects a consequence of the 1999 price revision. However, the English and Welsh turnover per worker likewise began to increase massively starting in 1999, which goes to show once more that the turnover decrease was (more than) compensated, from the company's angle, by staff retrenchment.



Source: Module 4 of national case studies, compiled by IFIP.

Fig. 4-1: Turnover development in water supply per inhabitant connected and per worker in Austria and England and Wales.

With respect to wastewater disposal, the three countries present more similar results. The turnover per worker in Austria is clearly above the very personnel-intensive French water sector; for all other coefficients, England and Wales is again ahead of France, which in its turn is followed by Austria (Table 4-20).

Table 4-20: Absolute and relative turnover figures of the wastewater disposal industry (M4)

Price basis 2001	Turnover absolute [€ mill.]	Turnover per connected I [€/I]	Turnover per worker [€1,000/I]	Turnover per m^3 of waste-water disposed and purified [€/m3]	GDP share	Turnover development in recent years (av. change p.a., real figures)	Source of turnover figures
Austria 1999 [(a)]	492.1	71.1	196.6	0.46	0.24%	2.5%	Statistics Austria, company register[(a)]
England & Wales 2000	5,082.3	101.0	318.6	1.35	0.35%	2.3%	OFWAT
France 2000	4,668.0	97.0	109.1	n.av.	0.33%	n.av.	ENGREF

(a) Since the company register of Statistics Austria covers public undertakings only incompletely, the turnover income may be estimated to be up to 15% higher than stated in this table, in terms of both absolute figures and in connection with the various coefficients.

Source: Module 4 of national case studies, calculated by IFIP, 2002.

4.5.3 A comparison of organisational and ownership structures

The countries examined differ from each other very markedly with respect to the legal form and ownership structures of water service providers.

England and Wales is the only country where water management is almost entirely (i.e. with the exception of some subsidiaries recently established in the non-profit private sector) handled by profit-oriented private undertakings. The undertakings usually also own the installations they use and operate. This is a private-economy sector with large-scale regional monopolistic undertakings, whose pricing policy and efficiency is monitored and controlled by a regulating body.

In France, it is principally the municipalities that are in charge of water supply and wastewater disposal, own the respective installations and decide on the manner of service provision. Most municipalities or associations of municipalities commission private undertakings with the all-round operation of the installations (including planning, customer account management, etc.) for water supply and wastewater disposal; this private market is overwhelmingly in the hands of three big groups (Vivendi, Ondéo and Saur). The remaining municipalities (representing 24% of all inhabitants) manage their own undertakings. Decentralised disposal plays a certain role in wastewater management. There exists no centralised market regulation comparable to England and Wales.

In Austria, the water sector is determined by the **public** and the third (autonomous) sector; the latter characteristic is perhaps the most striking particularity in this international comparison. Due to the relatively high share of scattered settlements, above all in mountainous areas, where large-scale centralised systems would prove uneconomical, the opinion prevails that house-owners in peripheral locations should handle their own water supply and wastewater disposal. For generations, water management has therefore been marked by strong private and co-operative-based commitment to this task. In more densely populated areas, municipal supply systems predominate—similar to Germany—with local authorities very often joining forces in municipal associations. In the towns and cities, **undertakings under private law owned by municipalities** (i.e. formally privatised municipal undertakings) are the most widespread type of undertaking, although there also exist cases where these tasks are handled within a city's municipal administration. PSP concepts or purely private models have been attempted only in a few pilot projects so far. Principally, the supply and corporate structures in Austria are very small-scale, as they usually mirror the boundaries of individual municipalities or settlements.

Similar to Austria, a small-scale, municipal supply system is predominant in Germany (municipally owned and operated undertakings, functional associations, companies owned by municipalities and companies with combined ownership), although there also exists a growing trend—in particular in the eastern Länder—to go for larger, regional units and increased private participation.

The Dutch water supply system is structurally characterised by publicly owned companies, large-scale regional units and a high degree of centralisation. The undertakings are monitored by a central body called Rijkswaterstaat. Wastewater disposal is organised along a smaller scale, being a municipal task.

Table 4-21 shows the interaction between the size of the supply units and the predominant market sectors in the water management systems of the countries examined.

Table 4-21: Predominant company sizes and ownership characteristics of the water management industry in the countries compared: Predominant sector and size of supply units (M4)

		Private sector	Public sector	Autonomous sector (non-profit)
Supply units	Small-scale (municipal)	F	**A**, D**,** F	A
	Medium (small regions)	**F**, D	D, A	
	Large-scale (big regions, river basin areas)	**EW**	**NL**	

F France
A Austria
D Germany
NL Netherlands
EW England & Wales

Source: IFIP, 2002.

For Austria, England and Wales as well as France, it is moreover possible to visualise the ownership structure in percent, divided into water supply and wastewater disposal:

Table 4-22: Comparison of ownership structures of water supply companies

Ownership structure of water supply companies	**Publicly owned undertakings**		**Wholly or partly privately owned undertakings**		**Non-profit co-operatives and municipally owned and operated undertakings**	
	In % of companies	In % of population supplied in the catchment area	In % of companies	In % of population supplied in the catchment area	In % of companies	In % of population supplied in the catchment area
Austria, all suppliers	27	82	< 0.1	5-7	73	10-14
Austria, supplied areas with > 5,000 I	97	90	1.1	approx. 8-10	1.6	1-2
England & Wales	0	0	100	> 99.5	unknown	< 0.5
France	48	21	52	79	0	0

Source: Module 4 of national case studies, compiled by IFIP, 2002.

Table 4-23: Comparison of ownership structures of wastewater disposal companies

Ownership structure of wastewater disposal companies	Publicly owned undertakings (also managed as undertakings under private law)		Wholly or partly privately owned undertakings		Non-profit co-operatives and municipally owned and operated undertakings	
	In % of companies	In % of population supplied in the catchment area	In % of companies	In % of population supplied in the catchment area	In % of companies	In % of population supplied in the catchment area
Austria (relating to treatment plants)	95	96	1	1	4	3
England & Wales (relating to companies)	0	0	100	> 99.5	unknown	< 0.5
France (relating to companies)	62	48	38	52	0	0

Source: Module 4 of national case studies, compiled by IFIP, 2002.

4.5.4 Important changes and current developments of corporate structures in the countries compared in this study

In no country examined, the water sector was or is a static industry. Structural changes of varying extent and character took place over the last 10 to 20 years or are being currently discussed. Just as the status quo varies strongly from country to country, recent developments and reform proposals vary as well.

However, all systems under review presented certain main trends compatible with the general development of the international economy:

- increased cost and efficiency pressures;
- intensified (or beginning) competition at different levels;
- a stronger international market (internationalisation of providers as well as more intense commitment abroad);
- increased availability of multi-utility options, i.e. different services provided by one supplier.

The internationally identified trend towards market concentration in water management was not generally paralleled at the national level (e.g. occurs hardly in Austria or the UK).

The only country examined that has undergone a restructuring of water-related services on the basis of new legislation is the United Kingdom, which witnessed the total privatisation of the water management regimes of England and Wales in 1989. Although the basic supply structure has hardly changed since then, the market has remained on the move due to frequent company takeovers, chiefly by big foreign groups. This has led to increased involvement in the international market but hardly entailed concentration trends within the

sector (mergers of water companies); any such trends were moreover prevented by the regulatory body—an approach vehemently criticised by several representatives of the industry. A prominent trend concerns outsourcing, sometimes even extending to core businesses. In individual cases, the operation and maintenance of infrastructure, a low-profitability sector, was transferred to (specially established) non-profit companies.

In France, no massive structural changes occurred at the national level. Conversely, the three big French corporations Vivendi, Ondéo and Saur conducted an aggressive expansion push in the worldwide water market and now occupy positions 1, 2 and 5. The national oligopoly of the three groups was challenged in recent years after coming under intensified public and media scrutiny, which entailed price corrections and the loss of several contracts.

In Austria, the key change lay in a re-orientation of public services to accommodate market-economy organisational structures, which was most frequently achieved by setting up publicly owned companies under private law. Due less to direct competition than to EU requirements, lower budget fund appropriations and increased public scrutiny, companies are exposed to efficiency pressures, which they plan to meet by cutting costs and above all by increasing their turnover (side businesses, extension of service range, charge increases). In addition, purely private or combined organisational models have been in use for several years. In view of the budget restraints of many Austrian municipalities, it may be expected that these organisational models will become quite widespread in the next years. A re-organisation of the small-scale supply structure to embrace larger units was repeatedly proposed, although the idea so far has not met with consensus.

Table 4-24 and Table 4-25 provide a comparative overview of the extent of international interrelations, competition and multi-utility approaches in the water management systems of the countries examined.

Table 4-24: Current developments in corporate structures: A comparative description (M4)

	Share of domestic/ foreign ownership	International expansion in third countries	Extent of competition and/or co-operation	Trend towards multi-utility companies
Austria	Practically wholly in Austrian ownership.	First steps taken by individual companies: upstream activities, traditional services, one-stop-shopping solutions. Stronger expansion expected.	Hardly any competition in the supply market, but palpable rationalisation pressure caused by subsidy cuts and EU competition policy. Moderate competition in the upstream and traditional service markets.	Traditional multi-utility companies within municipal undertakings. First approaches towards links with the electricity sector.
England & Wales	Approx. 1/3 of companies owned by foreign (mostly French) groups.	Moderate. English utilities expand mostly after having been acquired by foreign groups (Example: RWE / Thames Water)	"Replacement" or comparative competition due to price limits imposed by regulatory body. Spot competition for large-scale customers.	At first only privatisation of water or wastewater management; soon followed by strong multi-utility interrelations due to acquisition by national and international groups.
France	So far practically wholly in French ownership.	Strong international expansion. The three French "giants" are worldwide leaders.	Moderate but increasing domestic competition (shorter concession periods, more changes—but market distribution continues to be largely regional). Strong (strategic) foreign competition. Individual co-operation projects between groups in case of particularly risky offers (international business).	Strong multi-utility orientation. Water as a key to the multi-utility sector; sometimes also withdrawal from the environmental business (Vivendi, Bouygues).

Source: IFIP on the basis of national case studies, 2002.

Table 4-25: Current developments in corporate structures: A comparative evaluation (M4)

	Share of foreign ownership	International expansion in third countries	Extent of competition for supply and disposal concessions	Multi-utility
Austria	o	+	o/+	++
England & Wales	++	++	o	++
France	o	+++	++	+++

o Inexistent or very slightly developed

\+ Slightly developed

++ Markedly developed

+++ Very strongly developed

Source: IFIP, 2002.

4.6 Synthesis of financial flows in the water sectors (Module 5)

G. Oppolzer (IFIP, TU Vienna)

4.6.1 Comparison of cost accounting and cost transparency

Parallel to the divergent traditions and organisational structures of the water sectors in the countries examined, the accounting practices, too, differ markedly. Public undertakings, which play an important role in French and Austrian water management, traditionally maintain only income and expenditure accounts that do not record either periodic value consumption of gross fixed assets (depreciation) nor calculated return on equity. Only in recent years (since the 1980s in Austria, even later in France), public undertakings have increasingly extended their accounting practices to include cost and performance accounting.

For various reasons, true cost transparency in water management does not exist in any of the countries, which duly impacts the inherent reliability of the financial flow analysis given below:

- The water sector operates with extremely capital-intensive and durable investment assets. Many pipeline networks were laid before 1900, and no accounting system has consistently recorded changes in the gross fixed assets over this long period. For every system or accounting re-organisation of a municipality, it was therefore necessary to estimate the value of the fixed assets in order to obtain a depreciable basis for subsequent years. This was done at company level and mostly in major cities—thus national data are just a sum total of communications by companies, complemented by further estimates for the rest of the country. Only in England and Wales, a nationwide depreciation was carried out in the context of the 1989 privatisation push (but here, too, the value and condition of the installations had to be estimated). In Austria and France, there exists no information about the exact total length or age, let alone the book value, of pipelines and conduits.
- In England and Wales, the private water companies develop detailed cost and performance accounts that are also communicated to the regulator OFWAT and published. Production cost data are therefore available. However, these, too, are distorted, as in the course of privatisation the fixed assets were sold to the new owners at considerably lower price than their estimated book value, and value consumption is calculated in a manner different from that used for depreciations in Austria or France.
- Moreover, many municipalities in France and Austria still do not maintain cost accounts; furthermore, even expenditures cannot be precisely allocated to individual activities (e.g. personnel costs for municipal employees who spend only part of their working hours on water supply tasks).

Cost recovery and cost transparency as demanded by the European Water Framework Directive will therefore be delayed in becoming reality for the pragmatic reason that real-

cost accounting and recording in many countries are only in their initial stages. France has thus undertaken to compile a standardised overview of economic-environmental data by means of an ambitious interdisciplinary research programme (involving CEMAGREF, IFEN and others).

4.6.2 A comparison of production costs in the water sectors

By way of introduction, it should be said that any comparison of production costs is highly problematic, both due to the above-mentioned lack of transparent information and because of a lack of standardised statistical recording methods within one country and even more so between different countries[24]. However, such an attempt was made in the context of the present project, with the following reservations:

- The total value for the production costs was derived from the sources specified; responsibility for their correctness lies with the primary sources. However, the following adjustments were carried out in order to improve comparability:
  - All currency data were deflationed to 2001 according to the national consumer price index.
  - If contained in the primary sources, the relative values (costs per m^3, per worker, etc.) were not adopted directly; rather, the absolute figures were newly calculated with unified values for employment, volume and population figures per country and year, which may result in slight departures from the primary data.
  - Where the primary data of one country obviously represent a different dimension than those of another country (e.g. expenditure instead of costs in France), a rough estimate was carried out, if possible, on the basis of the primary data, drawing attention to the fact that comparability is additionally complicated.
- If they derive from different sources, the results for different years principally offer no information about developments over time. In these cases, the authors have preferred to highlight the range of different approaches used.
- The figures contained in the tables must not be interpreted without the accompanying texts, which formulate certain contexts more cautiously than the seemingly “hard” table values might imply.
- Finally, the results are juxtaposed with those of the other Modules and tested for their plausibility. Non-plausible results were eliminated.

[24] The input-output tables of national income accounts (NIA), which are calculated according to the same method in all of Europe (European System of Accounts), proved a disappointment to the authors inasmuch as they are applied to water management systems either not at all (in France) or only to an incomplete degree (in Austria) and moreover do not distinguish between wastewater and solid waste disposal. They were included in the comparison as only one of several calculation methods.

4.6.2.1 Production costs of water supply

Table 4-26: Comparison of production costs in water supply according to calculation methods at both the general economic and the company level (M5)

Real terms, in 2001 prices	Estimated production costs, total [€ million]	Production costs per inhabitant connected [€/I] (b)	Production costs per worker [1,000 € /worker]	Production costs per m^3 of water [€/m^3]	Source	Note
Austria 1995 (NIA)	480	83	218	0.9	Input-output table, 1995	Without micro suppliers (approx. 15% of inhabitants).
Austria 1997	730	104	292	1.1	IFIP based on KDZ, 1999	Basis: municipalities > 10,000 I, extrapolated in percent.
Austria, total, 2001 forecast made in 1995	852-942	115-127	341-377	1.3-1.5	IFIP estimate acc. to Schönbäck, 1995	Lower forecast range excluded, as costs have tended to decrease since 1995.
UK 1995 (NIA) (a)	5,257	90	184.4	-	UK input-output table, 1995	Data somewhat unreliable, as depreciations probably estimated by statistical office.
UK 1999 (NIA) (b)	6,637	112.5	316.0	-	UK input-output table, 1999	
England & Wales 1995 (c)	5,669 (6,090)	112 (120)	229 (245)	-	CRI based on CIPFA, OFWAT	Instead of depreciations, "capital conservation costs" (tend to be lower) are recorded. Profits and dividends are recorded as costs.
England & Wales 2001 (c)	5,173 (5,590)	98 (106)	284 (307)	1.0 (1.0)	CRI based on CIPFA, OFWAT	
France 1995 (estimated on expenditure basis)	6,925 (6,823)	121.2	-	-	IFEN, M5 France	No cost data available. Estimate: production costs correspond to operating expenses + 5% of average investment spending (operating expenses in brackets).
France 1998 (estimated on expenditure basis)	7,386 (7,284)	128.6	171	1.8	IFEN, M5 France	

The values without brackets state the costs (calculated at company level) acc. to the source data (=49% of the costs of the entire water industry of € 10,557 million); the values in brackets correspond to the estimated external costs (calculated at the general economic level) based on the conversion of the subsidies granted at the moment of privatisation ("green dowry") to the annual costs not incurred according to the opportunity cost approach (calculated by IFIP; see country study for England and Wales).

Connection figures used: see Table 4-48, p. 103; for UK: 1995 = 58.5 million, 1999=59 million.

Source: Country reports, calculated and compiled by IFIP, 2002.

In terms of costs per inhabitant connected, the differences between data sources are bigger than those between countries. In the last five years, the production costs were roughly between € 100 and 130 per inhabitant. The most recent results show England at the bottom, France and Austria at the top of this range. With respect to costs per worker, the differences are more marked: France with its personnel-intensive water management system attains a production value of less than € 171 per worker; the corresponding values

for England and Wales are about € 230 to 300; for Austria, they amount to over € 350[25] per worker, which points to an economic structure with rather fewer workers but expensive production. Regarding the costs per m^3 of water supplied, the situation is different: France is the most expensive country, Austria holds the middle position, and England is cheapest.

4.6.2.2 Production costs of wastewater disposal

The situation of wastewater disposal (Table 4-27) is somewhat different. The discharge and purification of one cubic metre of wastewater entails a cost between approx. € 1.0 (Austria) and € 1.7 (France). However, it is very doubtful whether the wastewater volumes on which this calculation is based are correct and comparable, as the data indicate highly divergent wastewater volumes produced per inhabitant connected in the various countries, which seems hard to explain: 152 m^3 per inhabitant and year in Austria vis-à-vis only 78 in England and Wales or 66 in France.

However, a similar cost ratio involving France and Austria is also arrived at if we analyse the costs of pollution load removal from wastewater: in 1995, the costs in Austria amounted to € 780-962 million; the pollution load was reduced from 11.2 million p.e. to 1.6 million p.e. (BMLFUW, 1996), i.e. by 9.6 million p.e. This equals a cost of € 81-100 per eliminated p.e. In France, the specific costs are € 175 per eliminated p.e. (in 1995), with production costs of € 4,568 million and 26 million of eliminated loads (cf. Vol. 1, Chapter 3.3.6).

Austria is clearly in the top range for the costs per worker and per inhabitant connected.

It is true of both water supply and wastewater disposal that the lower production costs in England and Wales approximate the Austrian cost level if the estimated cost savings owed to the “green dowry” are added to the normal management costs, as this causes the annual production costs to rise by approx. 7 to 9%.

[25] It is possible that this value is distorted by the numerous part-time workers in small-scale waterworks. However, the cost figures contain small-scale waterworks only to a limited degree; thus the error should not be significant.

Table 4-27: Comparison of production costs in wastewater disposal according to calculation methods at both the general economic and the company level (M5)

Real terms, in 2001 prices	Estimated production costs, total [€ million]	Production costs per I connected [€/I] (b)	Production costs / worker [1,000 € /worker]	Production costs per m^3 of purified wastewater [€/m^3]	Source	Note
Austria 1995 (NIA) (a)	780-962	130-161	322-397	-	IFIP based on input-output table, 1995	Cf. (a)
Austria 1997	1,062	169	425	1.0	IFIP based on KDZ, 1999	Basis: municipalities > 10,000 I, extrapolated for all of A.
Austria 2001, extrapolation of bench-marking sample	1,220	171	468	1.1	Extrapolation acc. to BMLFUW, 2002.	Refers to treatment plants + sewer systems > 5,000 < 100,000 I COD 110. Not reliable!
UK 1995 (NIA) (a)	3,330-4,040	59-71	155-188	-	CRI estimate acc. to UK National Statistics	Share of wastewater disposal in NACE 90: 33-40% (estimate).
UK 1999 (NIA) (a)	5,090-6,170	88-106	321-389	-		
England & Wales 2001 (b)	5,384 (5,800)	107 (115)	393 (424)	1.4 (1.5)	CRI based on OFWAT, 2001	
France 1990 (estimate)	2,788 (2,651)	64	-	-	IFIP based on IFEN, 2001 (c)	No cost data available. Estimate: production costs correspond to operating expenses + 5% of average investment spending (operating expenses only in brackets)
France 1995 (estimate)	4,568 (4,431)	98	-	-	IFIP based on IFEN, 2001 (c)	
France 1998 (estimate)	5,362 (5,225)	113	124	1.7	IFIP based on IFEN, 2001 (c)	

(a) Note: The input-output statistics show wastewater disposal only together with sold waste disposal (NACE 90). The share of wastewater disposal was estimated on the basis of industry information and consultations with the national statistical offices; i.e. in Austria, at 30-37% (in keeping with turnover and personnel shares), and in the UK, at 33-40% (acc. to an estimate by CRI and UK National Statistics).

(b) The values without brackets state the costs (calculated at company level) acc. to the source data (=49% of the costs of the entire water industry of € 10,557 million); the values in brackets correspond to the estimated external costs (calculated at the general economic level) based on the conversion of the subsidies granted at the moment of privatisation ("green dowry") to the annual costs not incurred according to the opportunity cost approach (calculated by IFIP; see country study for England and Wales)..

(c) Expenses refer to central wastewater collection and purification (households and indirect dischargers). Source: IFEN, Données économiques de l'environnement, 2001.

(d) Connection figures used: see Table 4-49, p. 103, for UK: 1995 = 56.7 million, 1999=58 million.

Source: IFIP, 2002.

An interesting real indicator of labour productivity is the quantity of water delivered or purified per worker (Table 4-28). In this respect, England and Wales (more than 300,000 m^3 per worker) is ahead of Austria (approx. 240,000 m^3); France trails far behind with approx. 94,000 m^3 per worker. Austria is most efficient in the wastewater sector—approx. 380,000 m^3 per worker vis-à-vis 290,000 m^3 in England and Wales and only 75,000 m^3 in France.

Table 4-28: Real indicator of labour productivity: Quantity units per worker (M5)

Water supply			
	Volume of water delivered [million m^3/a]	**Workers**	**Water volume / worker [m^3/a]**
Austria 1997, municipalities > 10,000 I, extrapolated for all of A	653 (a)	2,500	261,200
England & Wales, 2001	5,400 (c)	18,200	296,700
France 1998	4,045 (d)	43,200	93,600
Wastewater disposal			
	Volume of discharged and purified wastewater [million m^3/a]	**Workers**	**Wastewater volume / worker [m^3/a]**
Austria 1997, municipalities > 10,000 I, extrapolated for all of A	1,079 (b)	2,500	431,600
England & Wales, 2001	3,960 (c)	13,700	289,100
France 1998	3,150 (d)	43,200	72,900

(a) ÖVGW, 1999 (value for 1997)

(b) BMLFUW: Water Protection Report 1999 (value for 1998)

(c) Calculated on the basis of Table 2-27 in Vol. 1, Chapter 2.5.2

(d) Taken from Table 3-24 in Vol. 1, Chapter 3.5.1.2

Source: National case studies, compiled by IFIP.

Even if the figures are not entirely reliable, the basic trend shows that Austria, despite its small-scale supply structure, does not lag far behind British productivity values in the water sector and in fact is clearly ahead of France.

A comparison of the production costs with the turnover figures of Module 4 (Chapter 4.5.2) may at first appear confusing: while the ratios between countries are largely analogous, the costs in all countries exceed the stated turnover figures in the years compared[26]—in England and Wales, by just a few percent (which may be simply due to inexact data[27]), in France, by 15 (wastewater) to 30% (water), and in Austria, by up to 100% (for water and wastewater). It might be argued that the turnover figures were set rather too low (since not all companies were included) while the cost figures are possible too high (based as they are on the extrapolation of samples and estimates); however, the difference cannot be fully explained in this manner. Production costs that significantly exceed sales revenue point towards massive subsidisation of operating activities. This is also confirmed by a

[26] The heterogeneous data stock does not permit any direct comparison of costs and turnover. The following data are rounded to facilitate a plausibility check.

[27] In England and Wales, costs are defined as identical to turnover, since profit and dividends, too, are put to account as costs.

comparison of the cost recovery rate (Table 4-32 and Table 4-33) and by the revenue and expenditure of the public sector (Chapter 4.6.7).

Table 4-29: Production costs of the water sectors as relative to the GDP of the countries compared

Production costs in % of the country's GDP	**Water supply**	**Wastewater disposal**	**Sum total of water sector**
Austria 1997	0.38%	0.55%	0.93%
England & Wales 2001	-	-	0.70%
France 1998	0.57%	0.41%	0.98%

Source: National case studies, compiled by IFIP, 2002.

Table 4-29 relates the production costs (gross production value) of the water sector to the gross domestic product of the respective country. It is obvious that the water sector in general holds a more important position for the economy in France and Austria than in England and Wales.

4.6.3 Comparison of cost structures

With respect to the British and Austrian water supply systems, the national income accounts reveal the share of the individual items in the overall cost picture.

Table 4-30: Cost structures of water supply according to the NIA: Share of intermediary demand and value-creation components in overall costs

Share in production value	**Share of intermediary demand**	**Share of real wages/salaries to be paid to workers**	**Share of taxes on production minus subsidies**	**Share of depreciations**	**Share of operating surplus**	**Production value, absolute (=100%) in € million, real terms, 2001**
Austria 1995	34.0%	27.1%	5.4%	17.6%	15.1 %	480
UK 1995	25.4%	19.6%	5.6%	49.4%		5,257
UK 1999	30.2%	16.6%	5.2%	48.0%		6,637
France	Not available					

(a) Depreciations and operating surplus are shown jointly for the UK. According to OFWAT (1995, 1996, 2001), dividends in 1995 were 26% and depreciations were 24% of the production costs.

(b) Cf. (a) 2001: dividends 16%, depreciations 28%.

Source: Input-output statistics for UK and Austria, country reports, IFIP, 2002.

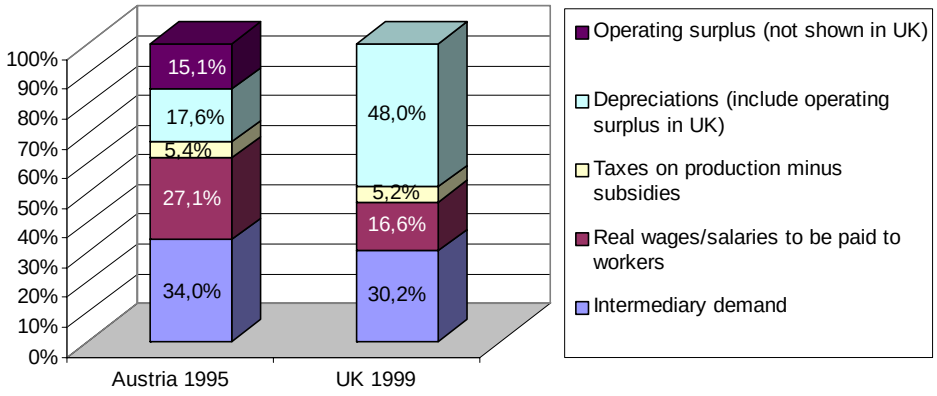


Fig. 4-2: Cost structures of water supply according to the national income accounts in the UK and Austria (M5)

The biggest difference in the cost structure of water supply between the United Kingdom and Austria lies in the divergent personnel-cost shares, which in Austria amount to 27% but in England and Wales, to just slightly under 17%. Conversely, depreciations and operating surpluses in the UK (available only as aggregate figures) considerably exceed those of Austria. Apart from the depreciation equivalent, the return on outside capital would moreover have to be subtracted from the operating surpluses in order to arrive at the (disposable) profit; this is not shown in the NIA. On the basis of company balance sheets, OFWAT states the share of dividends (= profit paid out) in England and Wales as 26% for 1995 and as 16% for 2001. These extremely high profits of English water companies decreased markedly with the last price revision by the regulator OFWAT in 1999.

Table 4-31 Cost structures in the water sectors: A comparison of operating-cost and capital-cost shares (M5)

	(1) Water supply			(2) Wastewater disposal			(3) Water sector, total		
Absolute values in € million, real terms, 2001 prices	Share of current operating expenses	Capital costs (incl. operating surplus)	Production costs, absolute (=100%)	Share of current operating expenses	Capital costs (incl. operating surplus)	Production costs, absolute (=100%)	Share of current operating expenses	Capital costs (incl. operating surplus)	Production costs, absolute (=100%)
Austria 1995 (water) [a] and 2001 (wastewater)[b]	67%	34%	480	approx. 40%	approx. 60%	1,220	approx. 51%	approx. 49%	1,800 [c]
UK 1999 (NIA)	51%	49%	5,257	n.av.			-	-	-
England & Wales 2001 [d]	46%	54%	5,173	33%	67%	5,384	38%	62%	10,557
France [e]	Not available								

(a) Input-output table 1995.

(b) Estimate of BMLFUW, 2002 (benchmarking).

(c) Due to different years and sources, this value is not the sum of (1) and (2) but is derived from KDZ (1999) for 1997 (cities > 10,000 I; extrapolated to all of A). The shares stated are the weighted mean of (1) and (2).

(d) CRI, OFWAT, 2001.

(e) For France, only revenue/expenditure data, no cost data available.

Before and after the price revision of 1999, England and Wales presented a clearly higher capital-cost share in the water sector than Austria, although personnel costs (as part of current operating expenses) are likewise lower than in Austria. Despite that, the average investment spending per capita in England and Wales is lower than in Austria[28] (cf. Chapter 4.6.5), which can only be explained by the significantly higher operating surpluses (calculated return on equity plus net profit) contained in the capital costs. However, capital costs in Austria are probably distorted downwards by the high subsidy share for investments. Putting it somewhat pointedly, one might define the English investment strategy in water management as profit-maximising and its Austrian equivalent as “subsidy-maximising”.

4.6.4 Profit structure and cost recovery

It should be stated beforehand that the present study cannot offer a calculation and comparison of cost recovery rates. The data on costs and profits in installation management are too incomplete and heterogeneous to permit direct confrontation. For this reason, it was decided to simplify the procedure by juxtaposing income and expenditure figures, where available, and thus to calculate the cost recovery rate. But these figures, too, should be interpreted cautiously, as they derive from different calculation methods. The data refer to current operating expenses and investment spending (Table 4-32 and Table 4-33).

While all countries attain a cost recovery rate of over 100% in water supply, this rate is achieved in France, and to an even higher degree in Austria, only by means of public subsidies, in particular in the investment sector. In Austria, the cost recovery rate based solely on water charges is merely between 57 and 85%, depending on the source, while the corresponding rate for wastewater is even lower. Both the subsidy share and the cost recovery rate (including subsidies) are higher for wastewater disposal than for water supply in France and Austria. It seems that subsidies account almost exactly for the surplus in France, where subsidies are less substantial overall.

[28] This holds for wastewater disposal and xxx water sector in its entirety, with the exception of drinking water supply. Cf. Chapter 4.6.5.

Table 4-32: Comparison of income structures and cost recovery rates in water supply (M5)

	In % of income[(a)]			In % of expenditure [(a)]		Source	Note
	Public subsidies	Loans	Charges	Income / expenditure (cost recovery)	Income from charges / total expenditure		
Austria, 1997, municipalities > 10,000 I	43%		57%	101%	57%	KDZ, 1999	Only regular charges, one-time-only payments not entered as charges => share of charges perhaps underestimated.
Austria, 1999, municipalities without Vienna	5.20%	15%	80%	106%	85%	IFIP, Gembon, from financial statistics	Refers to municipal income and expenditure for water supply, without Vienna.
England & Wales, 2001	< 0.5%	n.av.	> 99.5%	n.av.	> 100%	Country report England and Wales	The private water industry does not publish income/expenditure accounts but cost accounting statements.
France, 1998	4-6%	94-96%		104%	98-100%	IFEN	Allocations to Agences were calculated as charges.

(a) Income and expenditure are understood in terms of government accounting, on which the Austrian and French sources are based. In the terminology of standard business management (double-entry accounting), loans and repayments are not classified as income or expenditure, as they are asset-neutral.

Source: Compiled by IFIP.

Table 4-33: Comparison of income structures and cost recovery rates in wastewater disposal (M5)

	In % of income [(a)]			In % of expenditure [(a)]		Source	Note
	Public subsidies	Loans	Share of charges in total income	Income / expenditure (cost recovery)	Income from charges / total expenditure		
Austria, 1997, municipalities >10,000 I	47.50%		52.50%	111%	58%	KDZ, 1999	Only regular charges, one-time-only payments not entered as charges => share of charges perhaps underestimated.
Austria, 1999, municipalities without Vienna	8.30%	23.30%	68.30%	107%	73%	IFIP, Gembon, financial statistics	Refers to municipal income and expenditure for wastewater disposal, without Vienna.
England & Wales, 2001	< 0.5%	n.av.	>99.5%	n.av.	>100%	Country report England and Wales	The private water industry does not publish income/expenditure accounts but cost accounting statements.
France, 1998	9-13%	87-91%		115%	100-105%	IFEN	IFEN

(a) Income and expenditure are understood in terms of government accounting, on which the Austrian and French sources are based. In the terminology of standard business management (double-entry accounting), loans and repayments are not classified as income or expenditure, as they are asset-neutral.

Source: Compiled by IFIP.

4.6.5 Comparison of investment spending and financing

Investments are of crucial importance for capital-intensive economic sectors. The following section juxtaposes the absolute and the relative investment spending for water management in the countries examined.

Table 4-34 Investment spending in water management (M5)

2001 price basis	Investment spending p.a. (average) [in € million]	Investment development (trends)	Investment spending / I connected [€]	Share of new investments	Ratio of investment spending / turnover (average)	Ratio of investment spending / total book value of installations	Ratio of investment spending / replacement cost of installations
Austria, 1993-2001	145	No discernible trend (on decrease after 1998)	21.0	n.av.	32%	9.1%	n.av.
England & Wales, 1985, 1989	1,367	Investment low before, and investment high after, privatisation, then again on decrease	28.2	n.av.	31%	n.av.	n.av.
England & Wales, 1990, 1995, 2001	2,331		46.2	approx. 45%	46%	9.1%	2.3%
France, 1990, 1995 and 1998	2,048	Constant in real terms, share in total expenditure decreasing	35.8	n.av.	36%	n.av.	n.av.

Source: Country reports, compiled by IFIP, 2002.

For water supply, the average investment spending per inhabitant connected is lowest in Austria, where it is even lower than in England before privatisation, when investment activities were at an all-time low. Austria also trails the other countries with respect to investment spending per turnover. However, this statement must be relativised since the input for drinking water treatment required in Austria is practically zero if compared to the other countries; thus the specific investment demand in the drinking water sector may in fact be lower[29].

[29] On the other hand, it might also be assumed that the comparatively scattered settlement structure of Austria causes a greater investment demand. These two effects were, however, not weighed against each other.

Table 4-35 Investment spending in wastewater disposal (M5)

2001 price basis	Investment spending p.a. (average) [in € million]	Investment development (trends)	Investment spending / I connected [€] [(a)]	Share of new investments	Ratio of investment spending / turnover (average)	Ratio of investment spending / total book value of installations	Ratio of investment spending / replacement cost of installations
Austria, 1993-2001	827	Variable, no discernible trend (on decrease after 1998)	138.2	n.av.	176%	n.av.	1.6%
England & Wales, 1985, 1989	1,510	Investment push in 1990 (after privatisation), then again on decrease	33.2	n.av.	36%	n.av.	n.av.
England & Wales, 1990, 1995, 2001	2,579		52.1	approx. 59%	46%	4.8%	0.7%
France, 1990, 1995 and 1998	2,749	Constant in real terms, share in total expenditure clearly on decrease	58.8	n.av.	59%	n.av.	n.av.

(a) Number of connections: see Table 4-49, p. 103: mean value of respective annual number of connections.

Source: Country reports, compiled by IFIP, 2002.

The situation of wastewater disposal is an entirely different one. Austria is the clear leader with respect to its relative investment spending. While the other countries examined invest only slightly more in wastewater disposal than in water supply, the corresponding Austrian input is almost six times as high. Taking turnover as a yardstick, it becomes evident that Austria invests in wastewater disposal far beyond the income from charges, which is only made possible by massive public subsidies. These investments have undisputedly led to a superior purification performance and increasingly good water quality in Austria. In view of a subsidy policy that, in the opinion of numerous experts, offered few incentives for cost efficiency until 2001[30], the question remains, however, whether these objectives could not have been attained by less costly measures.

Table 4-36 gives a simplified overview of the financing models for water management employed in the different countries. All three countries advocate borrowing for financing purposes—even England and Wales, which is gradually moving away from the equity financing model introduced at the moment of privatisation. In all countries examined, a number of specialised banks play an important role as lenders: in Austria, Kommunalkredit Austria AG was commissioned by the Federal Republic with handling environmental subsidies. In England and Wales, low-interest credits of the European Investment Bank (EIB) were drawn upon to a high degree; the high investment spending in the first post-

[30] Cf. documentation in Module 5 of the Austrian case study.

privatisation years was largely made possible by the so-called "green dowries"[31]. In France, the key lenders are the Agences de l'Eau, which form reserves on the basis of compulsory charges paid by water customers and use these amounts for eligible investment projects in the water sector, which are granted interest-free loans and grants.

Although the extent of public investment promotion varies markedly, all three countries take recourse to considerable interest relief (up to rate zero) for credits. However, conventional bank credits at standard interest rates are drawn upon as well.

Table 4-36 Investment financing in the water sectors (M5)

Country	Equity ratio	Non-subsidised portion	Extent of public subsidies	Lender	Average interest on outside capital
Austria (1993-1998)	n.av.	57% (higher today)	43%, chiefly federal and provincial subsidies	Chiefly Kommunalkredit Austria AG	n.av.
England & Wales	Since 1989 drop from 100% to approx. 50%	95-100%	Due to "green dowry" approx. 30-35% from 1989 to 1999[(a)], later only in the form of lower interest rates offered by EIB	Chiefly EIB, national banks	4-6 %
France	n.av.	Loans and grants by the Agences de l'Eau [(b)]: 9% of investment spending for water, 26% for wastewater. Occasionally state subsidies.		Chiefly Agences de l'Eau	Usually no interest with Agences de l'Eau, approx. 6% with banks

(a) Estimated by IFIP: assuming that the subsidy granted at privatisation in 1989 was spent entirely on investments over a 10-year period (as in fact required), investment spending induced by green dowries accounts for roughly one third of the average annual investment spending.

(b) These are not subsidies because they are financed by charge allocation.

Source: Country reports, compiled by IFIP, 2002.

4.6.6 Asset value and estimated future investment demand

4.6.6.1 Book value and replacement cost of installations

Due to a lack of continuity in accounting over long periods of time, it is extremely problematic to estimate the asset value of entire national systems of the water sector (cf. Chapter 4.6.1).

The book value corresponds to the value of the installations entered in the asset and liability statements of undertakings, reflects the sum total of the acquisition or production costs, reduced by the annual depreciation rate, and is highly contingent on the depreciation period employed. In England and Wales, the RCV (regulatory capital value) corresponds

[31] The term "green dowry" denotes debt write-offs and direct transfers of the government to the newly established undertakings at the moment of privatisation in 1989, which amounted to approx. £ 6.4 billion; this obligated the undertakings to carry out a comprehensive investment programme (cf. documentation in the country study for England and Wales).

most closely to this value; the RGV is derived from the purchase price at privatisation and used for price adjustment. However, value consumption is calculated in an entirely different manner[32] than in Austria, which invalidates any direct comparison.

From the methodological angle, a comparison of replacement costs seems less problematic, as it may be assumed that the construction of new installations in the countries examined will reflect comparable technological standards. However, this comparison falters due to the fact that almost no estimates or calculations at the national level are available so far for France and Austria.

Table 4-37 and Table 4-38 reflect the available asset value data of the countries examined. The authors have deliberately abstained from interpreting the differences.

Table 4-37 Estimated book value of water supply installations (M5)

Real terms, 2001 price basis	**Estimated book value (for E&W: RCV [(a)] [in € million]**	**Per I connected [€]**	**Replacement cost (for GB: MEA, i.e. modern equivalent asset value) [in € million]**	**Per I connected [€]**	**Source**
Austria, 1999	1,596	214	n.av.	-	ÖVGW
England & Wales, 2001	15,099 [(b)]	284	99,617	1,886	OFWAT, CRI
France	n.av.	-	n.av.	-	

(a) Note: Due to the different calculation methods, any quantitative comparison between countries is inadmissible.

(b) The RCV does not differentiate between water and wastewater. Share assumed equal to MEA.

Source: Country reports, compiled by IFIP, 2002.

Table 4-38 Estimated book value of wastewater disposal installations (M5)

Real terms, 2001 price basis	**Estimated book value (for E&W: RCV) [in € million]**	**Per I connected [€]**	**Replacement cost (for E&W: MEA) [in € million]**	**Per I connected [€]**	**Source**
Austria, 1999	n.av.	-	45,000-51,000 [(a)]	6,630-7,370	IFIP, based on Schönbäck et. al., 1995
England & Wales, 2001	31,233 [(b)]	619	206,072	4,097	OFWAT, CRI
France	n.av.	-	n.av.	-	-

(a) Estimated on the basis of the 1995 forecast for 2001.

(b) The RCV does not differentiate between water and wastewater. Share assumed equal to MEA.

Source: Country reports, compiled by IFIP, 2002.

[32] In England and Wales, above-ground installations are written off on the basis of replacement costs. For below-ground installations, capital conservation costs are calculated instead of depreciations.

4.6.6.2 Future investment demand

In the coming years, new national and European frame conditions will call for a continuation or even a stepping-up of investment activities in the water management sectors of all countries examined.

The table below reflects the mean annual investment demand in the countries compared as estimated by the competent institutions. It is not known from what basis these estimates are derived, nor what policy they pursue[33]. Principally, it may be assumed that the estimates take account of the requirements laid down in the Urban Waste Water Treatment Directive and the Water Framework Directive. However, no statement can be made regarding the level urban water management and water protection are to attain through these investments, nor regarding the time-scale in which this is to occur.

Table 4-39: Estimated annual investment demand in the water sectors and comparison with current investment level (M5)

Water supply and wastewater disposal	Estimated average investment demand p.a. [in € million]	Investment demand p.a. per I connected (in 2001) to central DWS [€]	Average investment level so far per I connected (in 2001) to DWS [(a)] [€/I]	Source of investment demand data
Austria, 2002-2012	891	121	132	Calculated by Kommunalkredit Austria, 2002
England & Wales, 2000-2004	5,333	100	100	OFWAT, 1999
France, 2001-2011	6,000-8,000	10-137	82	Barraqué (acc. to different, unmentioned sources)

(a) Average of past 10 years. For France, average of the years 1990, 1995 and 1998.

Source: Module 5 of country case studies, compiled by IFIP

Austria is the only country expecting a slight decrease of the investment volume, which is probably due to the new, more restrictive subsidy guidelines in force since 2001. Being the country that has invested most in wastewater disposal and water protection so far, even the new legal standards will not entail higher future investment requirements for Austria.

In all, the future investment estimates point to a certain convergence between the countries examined. England and Wales intends to maintain its investment level, which was increased following privatisation, due to the then-existing backlog. France plans to increase its average relative investment spending, thus bringing it close to the Austrian level. Since

[33] First provincial estimates in Austria e.g. tend to be too high, in order to gain access to the maximum possible federal subsidy rate. Conversely, in France – where investment costs are largely passed on to the water charges – investment demand is often claimed to be inferior to actual requirements in order to stave off consumers' protests.

the highest increase in per-capita investment spending is expected for France, the country is searching for ways to observe legal requirements while avoiding mushrooming water charges (which in any case have been on the increase for years).

4.6.7 Overview of the role of the public sector

This section will not address the role of the state with respect to its legislative and regulatory functions (for this aspect, cf. Module 2), but rather look at ways in which the state itself intervenes (at different levels) in the financial flows of the water sector.

Generally speaking, the state's share in water management is highest for Austria, since the state is very active both as an operator and subsidiser[34]. In France, the share of the state is comparatively small, and in England and Wales, it has withdrawn almost completely from the water sector since the privatisation push.

However, a more in-depth look at the individual fields of activity in which the state can take financial action results in a more differentiated picture. The following section defines these fields of activity, while the tables below the paragraphs illustrate the degree of state involvement in the individual countries examined.

- Income and expenditure for state-owned water sector installations: income and expenditure derived from the operation of water service undertakings (municipal departments, owned/operated undertakings or publicly owned undertakings under private law)

Austria: +++ Very strong .	**France: +** Moderately strong (approx. 25% of market).	**England and Wales**: 0

- Commissioning of third parties (contracts): the public legal entity (local authority) pays an operating fee to a supply and/or disposal undertaking commissioned by it, unless the undertaking was granted the right to levy charges on its own. If the local authority wants to maintain the charges largely unchanged, this may also involve a subsidy share (operating subsidy).

Austria: ++ Relatively strong, chiefly due to payments to formally privatised municipal utility providers, usually subsidised in part.	**France:** + Moderately strong. The commissioned undertakings are usually paid directly by the end consumers.	**England and Wales**: 0

- Investment promotion: the state promotes investments in the water sector in the context of its environmental policy.

[34] The 1995 input-output calculation gave the state's share in the development of the gross production value as being 88% for water supply and 67% for wastewater and solid waste disposal (excluding publicly owned undertakings under private law). Due to the numerous spin-offs of municipal utility providers, this share is now definitely lower.

Austria: +++ Very strong promotion within the state sector (from Federal Republic to municipalities) and to private bodies (approx. 40% of total investments), reduced since 2001.	**France:** + Only few, individual state subsidies granted. The main investment funding bodies are the Agences de l'Eau.	**England and Wales**: 0/+ Possible in very rare cases.

- Transfers of money or physical resources to undertakings: the state subsidises undertakings commissioned by means of one-time-only or regular transfers of physical resources and/or monetary payments.

Austria: + In case of outsourcing, transfers of money or physical resources are possible. Sometimes also regular transfers to private operators.	**France: -** No data available.	**England and Wales**: ++ One-time-only transfers of money and physical resources during privatisation process (fixed assets sold below actual value).

- Economic regulators: regulatory authorities are used to substitute competition in order to prevent consumer exploitation and restrictions on consumption caused by monopolies.

Austria: 0	**France:** 0	**England and Wales**: + 88% of the budget of the regulator OFWAT is raised by private water companies.

Other authorities regulating the water management regime (water authorities, bodies for water quality monitoring, flood protection, water quantity management, etc.) exist in all countries as part of public administration and are not considered in detail in the present report.

4.6.8 The role of sales revenue in case of privatisation

The sales revenue volume attained in the privatisation of water companies is an issue eclipsed by the question of whether revenue generation was or is a declared goal and important reason in pro-privatisation decisions. In this respect, the differences between countries are marked:

In England and Wales, the only country examined that has a wholly privatised water sector, the achievement of the highest possible sales revenue for the public sector was definitely not the prime objective of privatisation, which in fact was chiefly motivated by regulatory policy reasons. However, financial aspects did come into play as well: the Thatcher government was obviously interested in getting rid of low-efficiency undertakings heavily hit by budget cuts, whose massive debts rendered them unable to carry out urgently needed investments, while at the same time reducing the state's share in the water sector. The government argued that only radical restructuring could render the water management system fit to meet future challenges: instead of reforming public undertakings, it was thus decided to opt for a system carried by private entrepreneurship that would only be

regulated, but no longer governed, by the state. Moreover, the government spared no expenses for this system dismantling, defraying the transaction costs as well as selling formerly state-owned undertakings at a price below their theoretical market price or actual value in order to give the new owners a head start. While the sales prices were set at least high enough to pay off the debts of public undertakings and balance the budget deficit caused by the water sector, the government, however, did not derive a net profit from the sale of its water companies.

In Austria, easing municipal budgets is often the primary goal of privatisation plans. However, a distinction must be made between already widespread formal privatisation, where an undertaking remains a public property, on the one hand and actual, true privatisation (a rare case so far), where the entire undertaking or parts of it are sold to a private company, on the other hand. In the first case, no direct revenue will result from the sale, as seller and buyer are identical. There is hardly any reflux of funds into municipal budgets, since cities themselves provide start-up money for their newly-established undertakings. Usually, ownership of pipeline networks (sewers and water conduits) is not transferred, either, but remains with the public legal entity. Still, the sale to an undertaking under private law may be of great importance for the municipal budget, since the company's budget is not part of the municipal budget and hence irrelevant under the Maastricht criteria. However, this effect can be equally achieved by means of mere "reshuffling" within the public budget, i.e. without restructuring a provider into a private-law institution.

The situation is different if an undertaking is sold to a company with a significant private capital share. The biggest property transfer of this kind in Austria so far concerned the sale of NÖSIWAG to EVN, which netted a considerable sales price (€ 87.2 million, which corresponds to approx. 2% of the average annual revenue of the entire federal province), two thirds of which, however, were brought into the successor company EVN Wasser as assets in kind. Yet many mayors considering a potential participation of private actors in the water sector are less interested in realising short-term sales revenue than in the fact that this approach permits them to get rid of a massive investment burden that would overtax their municipal budgets.

With its tradition of "délégation", where the water service business is assigned to private companies for the duration of concession contracts while keeping ownership of the installations themselves public, France makes do without the concept of sales revenue in the strict sense. Here, too, mayors are probably motivated by the fact that this method enables them to get a labour- and know-how-intensive competence off their hands, although investment financing duties in most cases remain with the local authorities. Since private companies as a rule are also authorised to levy charges and thus receive fees for their services directly from end consumers, the flow of funds between local authorities and undertakings is minimal. The 1995 Barnier Act outlawed formerly frequent one-time-only "entry payments" made by the successful bidder to the local authority in exchange for contract awarding.

4.7 Synthesis of tariffs and pricing for end consumers (Module 6)

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4.7.1 Water consumption

The quantity of water consumed per person and day is roughly the same in Austria, France and in England and Wales (Table 4-40). This may be explained by similar living standards as well as by the use of low-consumption fittings and household appliances. Despite its rich water resources, Austria, too, strives for a careful and sparing use of drinking water.

In England and Wales, water consumption is shown separately for consumers with and without water meters; only approx. 20% of water and wastewater customers in England and Wales have a water meter installed.

If industrial and commercial water consumption is included in the statistics, the water consumption per capita is markedly higher. In recent years, the water consumption of big industrial enterprises has decreased—sometimes massively so—as a result of the closing of water cycles in production processes, but also due to plant closedowns and relocations. One big industrial water consumer is the paper and cellulose industry. In Austria, per-capita water consumption (including industrial and commercial consumption) is by 27% above that of France. No relevant data are available for England and Wales.

Table 4-40: Water consumption (M6)

Category		Unit	Austria	France	England/Wales
Basis year			*n.av.*[35]	*1997*[36]	*2000-01*[37]
Water consumption	total	l/I/day	150	151	149
	with meter/without meter[38]		(n.av.)	(n.av.)	(134 / 152)
Water consumption incl. small-scale enterprises		l/I/day	260	205	n.av.

Only the installation of water meters enables consumers to obtain an idea of the amount of water consumed, hence creating an incentive to use this resource more sparingly.

[35] Source: BMLFUW, 1999a.

[36] Source: Water UK, 2000.

[37] Source: OFWAT, 2001c: Tables 6 and 7.

[38] England/Wales: prices and charges of most domestic consumers are calculated by means of an obsolete, land tax-based household assessment (the so-called “rateable value” or RV). In 2001, approx. 20% of domestic customers were metered. These pay a charge based on their consumption measured by water meter.

4.7.2 Tariff systems and prices for water supply

The following section provides an overview of water supply prices (cf. M6 of country studies, Chapters 1.6.2, 2.6.2 and 3.6.2). The sheer variety of tariff systems both within and between countries (in particular in Austria) strongly impairs the comparability of cubic-metre prices. However, it is possible to discern pricing trends by comparing the annual household bills for water supply in the countries examined. The household parameters (number of persons per household, water consumption per household) vary from country to country, depending on data availability.

As a rule (with the exception of England and Wales), statistical overviews of water prices (and wastewater charges, see Chapter 4.7.3) do not extend to all undertakings or to the entire population. The different statistics used in the various countries examined must be taken account of in any comparison.

In **Austria**, the available data concern merely 71 major cities and towns, which are home to approx. 50% of Austria's population[39]. Table 4-41 offers an arithmetic mean of these 71 cities and towns, both for the average price per cubic metre and for the average annual bill of a fictitious household.

The data for **France** are derived from two different statistics. The price per cubic metre originates in a study by IFEN (Institut Français de l'Environnement) and SCEES (Service Central des Enquêtes et Etudes Statistiques) of 5,000 cities and towns (representing all sizes and types of management), while the annual bill of a standardised household was taken from a study of the Ministry of the Economy, Finance and Industry (comprising only major cities)[40].

In **England and Wales**, the regulator OFWAT publishes an annual report on prices and charges of the water sector[41], from which all data contained herein derive.

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[39] Cf. ÖSB, 2001.

[40] Cf. IFEN / SCEES / Agences de l'Eau, 1998; Ministère de l'Economie, des Finances et de l'Industrie, DGCCRF, 2001.

[41] Cf. inter alia OFWAT, 2002c.

Table 4-41: Water supply prices (M6)

Category			Unit	Austria	France	England/Wales
Water connection charge (one-time-only)			€/ connection	Tyrol: 363 (1998)	n.av.	Survey possible, not stipulated by OFWAT
Basis year				*2000*[(a)]	*1998*[(b)]	*2001-02*[(c)]
Water meter charge	Margin (average)		€/HH/a	5.67-38.87 (15.94)	n.av. n.av.	n.av. n.av.
Water price						
Consumption-related billing (metered)	Fixed share		€/a	n.av.[(d)]	n.av.[(e)]	24.69-34.57
	Variable share: margin (average)		€/m³	0.45-1.45 (0.92)	n.av. (1.30)	0.79-1.98 (n.av.)
Billing independent of consumption (unmetered)	Fixed share		€/a	n.a.	n.a.	11.05-165.15
	Variable share		€/€RV[(f)]	n.a.	n.a.	13.76-37.08
				Fictitious HH[(g)] *with 150 m³*	*Standard HH*[(h)] *with 120 m³*	*Household*[(i)]
Average annual costs for water supply of one household		1995	€/HH/a	127.23	136.83	138.05[(j)]
		1996	€/HH/a	137.08	142.75	(155.60)
		1997	€/HH/a	141.93	146.43	173.15
		1998	€/HH/a	147.00	147.66	176.73
		1999	€/HH/a	148.00	149.14	176.73
		2000	€/HH/a	151.75	151.54	162.53
		2001	€/HH/a	n.av.	n.av.	165.69
Persons per household[(k)]			I/HH	2.5	2.4	2.3
Calculated annual costs for water supply per person[(l)]		2000	€/I/a	60.70	63.14	70.67

(a) Statistical survey of the Association of Austrian Cities and Towns on prices in the fields of water supply and wastewater disposal for cities > 10,000 inhabitants, of which there are 71 in the country (ÖSB, 2001). These 71 cities account for roughly half of Austria's population (written communication, Statistics Austria, 6 June 2002).

(b) Study by the Institut Français de l'Environnement and the Service Central des Enquêtes et Etudes Statistiques of 5,000 cities and towns representing all sizes and types of management, assuming an annual consumption of 120 m³ (IFEN/SCEES/Agences de l'Eau, 1998).

(c) Statistics on prices and charges compiled by the Office of Water Services (OFWAT, 2002c, Table 5 and Table 13).

(d) The assessment basis may reflect a minimum rate that is charged if actual water consumption is below the minimum rate threshold.

(e) The water price is composed of a consumption-dependent and a fixed share.

(f) Rateable value.

(g) Rented flat, 80 m², two adults, one child, one toilet, one bathroom and an annual water consumption of 150 m³ (ÖSB, 2001).

(h) Average household (2.4 persons) with an annual water consumption of 120 m³, including all taxes (Ministère de l'Économie, des Finances et de l'Industrie, DGCCRF, 2001).

(i) Data in £ (£ 1.00 = € 1.58, 20 September 2002). The 1996 value was interpolated from the 1995 and 1997 values (OFWAT, Tariff Structure and Charges, various years; *) UBA, 1998).

(j) UBA, 1998

(k) Austria: a fictitious household is composed of two adults and one child (ÖSB, 2001). France: an average household is composed of 2.4 persons (INSEE, 1996). England/Wales: corresponds to 2.3 persons/household (UBA, 1998).

(l) Calculated from the annual costs of water supply per household and the number of persons per household.

In **Germany**, the weighted water price for 2001 was € 1.70 per m^3 (cf. Vol. 4, Chapter 4.1.6). With a water consumption of approx. 128 litres per person and day and roughly 1.8 persons per household, this results in an average annual water bill of approx. € 79 per person or approx. € 143 per household. In the **Netherlands**, an average water price of € 1.34 per m³ was stated for 2000, which corresponds to a water bill of € 67 per inhabitant and year (cf. Vol. 4, Chapter 4.2.6).

In all countries examined, a one-time-only **charge for connection** to the water supply network is levied. However, there are often no data on the average level of this amount. Information about water meter charges exists only for Austria.

In Austria and France, **water prices** are consumption-dependent. In most municipalities, the water supply tariff is composed of a fixed and a consumption-dependent share (the only exception are some Austrian municipalities that levy no fixed share). In England and Wales, water prices are normally levied depending on the rateable value (RV) of the property, i.e. irrespective of actual water consumption. However, the installation of meters has led to almost 20% of household customers receiving a consumption-dependent water bill in 2001.

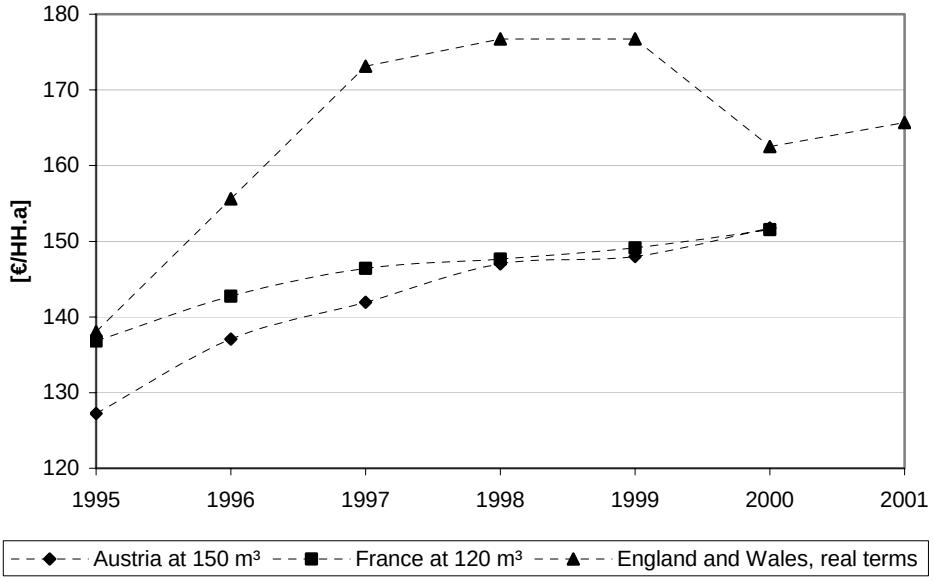

Fig. 4-3: Development of household bills in water supply (M6)

While the divergent data stock must be taken account of when interpreting a direct comparison of water prices in the three countries examined, the basic data scale is largely the same. A certain trend can be identified for the development of annual water supply costs per household in all countries (Fig. 4-3). In Austria and France, the annual household costs for water supply increased steadily from 1995 to 2000, while England and Wales was first (i.e. between 1995 and 1998) characterised by an increase and later, starting in 1999, by a decrease of billed costs. This is due to the interventions of the regulator OFWAT. For

the periods from 1999-2000 to 2004-2005, OFWAT stipulated an average annual reduction of the inflation-adjusted price level of 2.1% (reducing the price level by 12.3% in the first year), while average price increases by 1.1 to 1.4% per year were permitted in the 1990s.

The annual water supply costs per household were expressed as the **annual costs per person** by using the available data on the number of persons per household, which varies from 2.3 to 2.5 (see Table 4-41). Although household parameters (such as size and annual water consumption) are different in the various countries, the basic scale of annual costs may be compared. The annual costs per person in 2000 for England and Wales were by 16% higher than those for Austria and exceeded the French costs by 12%, despite the regulatory interventions of OFWAT (see above).

4.7.3 Wastewater disposal charges

The following section provides an overview of the wastewater disposal charges (cf. M6 of country studies, Chapters 1.6.2, 2.6.2 and 3.6.2). The systems of charges applied to wastewater disposal in the individual countries vary as strongly as the tariff systems for water supply, which renders a comparison of charges per cubic metre very difficult. However, it is possible to compare the annual household bills for wastewater disposal in the countries examined. The household parameters (number of persons per household, water consumption per household) vary from country to country, depending on data availability.

The statistical overviews of wastewater charges likewise differ strongly from country to country, which must be taken account of in any comparison. Chapter 4.7.2 provides an overview of the sources for national wastewater charge data. With respect to Austria, Table 4-42 contains the average charges per cubic metre as well as the average annual bill of a fictitious household, calculated as the arithmetic mean value of 71 major cities and towns.

Table 4-42: Wastewater disposal charges (M6)

Category			Unit	Austria	France	England/Wales
Sewerage connection charge (one-time-only)			€/ connection	Tyrol: 726	n.av.	Survey possible, but not stipulated by OFWAT
Basis year				*2000*[(a)]	*1998*[(b)]	*2001-02*[(c)]
Sewerage utilisation charge						
Consumption-related billing (metered)	Fixed share		€/a	n.av.[(d)]	n.av.	13.43-90.55
	Variable share: margin (average)		€/m³	0.30-2.88 (1.73)	n.av. (1.32)	0.79-2.51 (n.av.)
Billing independent of consumption (unmetered)	Fixed share		€/a	n.av.	n.a.	11.06-157.13 €/€RV
	Variable share: margin (average)		€/m² or €/€RV[(e)]	0.58-10.39 €/m² (0.79 €/m²)	n.a.	0.26-1.89 €/€RV
				Fictitious HH[(f)] *with 150 m³*	*Standard HH*[(g)] *with 120 m³*	*Household*[(h)]
Average annual costs for wastewater disposal of one household		1995	€/HH/a	176.50	137.23	n.av.
		1996	€/HH/a	186.00	148.49	n.av.
		1997	€/HH/a	206.64	154.54	213.03
		1998	€/HH/a	208.80	159.46	206.72
		1999	€/HH/a	218.78	163.28	211.45
		2000	€/HH/a	209.68	166.05	183.05
		2001	€/HH/a	n.av.	n.av.	187.78
Persons per household [(i)]			I/HH	2.5	2.4	2.3
Calculated annual costs for wastewater disposal per person [(j)]		2000	€/I/a	83.87	69.19	79.59

(a) Statistical survey of the Association of Austrian Cities and Towns on prices in the fields of water supply and wastewater disposal for cities > 10,000 inhabitants, of which there are 71 in the country (ÖSB, 2001). These 71 cities account for roughly half of Austria's population (written communication, Statistics Austria, 6 June 2002).

(b) Study by the Institut Français de l'Environnement and the Service Central des Enquêtes et Etudes Statistiques of 5,000 cities and towns representing all sizes and types of management, assuming an annual consumption of 120 m³ (IFEN/SCEES/Agences de l'Eau, 1998).

(c) Statistics on prices and charges compiled by the Office of Water Services (OFWAT, 2002c: Table 6 and Table 14).

(d) The assessment basis may reflect a defined minimum rate that is charged if actual consumption is below the minimum rate threshold.

(e) Rateable value.

(f) Rented flat, 80 m², two adults, one child, one toilet, one bathroom and an annual water consumption of 150 m³ (ÖSB, 2001)

(g) Average household (2.4 persons) with an annual water consumption of 120 m³, including all taxes (Ministère de l'Économie, des Finances et de l'Industrie, DGCCRF, 2001).

(h) Data in £ (£ 1.00 = € 1.58, 20 September 2002). Source: OFWAT, Tariff Structure and Charges, various years.

(i) Austria: a fictitious household is composed of two adults and one child (ÖSB, 2001). France: an average household is composed of 2.4 persons (INSEE, 1996). England/Wales: corresponds to 2.3 persons/household (UBA, 1998).

(j) Calculated from the annual costs of wastewater disposal per household and the number of persons per household, which varies between 2.5 and 2.3.

In **Germany**, wastewater charges are calculated either on a split (wastewater/precipitation water) or on a freshwater basis. In 1999, the charge was € 1.39 per m^3 of wastewater and € 0.77 m^2/a of precipitation water, while a charge of € 2.18 per m³ was levied on the freshwater basis. In 2001, the annual wastewater bill amounted to € 117 per person and to € 211 per household (cf. Vol. 4, Chapter 4.1.6). In the **Netherlands**, wastewater charges are calculated on the basis of the discharged population equivalents (pop.e.)[42]. According to this basis, the average annual bill paid by one household (3 pop.e.) for wastewater treatment is approx. € 136 (cf. Vol. 4, Chapter 4.2.6).

One-time-only **connection charges** are levied in all countries examined. Likewise, the wastewater charges of all three countries are composed of a fixed and a variable share. Consumption-independent billing is used in a few Austrian municipalities (chiefly on the basis of built-up surface) as well as in 80% of households in England and Wales (rateable value).

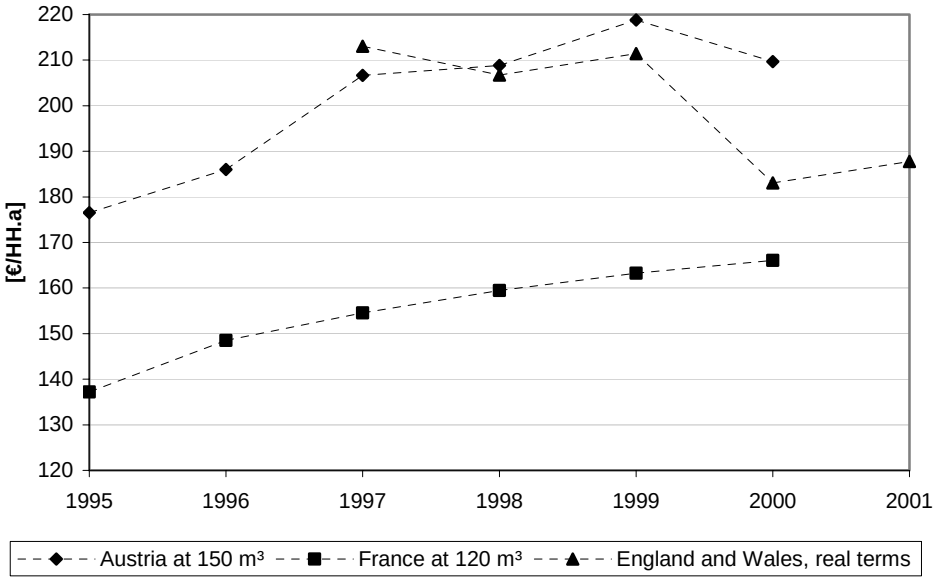

Fig. 4-4: Development of household bills in wastewater disposal (M6)

The development of annual household bills for wastewater disposal from 1995 to 2000 (Fig. 4-4) shows that the bills increased steadily in France while rising in Austria until 1999, only to drop to the 1998 level in 2000. In England and Wales, annual wastewater bills tended to oscillate (decrease from 1997 to 1998, increase in 1999), with a price reduction by approx. 13% in 1999-2000 due to the regulatory interventions of OFWAT (cf. Chapter 4.7.2).

The **per-capita annual bills** for wastewater treatment differ from water supply accounts with respect to their proportions. Contrary to water supply (cf. Chapter 4.7.2), the annual per-person costs for wastewater disposal in Austria exceeded those of France and England

[42] One population equivalent corresponds to 136 g of oxygen demand (cf. M6 of the Dutch country study, Chapter 4.2.6).

and Wales (by 21% and 5%, respectively). The reason for this seems to lie in the substantial investments in wastewater disposal made in Austria when implementing the Urban Waste Water Treatment Directive[43]. Moreover, the construction costs of sewerage systems in Alpine regions are obviously significantly higher than in plains.

4.7.4 Prices and charges for water supply and wastewater disposal

The following Table 4-43 summarises the prices and charges for water supply and wastewater disposal shown separately in Sub-Chapters 4.7.2 and 4.7.3, thereby offering a complete overview of all bills annually payable by customers for the water sector services.

Table 4-43: Annual bills for water supply and wastewater disposal (M6)

Category		Unit	Austria	France	England/Wales
Basis year			*2000*[(a)] *Fictitious HH*[(b)] *with 150 m³*	*1998*[(c)] *Standard HH*[(d)] *with 120 m³*	*2001-02 Household*[(e)]
Average annual costs for water supply and wastewater disposal of one household	1995	€/HH/a	303.73	274.06	n.av.
	1996	€/HH/a	323.09	291.24	n.av.
	1997	€/HH/a	348.57	300.97	385.61
	1998	€/HH/a	355.80	307.12	383.45
	1999	€/HH/a	366.78	312.42	388.18
	2000	€/HH/a	361.43	317.60	345.56
	2001	€/HH/a	n.av.	n.av.	370.83
Persons per household [(f)]		I/HH	2.5	2.4	2.3
Calculated annual costs for water supply and wastewater disposal per person [(g)]	2000	€/I/a	144.57	132.33	150.24

(a) Statistical survey of the Association of Austrian Cities and Towns on prices in the fields of water supply and wastewater disposal for cities > 10,000 inhabitants, of which there are 71 in the country (ÖSB, 2001). These 71 cities account for roughly half of Austria's population (written communication, Statistics Austria, 6 June 2002).

(b) Rented flat, 80 m^2, two adults, one child, one toilet, one bathroom and an annual water consumption of 150 m^3 (ÖSB, 2001).

(c) Study by the Institut Français de l'Environnement and the Service Central des Enquêtes et Etudes Statistiques of 5,000 cities and towns representing all sizes and types of management, assuming an annual consumption of 120 m^3 (IFEN/SCEES/Agences de l'Eau, 1998).

(d) Average household (2.4 persons) with an annual water consumption of 120 m^3, including all taxes (Ministère de l'Économie, des Finances et de l'Industrie, DGCCRF, 2001).

(e) Data in £ (£ 1.00 = € 1.58, 20 September 2002). Source: OFWAT, Tariff Structure and Charges, various years.

(f) Austria: a fictitious household is composed of two adults and one child (ÖSB, 2001). France: an average household is composed of 2.4 persons (INSEE, 1996). England/Wales: corresponds to 2.3 persons/household (UBA, 1998).

(g) Calculated from the annual costs of water supply and wastewater disposal per household and the number of persons per household, which varies between 2.5 and 2.3.

[43] In wastewater disposal, the average annual investment spending per I connected for the 1993-2001 period were € 138 in Austria vis-à-vis € 52 in England and Wales and € 59 in France (cf. synthesis for M5; Chapter 4.6).

Between 1995 and 2000, the annual water supply and wastewater disposal costs per household rose in Austria (the only exception being a slight decrease in 2000) and France while dropping by 12% in 2000 in England and Wales, following a period of slight increase and decrease. This reduction is due to the regulatory interventions of OFWAT (cf. Chapter 4.7.2). However, it should be noted that the annual household bills for water supply and wastewater disposal in England and Wales once more increased significantly in 2001 (almost attaining the level of 1999).

4.8 Synthesis of quality criteria (Module 7)

W. Hansen, N. Herbke (Ecologic)

4.8.1 Legal limit values

To a significant degree, all requirements for drinking water quality are determined by the "new" European **Drinking Water Directive** (**98/83/EC**) (cf. Chapter 2.3), which the EU Member States have pledged to transpose into their national law, thus adapting their legislation to the new Community requirements. Austria, Germany as well as France have transposed Directive 98/83/EC entirely into their national laws. The European Commission has instituted an infringement procedure against the United Kingdom for failing to fulfil its obligations under Directive 98/83/EC, since the corresponding legal provisions were not yet enacted in Wales (and Northern Ireland)[44].

The new Drinking Water Directive stipulates limit values for drinking water regarding a number of parameters that must be complied with "*in the case of water supplied from a distribution network, at the point, within premises or an establishment, at which it emerges from the taps that are normally used for human consumption*". This new standard embodied in Directive 98/83/EC, i.e. to comply with requirements for drinking water **at the point at which it emerges from the taps**, was taken account of in the national laws of the countries examined.

Analogously to the Drinking Water Directive, the national laws of the countries examined subdivide the parameters into limit values (microbiological and chemical parameters) and parameters with indicator function (e.g. turbidity, taste). Both France and England and Wales have included additional parameters in their national regulations and moreover assigned limit values to parameters defined as parameters with indicator function in Directive 98/83/EC, thus classifying them as chemical parameters. Conversely, Austria decided to classify all parameters in keeping with the requirements of the Drinking Water Directive (cf. Vol. 1, Chapter 1.7).

Furthermore, France has added the chemical parameters "benzene" and "microcystin-LR" to the parameters of the Drinking Water Directive and set a limit value for barium. Additionally, France has defined water turbidity as a binding limit value, although the Drinking Water Directive mentions this parameter merely as a quality indicator (cf. Vol. 3, Chapter 3.7). In England and Wales, a binding limit value was set for turbidity as well as for eight further parameters with indicator function[45] and tetrachloromethane (cf. Vol. 2, Chapter 2.7). It may be assumed that the approach of France as well as of England and Wales, i.e. to include a number of parameters with indicator function in the list of binding limit values, is rooted in problems with drinking water quality.

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[44] Cf. opinion of the Advocate General (of the European Court of Justice) Mr. Siegbert Alber of 15 October 2002, C-63/02, [http://europa.eu.int/jurisp/cgi-bin/form.pl?lang=de].

[45] Aluminium, colour, hydrogen ion concentration, iron, manganese, odour, sodium, taste.

Moreover, the parameter “Cryptosporidia” is monitored with particular intensity in England and Wales due to two epidemics of cryptosporidiosis in the mid-1990s.

None of the countries examined provides for a **minimisation rule**, i.e. the requirement to minimise the concentration of chemical substances in drinking water where this is possible from the technical and economic angle, as e.g. stipulated in the German Drinking Water Ordinance (cf. Vol. 4, Chapter 4.1.7.1).

4.8.2 Drinking water quality

While the new Drinking Water Directive (98/83/EC) stipulates compliance with limit values “at the point at which (water) emerges from the taps”, monitoring was hitherto a task carried out by the waterworks. The available data thus refer to the quality of drinking water at the point of exit from the waterworks.

Any comparison of drinking water quality between the countries analysed is complicated by the divergent quality of the data stock (cf. Chapters 1.7.1, 2.7.1 and 3.7.1 in the country studies). While French data on drinking water analyses complying with limit values per parameter for a three-year period (1993-1995) are available, England and Wales records data that are in excess of the prescribed concentrations or values[46] (data of 2001). In Austria, no data on drinking water quality covering the entire national territory are available. However, information on drinking water quality (at least regarding the parameters “nitrate” and “pesticides” and the chemical parameters of the Drinking Water Ordinance) delivered by the individual water suppliers is provided to customers (cf. Chapter 4.8.3.2).

Both in France and Austria, quality problems relating to drinking water mainly concern atrazine (a pesticide) and nitrate. Atrazine and nitrate loads in drinking water are limited to specific regions (mostly with intense agricultural use). Austria moreover has indicated quality problems relating to lead.

In France and in England and Wales, it is the limits for microbiological parameters that are most frequently exceeded, although this development is strongly on the decrease in England and Wales. Quality impairments caused by nitrites, polycyclic aromatic hydrocarbons and iron were likewise recorded for England and Wales. In 1995 and 1997, a few isolated cases of drinking water contamination with Cryptosporidia were reported.

4.8.3 Monitoring of drinking water quality

EU Directive 98/83/EC stipulates as follows, *“The Member States shall take all measures necessary to ensure that regular monitoring of the quality of water intended for human consumption is carried out, in order to check that the water available to consumers meets*

[46] Prescribed concentration or values (PCV).

the requirements of this Directive and [...] the parametric values set […].” In the countries examined, this is implemented by various national monitoring systems (cf. Chapters 1.7.3, 2.7.3 and 3.7.3 of the country studies).

4.8.3.1 Self-checks of undertakings and monitoring by authorities

In all three countries examined, suppliers are obligated to check their own installations, with the scope and importance of additional monitoring input by the authorities varying from country to country.

In Austria, operators of water supply installations have the duty to communicate the results of their self-checks to the governor of the respective federal province, who may order that the scope and frequency of these self-checks be stepped up and that certain measurements in connection with disinfection processes be carried out by provincial or other bodies.

Conversely, in France the Directorates of the Départements for Health and Social Affairs (DDASS[47])—**irrespective** of any self-checks by suppliers—additionally monitor drinking water quality. The DDASS (and thus the Ministry of Health) have the exclusive competence to declare water suitable for human consumption.

In England and Wales, the results of these self-checks must be relayed to the competent authority and the municipality in question as well as made publicly accessible. DWI is in charge of quality standard monitoring and reporting duties.

4.8.3.2 Consumer information

According to the Drinking Water Directive (98/83/EC), Member States shall take the measures necessary to ensure that adequate and up-to-date information on the quality of water intended for human consumption is available to consumers. In addition to consumer information, each Member State shall publish a report every three years on the quality of water intended for human consumption (the first report covering the years 2002, 2003 and 2004).

In Austria, suppliers are to inform consumers once annually on drinking water quality together with the water bill, via information sheets of the local authorities or in some other suitable manner. As a minimum requirement, suppliers are to state the values for the parameters “nitrate” and “pesticides” as well as the chemical parameters specified in the Austrian Drinking Water Ordinance (cf. Vol. 1, Chapter 1.7.3).

Conversely, in France it is a public authority task to update the general public on water quality. The prefects inform the mayors, who put the results up on the notice board of the

[47] Directions départementales des affaires sanitaires et sociales.

town or city hall. Moreover, the prefects supply the mayors with a annotated summary of the results of the quality checks, which is then published (cf. Vol. 3, Chapter 3.7.3).

No data beyond a general duty to update consumers on drinking water quality are available from England and Wales. However, a wealth of information on drinking water quality is available on the Internet and published by DWI (e.g. an annual report on the status of drinking water quality in England and Wales). If limit values are exceeded, the respective water supplier is obligated to inform consumers (cf. Vol. 2, Chapter 2.7.3).

4.8.3.3 Consequences of a failure to comply with the parametric limits

The measures to be taken by Member States in case of failure to comply with quality standards are likewise described in the Drinking Water Directive (98/83/EC): if a parametric value is exceeded, action must immediately be taken to identify the cause and implement the necessary remedial measures to restore water quality. If the situation constitutes a potential danger to human health, the use of this water must be restricted or prohibited. The competent authorities are to decide on the course of action.

In all countries examined, the competent monitoring authorities are to consult with the suppliers regarding the remedies to be taken and the corresponding work schedule. While water suppliers in England and Wales consult with DWI regarding suitable measures to ensure more stringent quality checks, DDASS (in France) and the governor of the respective federal province (in Austria) negotiate the necessary measures together with suppliers.

In England and Wales, DWI, as the competent authority, may take enforcement measures vis-à-vis water suppliers if quality standards are infringed on a continual basis, although this happens increasingly rarely. In addition, consumers in England and Wales have a right to certain quality standards being observed, which entails a right to compensation by the respective water supply company in case of infringement.

Directive 98/83/EC provides for **derogations** from the set parametric values. Member States may provide for derogations that do not constitute a potential danger to human health and provided that the drinking water supply in the area concerned cannot otherwise be maintained by any other reasonable means; these derogations shall not exceed three years. In exceptional circumstances, a Member State may prolong a derogation for two more times for a period not exceeding three years each.

In Austria and in France, the governor of the respective federal province or the prefect are responsible for the granting of a derogation (cf. Vol. 1 and 3, Chapters 1.7.3 and 3.7.3); this derogation stipulates a programme of measures (which in France contains a maximum limit value) and a period for remedial action. In Austria, this derogation option is made use of by many water supply installations. A total of 155 Austrian water supply installations operate with a derogation regarding atrazine. No data are available on the number of derogations in force in France.

4.9 Synthesis of consumers' and workers' interests (Module 8)

G. Oppolzer (IFIP, TU Vienna)

4.9.1 Comparison of consumer protection and consumer representation in national law

As EU Member States, all countries examined have the duty to transpose Directive 98/83/EC (Drinking Water Directive), which lays down fundamental standards of consumer protection in water supply (quality requirements, information and monitoring duties, etc.) and stipulates much stricter requirements than its predecessor, the 1980 Directive, into national law. This has already happened in Austria and France; the United Kingdom will follow suit as per the end of 2003.

The legal relations between suppliers and consumers are regulated variously by the countries covered in this report. In England and Wales, they are embodied in the Water Act of 1989 (and the Water Industry Act of 1991), a statute that also laid the basis for the privatisation of water management in England and is largely civil-law in character. It also contains legal provisions for tap water, since this is exempted from general British food law.

In France, the relevant provisions are embodied in the Health Code and Municipal Code, i.e. in statutes clearly belonging to administrative law. Consumer representation is laid down in the Chevènement Act adopted in 1993 (see the following chapter).

In Austria, the (civil-law) Consumer Protection Act can be applied to the water sector only to a very limited degree; more relevant statutes are the Water Act, the Supply Acts of the federal provinces (which come under administrative law) and the Food Act, which likewise is of a more administrative-law character.

This—very rough—distinction into civil law and administrative law shows that, in Austria and France, the state views itself as primarily responsible for consumer protection in water management, while its task in the United Kingdom is more to act as a guarantor of fair legal relations between third parties.

4.9.2 Role of consumer representation in the countries compared

Consumer representation is most strongly institutionalised in England and Wales, where legally embodied advisory groups are an integral part of the economic regulation processes. As employees of the regulator OFWAT, consumer representatives are, however, subject to directions and less independent in their actions than e.g. private associations.

In France, consumer advisory boards (CCSP commissions) were established for big public supply undertakings after the English model; while the CCSP have no co-determination

competences, they are involved in all major company decisions as advisors. It is their main task to improve the information and communication process between citizens and undertakings. Apart form the CCSP, a variety of local initiatives and associations joined forces with the media in their fight for concrete objectives, e.g. the reduction of prices perceived as excessive, the non-extension of concession contracts or stricter environmental monitoring in agriculture.

In Austria, consumer representation in water management seems to be no issue of relevance. There are no legally embodied or private institutions chiefly addressing this topic. In case of problems, consumers tend to contact the local authorities or waterworks directly. Local and provincial politicians occasionally take problem issues on board (captive customers, lead content in drinking water), yet only the recent privatisation and liberalisation debate has managed to push the water sector more closely to the fore of public interest.

Table 4-44: Comparison of legal provisions, institutions, rights and duties of consumer representation concerning the water sector (M8)

	Legal basis of consumer representation in the water sector	Institutions of consumer representation in the water sector	Rights and duties of these institutions	Other interest groups acting on behalf of water customers	Conflict issues (examples)	Degree of media attention
Austria	None	None	-	In isolated cases: political parties, chambers of labour, environmental and consumer protection associations	Captive customers, lead content in drinking water, privatisation / liberalisation of water management, pricing	Moderate. Only in isolated cases
England & Wales	Water Act of 1989, Water Industry Act of 1991	One CSC (Customer Service Committee) per undertaking. National level (voluntary): ONCC (National Customer Council)	CSC: market analysis, reporting to OFWAT, involvement in price-setting process	Political parties, consumer protection associations, trade unions, others	1990s: extent of corporate profits, pricing, supply suspension in case of defaults in payment. Today: sewer spills, defective networks	High in the 1990s, now moderate
France	Chevènement Act of 1993	Compulsory consumer commissions (CCSP) in big supply companies. No national body	Exchange of information between customers and undertakings, counselling, lobbying	National consumer associations: UFC, CNCV. Trade unions, local citizens' organisations, environmental associations	Pricing, oligopoly of big groups, water pollution caused by agriculture	Depends on current issues, rather high

Source: Module 8 of country reports, compiled by IFIP.

4.9.3 Optional choice of supply type (centralised or decentralised) and of supplier

Discussions regarding compulsory connection to public supply or disposal systems vs. decentralised installations were limited to Austria. For sanitary, ecological and economic reasons, properties situated within specific catchment areas in Austria are principally subject to connection to an existing public water supply system or sewerage. This provision was considered a nuisance by citizens' groups and smaller co-operatives operating decentralised installations or planning to establish these at per-capita construction and operating costs that were lower than those of the centralised system. This led to lawsuits and Supreme Court decisions—mostly favourable to the complainants. Today, compulsory connection is usually deemed enforceable solely if an existing decentralised installation (well or small-scale treatment plant) might constitute a health hazard, but not if the centralised installation might incur economic handicaps as a result of the properties concerned not being connected to it.

In France, too, compulsory connection exists under certain conditions. In the field of wastewater disposal, the share of decentralised systems is equally large; however, no problems ensuing from unwanted connection or exclusion from the centralised supply system are known. A similar situation applies in Germany, where in addition to compulsory connection the use of centralised water and wastewater systems is also mandatory (BMU/UBA, 2001a).

In England and Wales, the (theoretically available) possibility of self-supply or commissioning of an alternative, independent supplier is not made use of in practice. Over 99% of all households obtain water services from regulated undertakings.

With the exception of—quantitatively insignificant—inset appointments in England and Wales, water and wastewater companies in all countries compared are regional monopolies, which precludes the option to choose a (centralised) supplier. In France, where services of water supply and wastewater disposal are tendered anew after expiry of each concession, local citizens' initiatives unsatisfied with performances rendered have in a few cases brought about changes (example: re-communisation in Grenoble).

4.9.4 Comparison of customer satisfaction in the various countries

It is practically impossible to compare customer satisfaction with water-related services in the different countries, as no international yardstick exists. It is, however, possible to compare the significance attached to determining customer satisfaction in these countries as well as the way in which the survey results are handled.

It may safely be said that England and Wales has the most highly developed and standardised system for measuring customer service and satisfaction. The results of the regular surveys conducted by OFWAT and ONCC form part of the regulatory activities of OFWAT. Special attention is paid to customer contacts, e.g. frequency and subject-matter of customers' complaints, response time. Moreover, customer satisfaction with water and

service quality as well as the cost-benefit ratio are likewise regularly assessed and compared with the results of the previous year. The survey results show that the number of complaints, which had been extremely frequent after privatisation (mainly concerning prices and service interruptions), have decreased after the last price revision by OFWAT in 1999. Achievements of great importance from the consumer viewpoint, such as the ban on cutting-off the water supply of households, were accomplished in 1999. Thus 90% of all customers claim to be satisfied or very satisfied with their respective water company.

In Austria, water suppliers are legally obligated to update their customers on water quality and compliance with parametric values. Information and communication policies going beyond these requirements are voluntary. Surveys on customer satisfaction and general water management issues are irregularly carried out by some undertakings, federal provinces or the ÖVGW. It seems that satisfaction with water and supply quality is generally rather high, while the image of the supply companies appears to be less rosy[48]. Price sensitivity is rather low; prices (contrary, at least occasionally, to wastewater charges) are rarely perceived as a burden on the family budget. However, it may definitely be said that the privatisation of water supply is viewed with scepticism by most Austrians[49].

A standardised catalogue of indicators to measure customer satisfaction according to the English model is currently being prepared in France. An information centre (CIEau) established by several water companies conducts an annual customer satisfaction survey on the basis of a detailed catalogue of questions; the undertakings can then fine-tune their work in line with these results. The findings of these surveys are positive only to a limited degree: 80% of respondents are on record as being satisfied, while 18% are expressly dissatisfied with water supply and wastewater disposal. A (from the Austrian viewpoint) frighteningly high share of approx. 40% believe that tap water is unhealthy or not potable. However, this statement should be relativised by taking account of French lifestyles: in the country of Perrier and Evian, many families are unaccustomed to drinking tap water at table and even consider it somewhat “unstylish”, although the hygienic quality and taste are perfectly acceptable. The clear increase of water prices over the past 10 years has irritated many French, although the majority admit that improved water treatment and wastewater purification is bound to entail higher costs.

By way of summary, one might say that the water sector enjoys a worse reputation amongst French consumers than in England and Austria, even though this fact is influenced by a number of factors over which undertakings have no control.

With respect to all countries analysed, it is true that the lack of competition for customers has encouraged both private and public supply and disposal companies for a long time to make do without information or communication policies going beyond the strict legal requirements. Customers do not expect this, either—water supply and wastewater disposal are felt to be matter-of-fact services of general interest, whose provision is only discussed if the price/benefit ratio deteriorates. But this is exactly what has happened in all countries

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[48] 1993 ÖVGW survey, 2001 survey of the Water Supply Association of Northern Burgenland, 1999 survey of Upper Austria.

[49] Market Institut 2001, Kommunal 09/2001.

compared, chiefly in France and England, over the past 10 years, either due to internal (massive skimming of profits, low efficiency) or external causes (increased investment demand as a result of EU regulations in all countries, increased water pollution, above all in France). Generally, customers of water-related services are much more sensitive regarding quality than prices: justified and understandable[50] price increases are more easily accepted than drops in quality. An effective information and communication policy can boost the willingness of consumers to accept price increases as well as the overall image of the undertaking and its services; however, it is of little help in excusing drops in quality.

4.9.5 Acceptance of prices and dealing with social hardship cases

In general, the countries examined are characterised by a very high degree of willingness and financial resources to pay water bills. Undertakings definitely encounter fewer cases of delayed payment than e.g. the electricity or telecommunications sectors. However, this does not mean that customers always agree with the billed amount. In England and Wales, frequent customer complaints regarding mushrooming prices and company balance-sheet reviews by OFWAT led to a considerable reduction of price caps in the context of the 1999 revision. In France, several protests by consumer protection associations against inflated prices were successful; however, this did not in any way influence the national price level.

In each of the countries, there exists in fact a certain percentage of households that due to poverty or a temporary financial bottleneck are unable to pay their bills. In England and Wales, the privatised water companies responded to arrears in payment by cutting off these households' water supply or delivering only against advance payment—an approach that in the mid-1990s led to massive public protest. This practice was outlawed in 1999 with the argument that water is essential for warding off epidemics and thus must in any case be delivered. While there exists no general prohibition in France and Austria to cut non-paying household customers off from supply, companies act in this spirit and much rather write off bills as irrecoverable or have them paid by social services offices (see below).

A legal claim to a reduction or waiver of water and wastewater charges due to social neediness (*social tariffs*) applies solely in England and Wales and only under special conditions. However, a number of indirect benefits and special regulations for social hardship cases exist in all countries.

In all three countries, some regions calculate water prices and/or wastewater charges, not on the basis of consumption, but of the size of the property or flat. This implies a partial redistribution of the financial burden of charges to be borne by more affluent households. In France and Austria, it is widespread practice to have overdue bills be paid by charitable organisations or social services offices if agreements with the undertaking to establish generous instalment payments have been exhausted without success. However, some

[50] From the consumers' viewpoint, this definitely does not include dividend payouts.

debts are definitely irrecoverable and thus written off by undertakings. To maintain payment continuity, several French social housing developers have adopted the practice of converting variable, irregular amounts charged by water companies into monthly fixed sums payable by their tenants.

No comparable data are available regarding either the frequency of payment delays in percent or the share of irrecoverable bills.

4.9.6 Comparison of average gross pay of workers in the water sectors

There exist no internationally standardised data on the average pay by economic sector. The national information taken from the country studies can be compared only to a limited degree, as it is probably based on a variety of assessment methods and refers to different assessment bases. The following information and comparisons should therefore be viewed without expecting total data reliability.

Table 4-45: Comparison of average gross pay of workers in the water management, electricity and construction sectors (M8)

	All sectors	**Water supply and wastewater disposal**		**Electricity supply**		**Construction industry**	
€/employee/ year, in 2001 figures	Average gross annual income of salary and wage earners [e]	Average gross annual income	In % of all sectors	Average gross annual income	In % of all sectors	Average gross annual income	In % of all sectors
Austria, 2000 [a]	[26,200] [e]	36,823 [d]	141%	37,728	144%	27,583	105%
England & Wales, 2001[b]	[37,770] [e]	39,660	105%	48,570	129%	36,650	97%
France, 2001[c]	n.av.	33,000-36,000	-	n.av.	-	n.av.	-

(a) Statistics Austria: gross salaries and wages paid by undertakings excluding agriculture in 1995, extrapolated acc. to gross earnings in the 1995-2000 period, by sectors.

(b) Streamlined Analyses New Earnings Survey 2001; € 1= £ 0.625.

(c) Barraqué, Module 8, French country study.

(d) Refers only to water supply.

(e) The big difference between the stated average pay in England and Wales and in Austria indicates that the sources use different calculation methods and therefore can be compared only to a limited degree. In 2000, the per-capita GDP in the UK was (only) by 17% above that of Austria, in terms of exchange rate parities.

Source: IFIP, 2002

The average pay in water management in the countries examined is rather similar, with England and Wales at the top. However, if we consider the different overall economic level of salaries/wages and prices, which in the United Kingdom is roughly 15-20% above that of Austria, the Austrian water industry workers in fact receive better pay than their English colleagues, although it must be said that the primary data are too inconsistent for a more

precise comparison of countries. Still, it may definitely be stated for both England and Wales and for Austria (there are no comparable data available for France) that water management presents a markedly higher pay level than the construction industry. While it almost attains the pay level of the electricity industry in Austria, it is approx. 18% below that level in England and Wales.

It might be stated, though, that the arithmetic mean, aggregated for all workers, is on its own hardly sufficient for describing the pay structure of a sector in one country or for comparing several countries. Yet no further information (variance, differentiation into white-collar and blue-collar workers) that would lend itself to comparison is available in any other form.

4.9.7 Interests of workers in the water sector

Institutions representing workers' interests

None of the countries examined has a body representing the specific interests of water industry workers. Water industry workers are organised in the same manner as their colleagues in other sectors. Only in Austria, workers' interests are legally represented at a supra- or inter-company level (Chamber of Labour); workers are organised in trade unions on a voluntary basis. In addition to collective bargaining, key elements of political work include the negotiation of favourable staff recruitment conditions in case of company restructuring or, if possible, attempts to avoid that such an event will occur at all.

Table 4-46: Overview of institutions representing workers' interests in connection with the water sectors in the countries compared (M8)

	Representation of workers' interests at company level	Representation of workers' interests at supra-company level		Current focuses of political work in connection with the water sectors
		Obligatory membership	Voluntary membership	
Austria	Works council (in case of joint-stock or limited-liability companies also representation in the supervisory board) Staff representation (in public service)	Chamber of Labour	GdG (Trade Union of Local Government Employees), GPA (Trade Union of Private-Sector Employees)	Fight against privatisation and liberalisation trends Negotiating of favourable transition regulations for workers in case of outsourcing or company privatisation
England & Wales	Trade union groups (within companies)	None	Various trade unions	On the occasion of price cap drop in 1999: fight for reduction of dividends instead of layoffs (both events occurred) Negotiation of transition regulations wherever entire companies are sold
France	Comités d'entreprise	None	Various trade unions	Collective bargaining, etc.

Source: Module 8 of country reports, compiled by IFIP.

Labour relations and strike frequency

Traditionally, labour relations are rather good in the water sectors of all three countries. In the two countries dominated by private-economy solutions, i.e. France and England, trade unions participate in all relevant decisions. Strikes are extremely rare, which may also be due to the fact that staff active in this important service of general interest tend to shy away from any work stoppage.

Despite this, the trade unions were unable to prevent the numerous restructuring processes which entailed massive layoffs, chiefly in England and Wales. For this reason, they began to focus increasingly on containing the damage, i.e. negotiating acceptable transition regulations for the staff. In Austria, this applied to the formal privatisation of municipal utility companies; in England, to takeovers by other groups.

Consequences of restructuring and privatisation for workers

In all countries analysed, companies are being restructured in various ways in order to cut operating costs and hence also personnel costs. In such cases, Directive 77/187/EEC (safeguarding of employees' rights in the event of transfers), which refers to the transfer of public services to a private legal entity (irrespective of the ownership structure), prevents massive layoffs or the overnight deterioration of employment contracts. For this reason, all Austrian companies established through the privatisation of municipal enterprises took over these enterprises' staff at the same conditions as the former legal entity. In France, too, entities awarded a delegation contract will take over the entire staff of the former government-owned enterprise. In due course, however, it has become common practice both in Austria and France not to fill vacancies and to recruit new staff at different, usually inferior (from the employee's angle) working conditions. This is proof positive of a staff retrenchment process, albeit somewhat cushioned over time. It seems that in France and Austria the cutback trend is less marked than the trend to expand the service range without personnel increases (cf. Chapter 4.5.1.2).

The situation in England and Wales is different because the restructured undertakings are already private companies and hence do not come under the above-mentioned EU Directive. As already shown in Chapter 4.5.1.2, the worker volume has already decreased by more than 20% over the past 10 years. This was above all influenced by mergers and takeovers, where lower operating costs were both an objective and a prerequisite for approval by OFWAT, as well as by the trends of outsourcing or splitting tasks and staff between several undertakings (example: Dwr Cymru).

4.10 Synthesis of ecological criteria (Module 9)

N. Herbke, W. Hansen (Ecologic)

4.10.1 Combined approach (emission standard and water quality objective)

The Water Framework Directive embodies a combination of emission standard and water quality objective (combined approach) (cf. Chapter 2.2). The **water quality objective**, which ties the admissible quantities of discharged substances to the quality objectives for the respective body of water and stipulates that the interests of all users of a river basin be integrated, is already implemented or under preparation in France and Austria. In France, this approach was partly made reality in the water management and administration plans (SAGE[51]), although the **emission standard**, which defines unified emission criteria (limit values) for each discharger, is often applied (cf. Vol. 3, Chapter 3.9.1.1).

Austria has developed a draft for an immission ordinance in order to implement the combined approach together with emission ordinances. However, this draft has not been adopted so far; hence, the water quality objective has not yet been legally embodied as a water protection instrument (cf. Vol. 1, Chapter 1.9.1.1).

Conversely, England and Wales traditionally use the water quality objective approach. The Environment Agency checks whether or not the water quality objectives were complied with and duly grants discharge permits defining limit values for discharges (cf. Vol. 2, Chapter 2.9.1).

4.10.2 Water protection responsibilities

While the Environment Agency both grants wastewater discharge permits and monitors their compliance with legal regulations in England and Wales, competences in Austria and France are more clearly distributed between different institutions as well as between national, regional and local authorities (cf. Synthesis for M2, Chapter 4.3; Vol. 2, Chapter 2.9.1.1).

In France, the water protection programmes are co-ordinated at the national level, while implementation and monitoring are tasks of regional authorities and municipalities. Since the latter are relatively weak in France and partly lack the necessary funds or clout, problems regarding programme (SAGE) enforcement and compliance with legal provisions are no rarity (cf. Vol. 3, Chapter 3.9.1.2).

[51] Schéma d'Aménagement et de Gestion des Eaux.

4.10.3 Protection zones

Water protection zones or zones with limited water use may be designated in each of the countries examined in order to safeguard public water supply. However, depending on the respective country and the hazards potentially threatening a given body of water, we find differences between systems and restrictions of use that come into force as soon as a zone is designated a protection zone (no detailed data available).

In Austria and in England and Wales, protection and conservation zones as well as source protection zones[52] in the vicinity of groundwater abstraction points are designated by the competent authorities (competent water authority and Environment Agency). While in Austria certain forms of use may thus be explicitly restricted or banned by decree (cf. Vol. 1, Chapter 1.9.1.3), protection zone designation in England and Wales primarily signals local pollution risks (cf. Vol. 2, Chapter 2.9.1.3). Conversely, the relevant zones (water intake points) in France are subjected to a procedure resulting in protected status and the certification of the zone as a “public good” (cf. Vol. 3, Chapter 3.9.1.5).

Due to the diverse registration systems, but also due to the different restrictions, a direct comparison or assessment of the extent of protection zones is anything but easy. In Austria, 9% of the national territory is designated as protection zones; it is planned to designate further zones. While 2,000 intake points in England and Wales have been defined as source protection zones, approx. 30% of the intake points in France have so far been subjected to the procedure above and may thus been classified as protected. No data are available regarding the share of the national territory occupied by protected intake points in England and Wales as well as in France.

4.10.4 Preventive or end-of-pipe water protection

In the field of water protection, a distinction is made between preventive measures aimed at avoiding or reducing water pollution on the one hand and end-of-pipe measures, i.e. the purification of polluted bodies of water and the elimination of harmful substances from the water, on the other hand.

In France, the funds provided for investments in technologies to treat raw water for drinking water purposes are considerably more ample than those granted for preventive measures (cf. Vol. 3, Chapter 3.9.1.4). However, some approaches towards preventive water protection, e.g. promotion of voluntary pollution limits in agriculture, do exist (Ferti Mieux and PMPOA programmes; cf. Vol. 3, Chapter 3.9.2.3).

[52] SPZ

In Austria, agricultural undertakings are supported in the context of the environmental programme ÖPUL[53] since 1995, if they fulfil certain requirements of preventive water protection in the management of their acreage (cf. Vol. 1, Chapter 1.9.2.3).

4.10.5 Legal instruments of water protection

All countries examined dispose of a comprehensive legal framework for water resource protection. However, the extent to which groundwater and surface water resources are generally monitored varies from country to country.

In Austria, a series of ordinances regulates admissible emission levels and requirements for wastewater treatment (cf. Vol. 1, Chapter 1.9.2.1). However, the existing intervention leeway to improve groundwater quality is sometimes made little use of. For example, the Ordinance on Groundwater Limit Values provides for the possibility of designating rehabilitation zones and, if necessary, to decree an ordinance stipulating concrete measures. So far, however, this instrument is hardly ever used. Instead, water protection policy mainly focuses on subsidies when dealing with agriculture (cf. Vol. 1, Chapter 1.9.3.2.1). In addition, the quality of groundwater and surface water resources in Austria is assessed and monitored in the context of a comprehensive and nationally unified programme (cf. Vol. 1, Chapter 1.9.3.1). The programme data are annually published on the Internet (Federal Environment Agency).

While groundwater resources and surface water bodies used for drinking water supply are protected in France by strongly regulating legal instruments (see Chapter 4.10.3), there exists no comprehensive monitoring system of the Austrian type (cf. Vol. 3, Chapter 3.9.2.1). The key French problem relates to enforcement (see Chapter 4.10.2). The Water Police in charge of issuing permits as well as of their implementation and enforcement lacks the personnel and funds to meet these tasks in a satisfactory manner.

In England and Wales, groundwater and surface water resources are protected by a variety of laws. A monitoring programme in particular measures data on river water quality; these have been available on the Internet since July 2002 in the form of a database (cf. Vol. 2, Chapter 2.9.3). Information on groundwater quality is limited; a network of measuring points for groundwater sampling is currently being developed by the Environment Agency (cf. Vol. 2, Chapter 2.9.3.1).

4.10.6 Economic instruments of water protection

Prices and charges are economic instruments fulfilling a financial function; their chief objective is to fund water supply and wastewater disposal (see Synthesis for M6, Chapter

[53] German title: "Österreichisches Programm zur Förderung einer umweltgerechten, extensiven und den natürlichen Lebensraum schützenden Landwirtschaft".

4.6.1). By financing wastewater treatment plants, they contribute significantly to water protection. In addition to these financial instruments, there exist (para-)fiscal instruments aimed at institutionalising environmental costs, such as wastewater taxes and water abstraction fees, which are presented in the following section.

Both France and England and Wales levy **wastewater taxes**; these taxes constitute something akin to administrative fees in England and Wales, as they cover the fees incurred by the Environment Agency for discharge administration (cf. Vol. 2, Chapter 2.9.1.1). Conversely, French wastewater taxes are returned to the users in the form of water protection subsidies. While it is questionable whether these French taxes are sufficient to create a direct incentive for pollution control, the Agences de l'Eau, which levy these taxes, do tie their financial grants to the environmental commitment of the undertakings (cf. Vol. 3, Chapter 3.9.2.2). So far, no wastewater tax exists in Austria, since its introduction without EU requirement proved politically unacceptable (cf. Vol. 1, Chapter 1.9.2.2).

In France and in England and Wales, **water abstraction fees** are levied by the Agences de l'Eau and the Environment Agency. In England and Wales, these fees cover the entire administrative cost of water management and are based on licensed abstraction quantities (cf. Vol. 2, Chapter 2.9.2.2). In France, abstraction fees account for 2% of the average water bill. As a consequence of higher water bills, water consumption, in particular by industrial users, has decreased, although the relative scarcity of this resource is not adequately conveyed by the billed amounts (cf. Vol. 3, Chapter 3.9.2.2). No water abstraction fees are charged in Austria.

4.10.7 Water quality

The stock of data on the quality of groundwater and surface water varies from country to country (cf. Chapters 1.9.3, 2.9.3 and 3.9.3 of the country studies), which precludes any quantitative comparison. However, a general assessment may be carried out.

For England and Wales, there exists little information on groundwater quality, which is probably due to the fact that only 30% of the drinking water of England and Wales originates from groundwater and springs (vis-à-vis 70% in France and 99% in Austria, see synthesis for M1, Chapter 4.2.3).

The biological evaluation of surface water quality is based on a variety of indicators (Saprobia system in Austria, invertebrate composition in England and Wales, fish indicator, diatom index and biological global index in France) and hence equally precludes any direct comparison.

In all countries, it is obvious that the share of diffuse pollution of agricultural origin in the overall nutrient load is markedly increasing. In France, even the absolute nutrient load in water caused by fertilisers and pesticides is increasing in some cases.

4.10.7.1 Groundwater

In all countries, the main source of groundwater pollution is the contamination with nitrate and pesticides. In Austria, the regions most affected by groundwater pollution are situated in the east and southeast of the country (farmland). In recent years, the level of contamination with nitrates and atrazine, whose use in Austria was banned in 1994, has been decreasing (cf. Vol. 1, Chapter 1.9.3.2). In England and Wales, the agricultural use of atrazine is still permitted; together with mecoprop, it is the substance most frequently detected in groundwater (cf. Vol. 2, Chapter 2.9.3.1).

Contrary to Austria, France is still characterised by rising nitrate loads in groundwater. Moreover, contamination caused by pesticides constitutes a big problem in France as well; in some regions, arsenic and nickel pollution has likewise been observed (cf. Vol. 3, Chapter 3.9.3.2).

4.10.7.2 Surface water

If chemical criteria for water quality assessment are employed, two thirds of the big French rivers must be classified as being of medium to very low water quality. The rivers are subject to massive contamination both with nitrates and pesticides; in many cases, pesticides must first be eliminated before the water can be used for drinking water production. In addition, the level of eutrophication of stagnant waters is considered to be very high. Although clear improvements regarding pollution from point sources were achieved in recent years, surface water quality in France continues to be a major problem for drinking water production (cf. Vol. 3, Chapter 3.9.3.1).

In England and Wales, the water quality of rivers has significantly improved since 1990. Measurements conducted in 1999/2000 showed that less than 10% of the river sections monitored had to be classified as being of bad to very bad quality. Despite this, there still exists a problem with nutrient pollution; in particular, the eutrophication risk of lakes is considered to be high (cf. Vol. 2, Chapter 2.9.3.2).

The water quality of Austrian rivers may be called relatively good on the whole, although problems occur in areas subject to intense agricultural activity and in case of wastewater discharge into low-runoff bodies of water (cf. Vol. 1, Chapter 1.9.3.3.1). In most cases, the programmes launched to rehabilitate Austria's lakes were effective in stemming eutrophication, so that the quality of its lakes may be classified as being good to excellent (cf. Vol. 1, Chapter 1.9.3.3.2).

4.11 Annex to the synthesis

The consumer price index (CPI) was used to deflation currency data of different years to the standardised price basis of 2001.

Table 4-47: Consumer price index 1980-2001 for Austria, France and England and Wales (2001 = 1.0)

Year	Austria [a]	France [b]	England & Wales [c]
1980	0.567	0.451	0.363
1981		0.512	
1982		0.572	
1983		0.627	
1984		0.673	
1985	0.699	0.713	0.533
1986	0.711	0.732	0.563
1987	0.721	0.755	0.584
1988	0.735	0.775	0.604
1989	0.754	0.803	0.649
1990	0.779	0.830	0.698
1991	0.804	0.857	0.761
1992	0.837	0.877	0.793
1993	0.867	0.895	0.806
1994	0.893	0.910	0.826
1995	0.913	0.926	0.853
1996	0.930	0.944	0.878
1997	0.942	0.956	0.902
1998	0.951	0.962	0.932
1999	0.956	0.967	0.955
2000	0.978	0.983	0.974
2001	1.000	1.000	1.000
Average change p.a. (1980-2001)	2.7%	3.9%	4.9%
Average change p.a. (1980-1990)	3.2%	6.3%	6.8%
Average change p.a. (1990-2001)	2.3%	1.7%	3.3%

(a) Statistics Austria: Statistical Yearbooks for 2002, 1994, 1987.

(b) INSEE, 2002: consumer price index.

(c) CRI based on UK National Statistics.

Source: Compiled by IFIP, 2002.

Unless stated otherwise, all synthesis data referring to coefficients **per inhabitant connected** were calculated according to the following figures for water supply and wastewater disposal connections:

Table 4-48: Inhabitants connected to the central drinking water supply systems of the countries compared, 1980-2001

	1980	1985	1990	1995	1998	1999	2001
Austria [(a)]	5.790,000	6.047,000	6.415,000	6.809,000	*7.087,000*	7.226,000	*7.392,000*
England & Wales [(b)]		4.7725,400	49.112,700	50.500,000		52.300,000	*52.823,000*
France [(c)]		*54.802,000*	55.968,000	*57.134,000*	*57.425,500*		58.300,000

Figures not italicised were taken from the national sources below (rounded), while *italicised* figures are estimated or interpolated values used merely for comparative calculations.

(a) BMLFUW

(b) CRI based on OFWAT

(c) J.-M. Berland (OIEau-SNIDE)

Source: Compiled by IFIP, 2002.

Table 4-49: Inhabitants connected to the central wastewater disposal systems (sewers and treatment plants) of the countries compared, 1981-2001

	1981	1990	1991	1995	1998	2000	2001
Austria [(a)]	4.362,000		5.544,000	5.986,000	*6.551,000*	6.923,000	*7.096,000*
England & Wales [(b)]			48.929,000	49.519,000	49.816,000	50.295,000	*50.446,000*
France [(c)]		43.850,000		46.730,000	*47.431,000*	*48.132,000*	

Figures not italicised were taken from the national sources below (rounded), while *italicised* figures are estimated or interpolated values used merely for comparative calculations.

(a) BMLFUW, Water Protection Reports 1999 and 1996

(b) CRI based on OFWAT

(c) J.-M. Berland (OIEau-SNIDE)

Source: Compiled by IFIP, 2002.

5. Conclusions

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This final chapter once more aims at concentrating and summarising the results of the present study; it is composed of the following sub-chapters:

- Chapter 5.1 provides an overview of the key results of the analysis in the form of individual findings, structured around the most important sub-issues, and
- Chapter 5.2 derives perspectives for action from the results of the study.

The results of the analysis on which these statements are based are contained in the synthesis chapter and in the individual country reports. Regarding restrictions and the approach to data gaps, readers should consult Chapter 1.

5.1 Key results of the analysis

The present study had set itself the task to compare three highly divergent water sector systems, i.e. those of Austria, France and England and Wales. Although the basic data were anything but complete (see Chapter 1), important differences and common points as well as specific strengths and weaknesses of the three systems could be highlighted, which seems interesting for the Austrian discussion. The key results and findings are structured into sub-headings and summarised in the following section.

5.1.1 Competition and regulation

With respect to contacts with tariff customers, the water sectors, irrespective of ownership structures and system changes, maintain the **character of a monopoly** in all countries examined. So far, there exists no significant competition for tariff customers. The legal frame conditions provide for some degree of competition only with respect to (industrial) big customers; however, in practice this is impeded by economic, technical and natural conditions. This is borne out with even greater clarity in the liberalisation issue (the opening of water conduits to services rendered by a variety of operators, also called “common carriage”). In Austria, Germany, France and the Netherlands, this approach is considered too risky and politically undesirable. In England and Wales, common carriage is provided for by law; however, technical and sanitary risks motivated undertakings to formulate access codes that are so restrictive that common carriage has not become reality in England and Wales, either. However, in all countries examined, competition does exist,

albeit to varying degrees, in key market segments of the water sectors (in particular competition for upstream activities; in France and Germany, there also exists competition for operating concessions and similar tasks); cf. Chapter 4.5.

According to the theory of regulation[54], natural monopolies must be economically regulated in order to prevent inefficiency and consumer exploitation and to safeguard democratically legitimised control of the industry and its undertakings for the benefit of the community. As the present study shows, the countries use highly divergent regulating instruments: England and Wales has instituted a central regulator (OFWAT); in France and Austria, where local authorities are in charge of the water sector, municipal policy-makers handle price regulation, albeit in a much less comprehensive manner. Moreover, competition (tenders for operating concessions) produces a certain cost squeeze in France, even though the loss of a concession has become a possibility to be taken seriously only in recent years (cf. Vol. 3, Chapter 3.4).

With concentration and private-economy involvement, the degree of institutionalisation and economic regulation increased as well (e.g. in England and Wales); the regulation of tariff systems, water prices, wastewater charges, profits or revenues and/or investments to ensure services in the supply areas are called for. In case of profit-maximising systems, regulation by means of price caps acted as a direct incentive to cut costs—an incentive that was palpable far beyond the expected degree. The substantial lowering of price caps in England and Wales in 1999[55] and the related profit decline show that the regulator functions effectively and is able to influence financial flows. However, this influence will take practical effect only with a few years' delay, due to the information edge of the undertakings.

In Austria, the focus of regulatory activities is on the promotion of investments in order to attain comparatively high environmental standards without having to increase charges beyond what is socially acceptable. While this eases the direct financial strain on consumers, it does not decrease external costs, as the difference between charges and costs is balanced by subsidies. This socio-political approach of limiting the transfer of water management costs moreover encourages unchecked urban spread, since part of the costs of urban development is socialised (cf. Vol. 1, Chapter 1.5.6).

Austria and Germany as well as France use different methods of political-democratic price control at the municipal level. The democratically elected representatives of the citizens negotiate prices and charges with municipal or private undertakings. In particular in France, new forms of public control have developed spontaneously, mostly as a direct criticism of the lack of efficient control over the contracts concluded between strong enterprises and weak—because hampered by the central government—local authorities:

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[54] Cf. Spelthahn, 1994; Sherman, 1989 et al.

[55] This decision was definitely also a political action by the new government (change of government in 1997, when the Conservatives lost the elections to the Labour Party headed by Tony Blair).

- Local consumer and self-help groups were formed to combat excessive water prices or inferior water quality;
- the media supported these campaigns, published reports on “excessive cases” and thus brought about the revision of numerous contracts, which went far beyond the municipalities originally covered in the reports.

Traditionally, the interests of citizens and consumers are directly advocated in water sector decisions by their elected representatives in municipal councils (this happens in Austria and Germany). If centralisation and privatisation intensify, the degree of institutionalisation of consumers’ interests via organisations established or commissioned by the government must needs increase as well (France and England and Wales, cf. Chapter 4.9). As borne out by the events in England and Wales after the privatisation push in 1989, this may almost completely cancel out democratic control by municipal councils.

The **population’s scepticism regarding the privatisation** of services of general interest, in particular concerning the water sector, is very high in Austria and Germany. However, operating models that provide for private participation but leave asset ownership and the right to levy charges in the public domain are generally accepted in Germany. In view of current political developments, combined with sometimes very tight municipal budgets, it is to be expected that private companies will be commissioned more frequently to handle smaller or bigger tasks of the water sector across Europe.

In England and Wales, privatisation, combined with the ban on mergers issued by the regulator OFWAT, has facilitated the takeover of water companies by foreign undertakings. Thus French, then U.S. and recently also German investors have increasingly acquired shares in English and Welsh water companies. The French groups Vivendi, Saur and Ondéo, which are subject to rather soft regulation in their own country, were thus able to expand massively on an international scale, diversify into other industries and develop into worldwide market leaders. Today, some of them have decided to ankle their environmental business segments. A small-scale, publicly owned municipal corporate structure such as in Austria impedes the participation of Austrian undertakings in international competition while at the same time rendering the takeover of domestic undertakings by foreign companies unattractive.

5.1.2 Investments and preservation of value

The countries examined are principally characterised by a high degree of uncertainty regarding both the actual value of the existing installations and the extent and practical implementation of necessary replacement investments. In France and Austria, an investment push took place in the 1960s and 1970s. It is likely that a big (though not precisely assessable) challenge will confront the water sectors in 20 to 30 years, when these installations will become obsolete more or less simultaneously. Both in France and Austria, re-investments are subsidised more extensively than replacement investments,

and both countries are concerned that the renewal rate will fall below the depreciation rate. Following an investment push in the wake of privatisation, the investment level in England and Wales has dropped considerably but still is almost double (in real terms) the level in the early and mid-1980s, when the water sector was administered publicly[56] (cf. Vol. 2, Chapter 2.5.5).

While the capital and operating costs of water sector installations in Germany and in England and Wales are almost entirely covered by current sales, this is hardly a feasible solution in Austria or France, above all in sparsely populated zones. These areas are supported by a strong subsidy system in Austria. On an average, one third of investment spending, both for water supply and wastewater disposal, is raised through federal and provincial subsidies. France has **developed** an **apportionment system** functioning through the **Agences de l'Eau**, thereby **partly levelling the charge burden between the regions**. Such regional compensation measures are increasingly clashing with the objectives of social fairness, cost-based pricing, control of urban spread and environmental efficiency.

But the private water management system of England and Wales, too, took recourse to public subsidies. At the moment of privatisation, the undertakings were able to acquire the fixed assets far below value, keeping capital costs relatively low. Moreover, England and Wales is the only country examined where preferential credits by the European Investment Bank (EIB) play an important role, as evidenced by the EIB initiatives to promote privatisation.

5.1.3 Costs, prices and charges

Out of all countries examined, the gap between (estimated) cost and income from prices and charges is biggest in Austria, which reflects a high degree of subsidisation. With respect to labour productivity, Austria clearly trails England and Wales but is ahead of France. This permits the inference that the higher (i.e. as compared to France) costs of wastewater disposal in Austria are due to factors other than personnel expenditure (some attempts at explanation are offered in the following section).

No direct correlation between the extent of personnel costs and the degree of privatisation was identified for the countries examined. While it was noted that in England and Wales private actors tend to lay off staff (surpluses) and sometimes also to introduce pay cuts, no significant difference between private and public bodies was detected in France. However, long-term trends seem to indicate that private French water companies tend to employ fewer workers but pay them better than municipal undertakings do. Personnel cost cuts often entail additional expenses for outside services (outsourcing), which, however, only arise occasionally and, if calculated correctly by the undertaking, are lower than the fixed

[56] However, before that time, in the 1970s (before the cost cuts introduced by the Thatcher government), the investment level of the publicly administered facilities was higher in real terms than in the 1980s.

costs saved. It is also due to the "privatisation subsidy" that England and Wales enjoys the lowest specific production costs of water management. Yet the differences between the source data are sometimes bigger within one single country than between the individual countries. The data stock thus does not lend itself to inferring any direct correlation between efficiency and organisational structure.

In the field of **wastewater disposal, Austria presents specific costs that are by 30 to 50% higher than in the other countries studied**. Without proposing a quantitative overview of all single components, the following **attempts at explaining the high wastewater disposal costs** incurred by Austria are put forward:

- Extremely high investment costs (if compared to those of the other countries) trigger high capital costs and hence higher production costs. Conversely, the significant investment costs are on the one hand due to a very high development level and purification standard in wastewater disposal (high water protection standards) and on the other hand result from high specific investment costs (per metre of sewer and/or inhabitant) due to the natural mountain landscape. However, some of the disadvantages are "homemade" and related to settlement structures, e.g. the high degree of urban spread in the plains[57] and a not always cost-efficient delimitation between centralised and decentralised wastewater disposal tasks.
- The question whether the high investment costs are also caused by "luxury" construction methods can be answered only to a limited degree: undoubtedly, the subsidisation principle provided little incentive to save costs. Conversely, though, Austria deliberately opted for the policy of hard-wearing, durable (and hence more costly) structures, which moreover had to comply with high standards of smooth integration into the surrounding environment and aesthetic appeal (in-ground settling tanks, superior-quality industrial architecture) ("e*nvironmental technologies as a status symbol*"), which definitely were not paid the same degree of interest in the other countries[58].
- While operating cost disadvantages due to the small-scale structure may exist, they are unlikely to be massive and may even be compensated by the advantages resulting from smoothly functioning, decentralised self-checks by treatment plant operators.

[57] However, this is a problem shared by Austria with the other two countries studied, i.e. France and the United Kingdom (without being able to draw any quantitative comparison).

[58] According to experts' assessments: H. Kroiss (TU Vienna), A. Schnattinger (Vienna Ombuds-Office for Environmental Protection) and others.

Table 5-1: Estimated production costs per inhabitant connected (including industry and public consumption)

€/I 2001 price basis	Austria	France	England & Wales [a]
Water	105-130	120-130	100-110 (110)
Wastewater	165-175	110-115	90-110 (115)
Total	**270-305**	**230-245**	**190-220 (225)**

(a) The values without brackets are the costs calculated at the company level; the values in brackets correspond to the estimated external costs based on a conversion of the subsidy granted at the moment of privatisation ("green dowry") to the annual costs not incurred according to the opportunity cost approach (calculated by IFIP; see country study for England and Wales).
Margins correspond to an estimate average starting in 1997; as a rule, the higher estimates apply for the years before 2000, while lower estimates should be assumed for the years after 2000 (consequence of price revision in 1999).

Note: The margins correspond to the results taken from different sources (rounded). Direct international comparisons of costs should always be interpreted with caution, since the national sources do not make use of identical assessment and calculation methods. Moreover, the (varying) supply and purification performance is not taken account of in the cost data.

Source: Aggregation of Table 4-26 and Table 4-27; compiled by IFIP.

The average prices and charges per inhabitant and year do not differ markedly in the countries compared (cf. Chapter 4.7). Water prices are highest in England and Wales, while Austria is the price leader for wastewater charges. However, Austrian prices and charges are kept low by public subsidies.

Table 5-2: Average prices and charges per inhabitant and year (2000)

	Austria	France	England & Wales
	Fictitious household with consumption of 150 m³	Fictitious household with consumption of 120 m³	Actual household
Water price	60.70	63.14	**70.67**
Wastewater charge	**83.87**	69.19	79.59
Total	144.57	132.33	**150.24**

Source: Country reports.

In Germany, the water price per inhabitant and year is € 79, with a wastewater charge of € 117, i.e. a total of € 196. In the Netherlands, the water price is € 67, with a wastewater charge of € 45, i.e. a total of € 112 per person and year (source: Country reports).

In interpreting the data in Table 5-1 and Table 5-2, it should be borne in mind that the costs include non-domestic consumption, while data on prices and charges do not.

Price elasticity of demand is rather low in water management, above all in the short term. Most customers are willing, at least where drinking water is concerned, to accept price increases if this reliably safeguards good quality.

5.1.4 Cost transparency and cost recovery

The costs of the water sector are only covered in France and, to an even more extreme degree, in Austria, if substantial subsidies are granted (cf. Chapters 4.6.4 and 4.6.7). Thus environmental subsidies also contribute to the frequently achieved surpluses of municipal or private enterprises and—where the water sector is still part and parcel of the ordinary budget of local authorities—possibly to the cross-subsidisation of other municipal tasks.

All countries examined are lagging behind regarding the establishment of cost transparency, which is a prerequisite of truly cost-based pricing. While separate accounting practices as demanded by the EC Transparency Directive are mostly already practised in France, England and Wales and Germany, Austria was trailing the other countries right into the mid-1990s. Novelties in municipal accounting (inter alia, due to the “restructuring” of budget items strongly determined by charge payments), which are given intensive attention in Austria since the 1990s, are gradually improving cost transparency.

So far, no country has comprehensively internalised the costs the environment or resources trigger for the national economy in water prices or wastewater charges. Likewise, the **polluter-pays principle** laid down in the Water Framework Directive has not yet been fully implemented in any of the countries examined. In Germany, the wastewater taxes and water abstraction fees of the Länder aim at this objective (as control and financing instruments). With respect to the direct discharge of pollution loads into natural bodies of water (wastewater tax), no instrument exists either in Austria or in England and Wales that taxes the three user groups—households, industry and agriculture—in relation to the pollution loads produced by them (this is in part tied to measurement problems). In France, the charges are used to levy an indirect wastewater tax on pollution loads. Austria, Germany and England and Wales moreover levy heavy-pollution surcharges for indirect discharges. Thus industrial enterprises discharging wastewater into public sewers in these countries pay a basically appropriate compensation for these pollution loads. However, in agriculture, a strongly subsidised economic sector, political reservations against higher charges (proportionate to pollution loads) are manifest.

5.1.5 Drinking water quality and water protection

No comprehensive data on drinking water quality covering the entire national territory of the countries analysed are available, thus precluding a systematic comparison of drinking water quality for the present time. It was reported that isolated and temporary problems with drinking water quality due to atrazine and nitrate exist in France and Austria. In England and Wales, quality impairments considered problematic tend to be caused by nitrites, polycyclic aromatic hydrocarbons (PAHs) and lead.

In Germany, Austria and the Netherlands, preventive water protection is traditionally assigned greater importance than in France or England and Wales. The latter two countries

tend more strongly towards technical solutions to problems (treatment stages for drinking water production) than towards preventive measures.

A good case in point is the use of the instrument of water protection zones in order to protect drinking water resources: In Germany and Austria, large areas surrounding the water abstraction sources have been designated as water protection zones (approx. 10% of the entire national territory), where comprehensive restrictions of use apply. While this instrument for groundwater protection is also employed in France, inefficient implementation has led to protection zones being designated for only one third of water abstraction sources. As mentioned above, this is to do with the insufficient financial and personnel situation of French local authorities. England and Wales provides for the possibility of designating source zones. However, contrary to the other countries, this does not entail any direct restrictions of use in these zones. Still, designation does enable the Environment Agency to decree certain restrictions of use for water resources or land, if required.

Due to a programme of massive investments in wastewater disposal, Austria will comply with the requirements in “sensitive areas” according to the EC Urban Waste Water Treatment Directive on a national scale as soon as the upgrading in Vienna and Graz has been completed. Conversely, in France and in England and Wales, these requirements (tertiary purification stage in areas with over 10,000 inhabitants) are met to a much lower extent. Due to the natural landscape of Austria, decentralised wastewater disposal is assigned great significance and is also highly developed from the technical angle.

5.2 Perspectives for action

In all countries examined, the water sectors are faced with new challenges that are in particular influenced by mounting cost pressures (both in private and public installations) and the new frame conditions of environmental policy. This situation may be viewed as an excellent opportunity, since the quality of a system is inter alia evidenced by the way in which it responds to increasingly complex and difficult conditions.

How can Austria’s water sector show itself up to this challenge, and what options result from the experiences made in the other European countries?

This question can be best approached by analysing the **specific strengths and weaknesses** of the Austrian system, which are briefly summarised in the following:

It is an obvious fact that the Austrian standard of **water protection** is very high if compared to other countries. The **quality of** water supply and wastewater disposal **services** may likewise **be called good** (service interruptions or sewer spillovers are a rarity, water loss is low, the purification level is excellent). Due to outstanding hydrological resources, water quality, too, is mostly very high. The fact that the water sector is largely a decentralised competence (of municipalities, small co-operatives, treatment plant operators, even of individual building owners) also engenders the advantage of a strong local sense of responsibility for the water cycle, at least in rural areas.

In addition to these strengths, however, Austria's water sector is also afflicted by massive **weak points**, in particular in the fields of **economy and organisation**.

The main stumbling-blocks compared to the other countries are high **production costs** in the wastewater sector, **low cost recovery** due to high investment subsidies and a subsidy system that offers but **little incentives for cost efficiency**. Moreover, Austria is affected by enormously heterogeneous tariff systems and price and charge levels[59] that often cannot be explained by regional differences in cost structures and hence are detrimental to the objectives of cost transparency and probably also of fairness. Yet insufficient cost transparency and an inadequately implemented polluter-pays principle are weak points the Austrian water sector system has in common with the other countries examined and whose solution in the context of the Water Framework Directive is an urgently studied issue in all countries.

Another disadvantage Austria is willing to put up with in exchange for its stable, smoothly functioning water services is the comparatively **low economic dynamism of the water sector**. Customer orientation, competition for upstream activities, participation in international business, to mention just a few aspects, are developed less strongly than in the other countries of the study. Due to a lack of competition, to strong worker representation and to the assured continuance of public undertakings under any circumstances, it is evident that rationalisation potentials are not always fully exploited and passed on to the customers.

The question arises whether the obvious weak points of Austria's water sector call for a radical system change, and what types of experience made abroad could be used to inspire reforms of the existing system.

The experience made in England and Wales has shown that profound system restructuring processes, such as the full privatisation of 1989, also cause enormous costs of transaction, transition as well as risk that must be borne by public authorities. A comparably massive intervention into existing structures entailing this high economic and political risk is only justified if the current situation is objectively in a very bad way, if the proposed reform is likely to generate long-term advantages for the economy as a whole, and if the majority of the population, too, are basically open-minded regarding the project. Without addressing concretely discussed reform models or using these as a starting-point for an analysis of the economic advantages of such a venture, it may certainly be stated that both the first and the third **prerequisite for a radical system change do not apply for Austria**. Austria's water sector finds itself in a truly unsatisfactory situation in none of the performance areas specified (economy, ecology, quality), and there is hardly any other public service where the concept of privatisation is met with so much public scepticism as the water sector.

While the institutional framework of Austria's water sector is not called into question, there exist, however, possibilities for optimisation in several segments; without aiming for a

[59] The heterogeneous character of tariffs in the other countries was not examined in greater detail; however, apart from Austria, it is of (a certain) relevance only in Germany and France.

complete list, these will be addressed in the following section. The experiences made in other countries regarding specific problems and instruments permit us to derive a number of ideas and options for action that might also prove of interest for Austria. As a rule, these international experiences cannot be directly transferred to the Austrian system because of the manifest differences, regarding not only the natural, but also the organisational and institutional frame conditions of the countries examined.

Economic regulation and subsidy policies

In fully privatised systems, price regulation by way of price caps automatically entails cost regulation, since the undertakings themselves are interested in cost reduction (e.g. England and Wales). However, if the difference between regulated price (reasonable charge ceiling) and production costs per service unit is balanced by public subsidies, price caps alone will create no incentive for cost minimisation[60]. The task of regulating economic sectors partly dependent on public subsidies therefore lies not only in price control, but also in safeguarding subsidy efficiency. For this reason, the design of subsidy policies functions as an important regulator, and the subsidising bodies could make use of these policies to control affairs in a more dominant manner than they do today.

The current assessment of Austria's investment promotion (environmental subsidies granted by the Federal Republic) as primarily dependent on the estimated costs and on socially acceptable tariffs should be viewed critically for the following reasons:

- Despite a few first approaches in the amended subsidy guidelines of 2001, incentives for cost reduction are still quite weak.
- The calculation of environmental subsidy rates according to socio-political maximum contribution ceilings is dubious from the regulatory policy angle. While one and the same measure may combine environmental and social policy objectives, the danger exists that one of the objectives will in the end be given short shrift. From the environmental policy angle, it would be desirable to calculate and rank the priorities of all subsidy commitments (solely) according to environmental efficiency criteria. If this is a social policy objective, the charges may be backed later on, either by means of direct subsidies to low-income brackets or by means of an apportionment between charge payers (as is common in France).
- The high quality of decentralised wastewater disposal in Austria is a strong point, while compulsory connection to the public disposal system is occasionally met with disapproval. The delimitations of the "yellow line" defining compulsory connection should therefore be reviewed according to criteria of environmental efficiency, alternative disposal options and regional planning.

[60] On a worldwide scale, privatised systems mostly use rates of return (where this logic does not apply), not price caps, as their regulator.

Supporting efficiency increases

Several promising initiatives to boost the efficiency of Austria's water sector regime are currently being discussed and implemented in pilot projects. The institutional framework for these measures, i.e. whether they should be purely voluntary, promoted by means of economic incentives or stipulated as binding by the competent authority, must be examined separately:

- Benchmarking as a structured method of comparing performances and costs of similar installations. So far, projects were limited to classic cost benchmarking, i.e. specific costs are compared on the basis of identical process services, thus highlighting cost-cutting potentials. To implement a quality strategy, it would also seem desirable to extend benchmarking to environmental and performance coefficients, thus highlighting specific potentials for performance improvement on the basis of identical costs. The correct selection of comparable coefficients is essential for creating the "right" incentives and for avoiding e.g. one-sided efficiency improvements at the detriment of performance or environmental quality.
- Strengthening of co-operation ventures between associations and treatment plant twinning to tap synergy effects and offset specific operating-cost disadvantages resulting from Austria's small-scale structure, yet without centralising competences; e.g. joint procurement of materials, joint awarding of engineering or construction services, joint customer billing, etc.
- Identification of niches in the international market and establishment of, or participation in, groups of companies composed of partners that complement each other; e.g. supply undertakings, environmental technologies, banks, plant development, lab services; in particular, the municipal structure of Austria (and Germany) is an interesting model for water sectors in developing countries.
- Technical and municipal associations should assist local authorities that plan to organise calls for tender and to award construction and/or operating commissions to private companies right from the beginning by providing information and advice as well as criteria for decision-making and data on available alternatives and innovative organisational solutions[61]. Of relevance here are above all options for contract drafting, so as to safeguard that local authorities will retain the desired degree of influence even after awarding contracts to private actors.

Ownership and investments

Due to the marked uncertainties regarding asset value and the related high investment risk, much is to be said for leaving **ownership of these assets with public (or non-profit)**

[61] This is not to relieve specialised lawyers of their work but rather to offer support in the early decision-making phase, when lawyers often are not even involved yet.

bodies. A corresponding trend is also revealed by the political discussions and developments in the European countries examined. Even in England and Wales, where—a unique trait in Europe—the entirety of fixed assets is owned by private undertakings, an emerging development indicates a trend of retransferring fixed assets, at least in part, to non-profit "compulsory co-operatives" (probably also as a consequence of the increasingly strict regulation by OFWAT).

This is linked to widespread efforts in Europe of separating the role of installation owner from that of operator. The French models of concession or lease-and-operate are thus increasingly gaining in importance. This requires **precisely formulated contracts** that stipulate the tasks to be handled by the operator on the one hand and those that are the owner's competence on the other hand. Since there exists a considerable problem of delimiting the scope of tasks relating to **maintenance (repairs)**—usually to be discharged by the operator—and those relating to **preservation of value (investments)**—usually a competence of the owner –, the contract must obviously contain accurate definitions. The drawback of any separation of responsibilities for maintenance on the one hand and value preservation on the other hand lies in the fact that this may not motivate the operator to make sparing and careful use of the installations, since replacement investments are not amongst its duties. Conversely, however, a lack of investment initiative on the part of the owner may put the operator under pressure by forcing it to continue the operation of obsolete installations, entailing high costs[62]. Both strategies result in generally unsatisfactory economic efficiency.

Still, experiences made in the 1980s in England[63] and also in France have shown that a **public entity as installation owner** is not **per se a guarantor of durable investment activities**. In England and Wales, the lack of investment activities on the part of public undertakings was in fact one of the main reasons for privatisation, and to this day the volume of French investments is clearly below the (estimated) value preservation threshold. A way of motivating public undertakings to engage in value-preserving investments of their own accord lies in permitting them to place depreciations to account as costs and to be allowed to earn the depreciation equivalent. This presupposes a cost accounting system that has not yet been introduced in all public undertakings of Austria and France. Apart from the possibility of recovering their input by way of prices and charges, further instruments (e.g. subsidies, requirements, incentive systems) may be necessary to safeguard long-term asset maintenance. The maintenance cost of water management installations should be high enough to make sure that the functionality of the facilities is in fact preserved.

The trends observed in England and Wales, France and Austria allow for the conclusion that the water sectors will need investment subsidies for as long as its infrastructure is still

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[62] The fact that the operating expense shares have been on the rise in France for years now while investment spending is decreasing does imply the assumption that this is the prevalent strategy in France.

[63] Cf. footnote 247, Chapter 2.5.9 (Vol. 1)

developing or being retrofitted. Water supply, whose infrastructure is much more highly developed at the national level than that of wastewater disposal, makes do with much lower subsidies than wastewater management, where the requirements laid down in the EU Directives have set much more stringent standards. A gradual reduction of subsidies in relation to the "maturity" of the development level in any case seems inadequate for Austria, where the share of subsidies, but also the wastewater purification standard, is highest.

The current political discussion in Europe in particular addresses the issue of **concession tendering**. The question frequently debated is whether local authorities might under certain circumstances (e.g. majority holdings of private undertakings in public utilities) be forced to organise concession tenders. This has met with considerable political resistance in Europe and would in fact endanger the autonomy of local authorities in the medium term.

Internalisation of external effects and water protection

With its demand for truly cost-based pricing according to the polluter-pays principle, i.e. the idea that polluters should pay for the damage caused by them, the European Water Framework Directive calls for the internalisation of external effects of water use *"including environmental and resource costs associated with damage or negative impact on the aquatic environment"* (Directive 2000/60/EC, recital 38).

Two types of external effects must be distinguished: On the one hand, there are external effects that influence (the costs of) the water sector (e.g. pollution loads eliminated in treatment plants without payment of a corresponding compensation by polluters). On the other hand, there exist external effects that impact the community in general in the form of damage to the environment (i.e. pollution loads not eliminated and hence contaminating bodies of water). Corresponding ways of internalisation must be identified for either type of external effects. The compensation for the first type of external effects (which are inflicted on them) is to accrue to the water companies themselves, while taxes levied for damage to the environment should perhaps be administered by an authority on the basis of corresponding legal provisions (e.g. by earmarking these funds for environment spending).

Key steps towards attaining cost-based pricing in the water sector include the following:

- The determination and standardised recording of water sector costs including true understanding of the cost structure **(cost transparency)** should be principally improved in all countries examined. Cost transparency is an essential basis to ensure truly cost-based pricing. Thus subsidy shares and potential cross-subsidisation can be rendered visible, making it easier to openly address and deal with them. Any decision for or against cross-subsidisation may (and must) therefore be taken on a documented and informed basis.
- The requirements of cost-based pricing also demand a **review of the heterogeneous tariff systems** of Austria's water sector. The outcome should not be a national levelling of charges but rather deliberate, regional differentiation

according to the costs actually incurred, without excluding supplementary social transfers, if necessary. For this purpose, it might be useful to create a more uniform calculation basis (e.g. length of pipeline per house connection and soil type as well as relief/land use as a key basis for fixed costs and water consumption/relief as a basis for variable costs).

- Economic instruments, such as the German wastewater taxes or water abstraction fees, which are used as control and financing instruments, can contribute towards sustainable water protection. In this context, both the amount of these taxes and fees, which must be acceptable, and the desired incentive effect need to be carefully assessed and considered.

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EVN Wasser: http://www.evnwasser.at (biggest Lower Austrian water company)

Grazer Stadtwerke AG: http://www.gstw.at (municipal utility company)

Innsbrucker Kommunalbetriebe AG: http://www.ikb.at (municipal utility company)

Linz AG: http://www.linzag.at (municipal utility company)

OEVGW: http://www.wasserwerk.at (Austrian Gas and Water Association)

Salzburg AG: http://www.salzburg-ag.at (municipal utility company)

Stadt Wien: http://www.magwien.gv.at/m31 (City of Vienna)

Stadtwerke Bregenz: http://www.stadtwerke-bregenz.at (municipal utility company)

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