Final Report for Work Package 1 (Phase 1)

Analysis of the European Unions Explicit and Implicit Policies and Approaches in the Larger Water Sector

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LIST OF ACRONYMS

AWB	Artificial Water Bodies
BAT NEEC	Best Available Technology, Non Exceeding Excessive Costs
EC	European Communities
EU	European Union
GATS	General Agreement on Trade and Services
GES	Good Ecological Status
HMWB	Heavily Modified Water Bodies
OFWAT	Office of Water Services
OMA	Optimal Management Area (ATO in Italian)
PP principle	Polluter Pays principle
PPP	Public-Private Partnership
PSO	Public Service Obligations
PSP	Private Sector Participation
SAGE	*Schéma d'Aménagement et de Gestion des Eaux* (plan for water management)
SDAGE	*Schéma Directeur d'Aménagement et de Gestion des Eaux*, (master plan for water management)
SGEI	Services of General Economic Interest
SGI	Services of General Interest
TEC	Treaty of European Communities
TNC	Transnational Corporation
TPA	Third Party Access
UK	United Kingdom
USO	Universal Service Obligations
WFD	Water Framework Directive
WSS	Water Supply and Sanitation
WTO	World Trade Organisation

CONTENT

CONCEPTS AND DEFINITIONS

This preliminary chapter gives the definitions of the main concepts used in following fields: i) water services, ii) services of general interest, iii) liberalisation and regulation, iv) environmental principles. These concepts will be extensively used in the project EUROMARKET, and need to be defined precisely. Other topics will be progressively added.

I WATER SERVICES, WATER USES, WATER SUPPLY AND SANITATION SERVICES

Water services

The term **'water services'** has been introduced in the Water Framework Directive (WFD, 23 October 2000):

- First, as a definition, in Article 2, point 38:

  "'water services' means all services that provide, for households, public institutions or any economic activity:

  (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater,

  (b) waste-water collection and treatment facilities which subsequently discharge into surface water."

- Second, since this term is of importance for taking into account the principle of recovery of the costs (including environmental and resource costs) of water services, it was further specified in the WATECO guidance document.

In this document ("Economics and the environment - the implementation challenge of the Water Framework Directive: accompanying documents to the guidance"), the WATECO working group has provided an Annex in order to help understanding the definitions of water services and water uses.

According to WATECO:

> "a key objective of the Directive is to promote sustainable water use, based on a long-term protection of available water resources (Article 1). The Directive distinguishes human activities into 'water services' and 'water uses'.
>
> Overall, a water service represents an intermediary between the natural environment and the water use itself. The main purpose of the water service is to ensure that:
>
> • Key characteristics of natural waters are modified (i.e. the service offered is this modification) so as to ensure it fits with the requirements of well-identified users (e.g. provision of drinking water), or
>
> • Key characteristics of water 'discharged' by users are modified (i.e. the service offered is also this modification, e.g. waste water treatment) so that it can go back to the natural environment without damaging it.
>
> Overall, a water service *per se* does not consume water nor produce pollution, although it can directly lead to morphological changes to the water ecosystem".

This leads to a broad definition of water services. In addition, based on the political consensus reached, p.e. self-services[1] are to be considered as water services in case they have a significant impact on the water status, while only impoundments for water supply constitute a water service (and not for hydropower, navigation etc.).

Water uses

The WFD also introduces the term **'water use'**, in Article 2, point 39:

> "'Water use' means water services together with any other activity identified under Article 5 and Annex II[2] having a significant impact on the status of water. This concept applies for the purposes of Article 1 and of the economic analysis carried out according to Article 5 and Annex III, point (b)[3]".

Member States shall ensure an adequate contribution of the different uses, disaggregated into at least industry, households and agriculture, to the recovery of the cost of water services.

[1] The difference here is that an water related activity can be provided either by third parties (e.g. communal water services) or on an individual basis that is called self-services (e.g. water treatment facilities of industry, agricultural water abstraction, septic tanks of households etc.).

[2] Article 5: Characteristics of the river basin district, review of the environmental impact of human activity and economic analysis of water use. Annex II on surface waters and groundwaters.

Water Supply and Sanitation services (WSS services)

In the EUROMARKET project, we shall speak of **'Water Supply and Sanitation services'** that is a more restrictive term than the definition found in the WFD and its interpretation in the WATECO-document.

WSS services are limited to the supply of drinking water and the collection and the treatment of wastewater. It is focused on services for urban and rural uses (domestic, commercial, industrial connected on collective networks). In particular, it excludes the transfers of raw waters over long distances and irrigation.

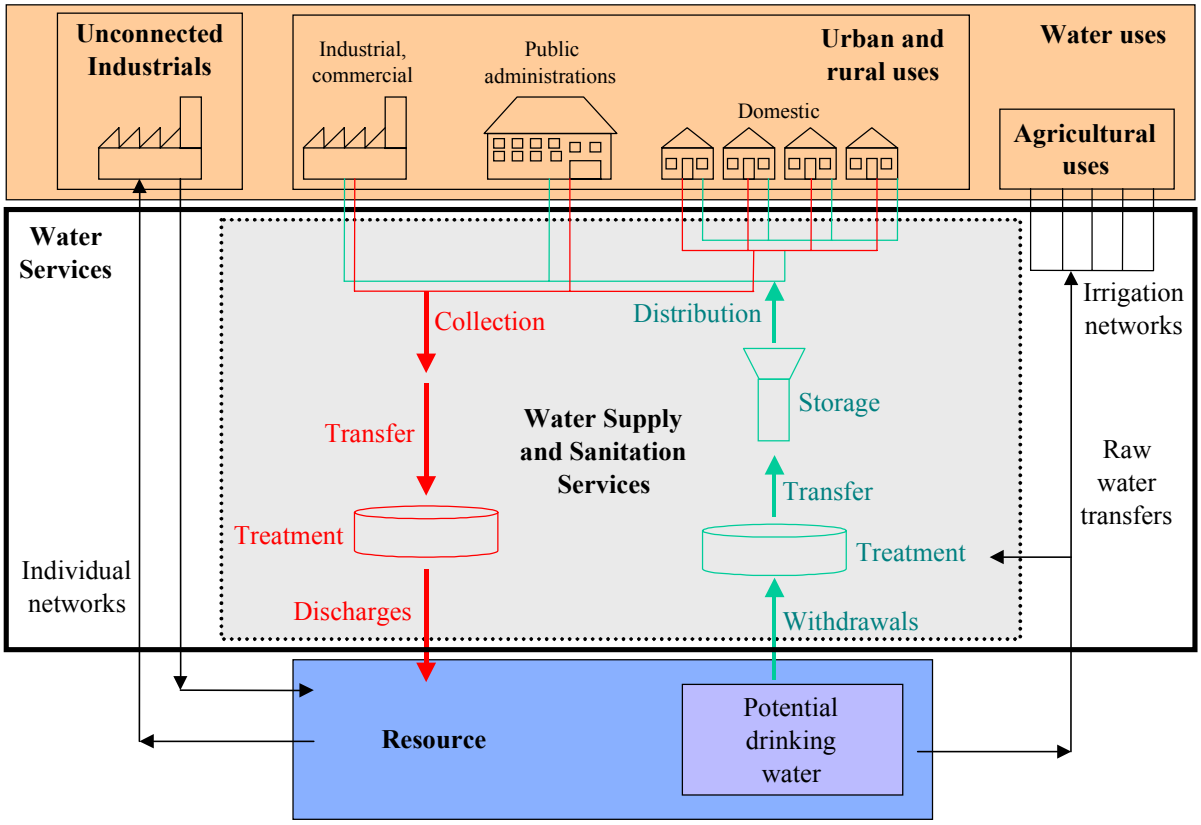
The implementation/management of WSS services may be shared between an authority responsible for the general organisation and political decisions, and an operator responsible for operation, maintenance and, in some cases, investment.

WSS services may depend on decisions/actions concerning the other water services. Therefore, some developments of EUROMARKET project may have to focus on these other services. Nevertheless, it will be done only from the perspective that it influences the core topic 'WSS services'.

As an illustration, Figure 1 represents the different terms (and their links): water services, water uses and WSS services.

[3] Annex III: Economic analysis.

Figure 1. Schematic representation of water services and water uses



II SERVICES OF GENERAL INTEREST, SERVICES OF GENERAL ECONOMIC INTEREST, PUBLIC SERVICE, UNIVERSAL SERVICE, SUBSIDIARITY

In order to avoid confusion and lack of comprehension, the European Commission was driven to define and use certain concepts that we will retain and that we shall refer to as definitions given by the European Commission in different texts[4].

Services of General Interest (SGI)

According to the different European Commission texts:

> "The term **'services of general interest'** cannot be found in the Treaty of Rome itself. It is derived in Community practice from the term 'services of general economic interest',

which is used in the Treaty. It is broader than the term 'services of general economic interest'…"

"They include non-market services (e.g. compulsory education, social protection), obligations of the State (e.g. security and justice) and services of general economic interest (e.g. energy and communications) which the public authorities class as being of general interest and subject to specific public service obligations. Article 86 of the Treaty (former Article 90) does not apply to the first two categories (non-market services and state obligations)".

Services of general interest seek to meet needs and wishes of consumers, citizens and society by:

- guaranteeing each person's right to have access to basic goods and services (e.g. health, education, transport, communications);
- promoting economic, social and territorial cohesion and solidarity as an expression of general interest at each level (local, regional, national, European);
- creating the conditions for sustainable development that is at the same time economic, social and territorial, thus satisfying the interests of future generations.

Services of General Economic Interest (SGEI)

According to the different European Commission texts:

"The term **'**Services of general economic interest' is used in Article 86(2) of the EC Treaty, formerly Article 90. A new Article 16 has been written into the EC Treaty by the Treaty of Amsterdam, acknowledging the place occupied by services of general economic interest in the shared values of the Union and their role in promoting social and territorial cohesion.

The term is not defined in the Treaty or in secondary legislation.

However, in Community practice there is broad agreement that the term refers to services of an economic nature, which the Member States, or the Community subject to specific public service obligations by virtue of a general interest criterion. The concept of services of general economic interest thus covers in particular certain services

[4] Green Paper on services of general interest, COM(2003) 270; Services of general interest in Europe, COM(96) 443 and COM(2000) 580; Report to the Laeken Council, COM(2001) 598.

provided by the big network industries such as transport, postal services, energy and communications. However, the term also extends to any other economic activity subject to public service obligations."

Public service

The term 'public service' is derived from a sound juridical and/or economic doctrine in certain European countries. In other countries, the notion is more a product of custom or case law. As the European Commission's texts also highlight:

"The terms 'service of general interest' and 'service of general economic interest' must not be confused with the term 'public service'. This term is less precise. It can have different meanings and can therefore lead to confusion. The term sometimes refers to the fact that a service is offered to the general public, it sometimes highlights that a service has been assigned a specific role in the public interest, and it sometimes refers to the ownership or status of the entity providing the service[5]."

Public Service Obligations (PSO)

According to the Green Paper on Services of General Interest:

"The term 'public service obligations' refers to specific requirements that are imposed by public authorities on the provider of the service in order to ensure that certain public interest objectives are met, for instance, in the matter of air, rail and road transport and energy. These obligations can be applied at Community, national or regional level."

The EU also uses the concept of 'Universal Service Obligations' (USO) in certain areas (telecommunication, postal services and, more recently, on electricity), but has modified its definition.

Universal service, Universal Service Obligations (USO)

According to European Commission texts:

"'Universal service' is a concept developed by the Community institutions. It refers to the set of general interest demands to which services such as telecommunications and

[5] There is often confusion between the term 'public service' and the term 'public sector'. The term 'public sector' covers all public administrations together with all enterprises controlled by public authorities.

the mail should be subject throughout the Community. The aim is to ensure that all users have access to quality services at an affordable price" (1996).

"'Universal service', in particular the definition of specific 'Universal Service Obligations' is a key accompaniment to market liberalisation of service sectors such as telecommunications in the European Union. The definition and guarantee of universal service ensures that the continuous accessibility and quality of established services is maintained for all users and consumers during the process of moving from monopoly provision to openly competitive markets. Within the context of open and competitive telecommunications markets, universal service is defined as the minimum set of services of specified quality to which all users and consumers have access in the light of specific national conditions, at an affordable price" (2000 and 2001).

"During the last two decades, the concept of universal service has developed into a major and indispensable pillar of the Community's policy on services of general economic interest." (Green paper, 2003)

Subsidiarity principle

According to the European Community Treaty, the subsidiarity principle is intended to ensure that decisions are taken as closely as possible to the citizen when needed[6]. Specifically, it is the principle whereby the Union does not take action (except in the areas which fall within its exclusive competence) unless it is more effective than action taken at national, regional or local level. Its general aim is to guarantee a degree of autonomy for a lower authority in relation to a higher body or for a local authority in respect of a central authority. It therefore involves the sharing of powers between several levels of authority. When applied in a Community context, this principle means that the Member States remain responsible for areas

[6] This principle is often incorrectly presented as giving priority to local levels in each circumstance. Article 5 of the treaty specifies that one must assess on a case by case basis whether such objective must come under such level, and this is so for a matter of efficiency:

> **"**The Community shall act within the limits of the powers conferred upon it by this Treaty and of the objectives assigned to it therein. In areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community. Any action by the Community shall not go beyond what is necessary to achieve the objectives of this Treaty."

that they are capable of managing more effectively themselves, while the Community is given those powers that Member States cannot discharge satisfactorily.

III PRIVATISATION, LIBERALISATION, COMPETITION, PRIVATE SECTOR PARTICIPATION, REGULATION

Privatisation and **liberalisation** are often confused, although they refer to two different processes. It is possible to liberalise a sector while conserving public ownership of the incumbent operator. Conversely, it is possible to privatise a public monopoly, while maintaining its special or exclusive rights. It is also possible to carry out these two processes at the same time or one after the other.

Privatisation

The non-governmental organisation EEB (2002)[7] uses the term **'privatisation'** to refer to the management of the operation of a service such as water, or part of it, that is devolved to a private entity. It thus includes sales; concessions, leases, or, any form of joint venture or partnership between companies and public authorities in the services; management contracts; and the sub-contracting of elements of service such as maintenance.

In the EUROMARKET project, **'privatisation'** is a more restrictive term. It consists of the transfer of assets ownership (including infrastructure) and management from the public sector to the private sector. For example in England the water supply and sanitation system and management is under the sole responsibility of private, but fully licensed, operators.

Private Sector Participation (PSP)

The term **'private sector participation'** refers to the delegation of the management of an activity to a private firm from the former public operator, while retaining public ownership of infrastructure. For example, in the water sector, with the concession or lease contract to

[7] EEB (2002): "A Review of water services in the EU under liberalisation and privatisation pressures", Special Report, 2002/012, Brussels.

private operators, the management of services is delegated to private operators, but the water supply system always remains publicly owned (French model).

Competition

The European Community's competition policy (Articles 81 to 89 of the EC Treaty, formerly 85 to 94) is based on five main principles:

- the prohibition of concerted practices, agreements and associations between undertakings which may affect trade between Member States and prevent, restrict or distort competition within the common market;
- the prohibition of abuse of a dominant position within the common market, in so far as it may affect trade between Member States[8];
- supervision of aid granted by the Member States, or through State resources in whatever form whatsoever, which threatens to distort competition by favouring certain undertakings or the production of certain goods;
- preventive supervision of mergers with a European dimension, by approving or prohibiting the envisaged alliances;
- liberalisation of certain sectors where public or private enterprises have hitherto evolved monopolistically, such as telecommunications, transport or energy.

There exist different forms of competition. Indeed, the general meaning of competition refers to competition in the market (where the final consumers may directly and at any time choose the suppliers of the good they purchase). When it is difficult to implement direct competition, other forms are feasible: competition for the market refers to bidding process for franchising or concession; comparative competition consists in comparing performance of different companies operating on different geographical areas but on similar services.

The difficulty of pursuing an effective competition policy lies in the fact that the Community must continually juggle aims that are sometimes contradictory, since it has to ensure that:

- the quest for perfect competition on the internal market does not make European businesses less competitive on the world market;

[8] The first two principles may, however, be subject to derogations, particularly when an agreement between undertakings improves the production or distribution of products or promotes technical progress. In the case of state aid schemes, social subsidies, or subsidies to promote culture and conservation of heritage, are also examples of possible exceptions to the strict application of competition rules.

- efforts to liberalise do not threaten the maintenance of public services meeting basic needs.

Liberalisation

The term **'liberalisation'** refers to a process by which competition is introduced in situations or sectors hitherto characterised by exclusive or special rights, or monopoly granted to historical operators[9].

Regulation, deregulation, re-regulation

The term **'regulation'** refers to a series of mechanisms defined by laws, decrees, and other legal documents, that specify the organisation rules of a sector or an activity.

The term **'deregulation'** refers to the removal of rules on a particular market aimed at introducing competition to improve the economic efficiency of that market and therefore the performance of the economy. It is therefore linked to the processes of liberalisation.

The term '**re-regulation'** refers to the redefinition of rules within a newly liberalised market.

Regulation system

The term **'regulation system'** may be defined as methods of permanent adjustment of a whole range of actions and of their effects, enabling the maintenance of a dynamic balance of unstable systems. This system covers 'regulations', the 'control' and appraisal of their achievements, and adaptation methods. The system of regulation exists because rules cannot anticipate everything. They are subject to different interpretations and also evolve according to circumstances and objectives. The mission given to the system of regulation of services of general interest is much wider than simply implementing common law regarding competition, and concerns relationships between competition rules and missions of general interest. These relationships are not stable and fixed, but evolve throughout time and space. They depend on history, traditions, institutions, and national culture. The 'deregulation' of this system often means the fact of leading liberalisation processes. However these processes do not consist of

[9] Historical operators are (was) publicly owned companies that exercise(d) a monopoly over certain public services (e.g. British Telecom, Deutsche Telecom, and France Telecom, in the telecom sector).

getting rid of all system of regulation, but in changing their content to set up new modes (i.e. re-regulation).

IV FULL COST RECOVERY, PRECAUTIONARY, POLLUTER PAYS PRINCIPLES

Full cost recovery

The term **'full cost recovery'** refers to a price charged to water consumers – such as for the abstraction and distribution of fresh water and the collection and treatment of wastewater – that includes environmental and resource depletion costs, in addition to the full costs of providing the necessary services.

In the WFD, full cost recovery is not sought after but: that the "Member States shall take into account the principle of cost recovery by 2010" and that "the different sectors (at least industry, households and agriculture) provide adequate contributions to the recovery of costs of water services."

Polluter pays principle

The **'Polluter pays principle'** was first widely discussed in the United Nations Conference on Environment and Development held in Rio de Janeiro of Brazil in June 1992. According to *Environment and Economics Guiding Principles concerning International Economic Aspects of Environmental Policies* (OECD Recommendation adopted on 26th May, 1972), this principle means that the polluter should bear the cost of carrying out the measures necessary to reduce pollution decided by public authorities to ensure that the environment is in an acceptable state. In other words, the cost of these measures should be reflected in the cost of goods and services that cause pollution in production and/or consumption.

Precautionary principle

The 'precautionary principle' was first developed in environmental law, on a national basis as well as in European Community law and international law. The 1990 Bergen Ministerial Declaration on Sustainable Development defines the precautionary principle as:

> "Environmental measures must anticipate, prevent and attack the causes of environmental degradation. Where there are threats of serious or irreversible damage,

lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

This principle has also appeared in EC food law. A precautionary approach was adopted by the European Court of Justice concerning measures against the mad cow disease:

"Where there is uncertainty as to the existence or extent of risks to human health, the institutions may take protective measures without having to wait until reality and seriousness of those risks become fully apparent" (ECJ, Case C-157/96 (note 30), EFLR 1998, 327 (328)).

CHAPTER 1 INTRODUCTION

This chapter aims first to present the general objectives of work package 1. Then it provides historical insight on the evolution of the water management and the EU water policy. Finally, it outlines the content of the present document.

I OBJECTIVES OF THE WORK PACKAGE 1

The EUROMARKET project focuses on Water Supply and Sanitation services[10] (WSS services hereafter), that set up a distribution network (but also all stages of the water cycle: pumping, treatment, storage, distribution, collection of waste water, discharge after treatment, etc.) for urban and rural uses of water. The objective of the project is to provide insights concerning a possible liberalisation of water services in the European Union. Hence, five phases have been defined: the first one consists of a review of the explicit and implicit European policies that have an influence on the organisation of water services. In the second phase, national organisations and markets are to be looked at more precisely. This will help to build different liberalisation scenarios (the third phase). Finally, in the fourth phase an assessment of the impacts (i.e. economic, ecological, social, institutional and legal implications) of these liberalisation scenarios will allow us to provide recommendations on the opportunity to build a European policy for water services (the fifth phase).

The main challenge of the first phase (which is also the first work package) is to see whether the current EU policy in water standards, resources management and liberalisation of network industries could constitute a general framework for analysing the possible evolution of the WSS with regards to liberalisation. The objectives of this document are:

- to analyse the role of the EU in the current liberalisation process,

[10] Water services, as they are defined in the Water Framework Directive (WFD, 2000), include all services which provide, for households, public institutions or any economic activity, water supply and/or sanitation services. This definition, completed by other sources (WATECO documents), gives to water services a rather broad sense, as it comprises irrigation activities, or individual networks. The EUROMARKET definition is more restrictive.

- to point out the elements that could foster or discourage a trend of liberalisation of WSS services that is already ongoing in some countries.

II HISTORICAL PERSPECTIVES ON THE WATER SECTOR IN THE EU

The aim of this section is to provide historical perspectives on the water sector in the EU. On the one hand, the recent evolution of the management of WSS services in Europe led to a *de facto* liberalisation process in some countries. Competition has been partially introduced in a sector previously characterised by natural monopoly granted to historical, local and often public operators. Moreover, the private sector is now involved in a more and more specialised industry having important financial needs. On the other hand, the EU water policy has evolved since the beginning of the 1970s creating a general framework that also influences the evolution of WSS services. Nevertheless, due to their specificities, WSS services have been excluded from the European liberalisation policy that took place in other network industries (e.g. electricity, telecommunication). Therefore, the driving forces (and also constraints) towards a liberalisation of WSS services in the EU must be analysed in order to better understand and single out the influence of the EU policy in this new trend.

II.1 From an extensive model towards an intensive model for WSS services[11]

For a long time, WSS have been basically local issues, managed quite simply by local authorities with relatively small efforts and correspondingly low input of technology and investment. The diffusion of sanitary standards during the 19th century in parallel with massive urbanisation has been identified as the main driving force that led to the institution and overall diffusion of 'WSS services' as we know them today, and the starting point of a specialised water industry.

Until recent times, however, the matching between water demand and water availability used to be searched through an 'extensive' management model based on physical infrastructure,

[11] From an internal document of Massarutto (2003): "A conceptual model of dynamic change in the water industry towards liberalization".

long-distance transfers, dams, reservoirs, aqueducts and other similar devices. On the other hand, the problem with wastewater management was mostly that of getting rid of it safely in order to avoid sanitary consequences. Once wastewater could be brought far from urban settlements, it could be given back to the environment without too many concerns for the final quality of watercourses.

Technology for this kind of 'extensive' water management systems is quite simple and developed on the basis of scientific knowledge that was already in place at the time of ancient Romans or during the Middle Age. The main problem lies in the availability of economic resources for realising and later operating and replacing water infrastructure. As Bernard Barraqué (1995) puts it, what is 'scarce' is not water, but money.

In many countries, this model has lasted until very recently. The most important sources of inputs to water management were therefore construction works and engineering of long-distance supply systems, dams and reservoirs. Very often, the necessary investment for these water resources management facilities was carried on by the State and financed from the public budget. The water policy network is dominated by 'iron triangles' between water users, construction industry and public administration spending money in order to achieve consensus (Bressers et al., 1997).

Today, the 'extensive' model is not feasible anymore: available water resources are too distant and too costly to gather; construction of new water systems meets social opposition; environmental quality of local water resources begins to become a problem in itself; and more generally, urban development and social demand become so widespread that the extensive model is not practicable anymore without severe external effects that turn out into a social cost.

This turning point starts a new phase of water management that we can label as 'intensive': the focus is concentrated on pollution prevention, cleanup and treatment. Technology becomes more complex and specialised in qualitative rather than quantitative issues. Stronger and stronger emphasis is put on information and quality control. Inputs that in a 'traditional' extensive model could be found quite easily (and if not were provided through large public

works policies and therefore controlled by the state) start to be produced and provided on a lively internationalised market, with significant patterns of innovation (Clausen and Rothgang, 2002; Kraemer, 2001).

II.2 A history of EU water policy

The European water policy has developed since the beginning of the 1970s, along with the first Environmental Action Programme[12]. Two generations of directives[13] can be distinguished. A first generation (1973-1988) mainly focused on the protection of water used for human activities. Measures were taken regarding drinking water standards, and the control of emissions of particular harmful substances (Hansen and Kraemer, 2000). The basic driving forces behind this first generation of directives were twofold: firstly, the harmonisation of environmental law to remove trade barriers and to avoid distortion of competition, and secondly, the protection of public health (Kallis and Nijkamp, 1999). A second generation of directives (1988-1995) completes the initial phase with more specific measures (e.g. purification of urban wastewater or limitation of manure spreading) following a command and control approach. Directives are more centred on pollution prevention and set emission standards regarding specific pollution sources, due to the deterioration of the environmental quality of coastal, surface and ground waters from sewage pollution and nitrates and phosphates from agriculture. For instance, the directive on urban wastewater puts in place a regulatory arrangement on the disposal of wastewater from urban wastewater treatment plants, assorted with a compulsory timetable for the provision of treatment plants in all urban areas (above 2,000 population equivalents). Over this period, the range of policy instruments

[12] The development path followed by the EU water policy is very similar to the general development path of the environmental policies in the European countries (see Jänicke & Weidner 2002). Initially the EC acts in the field of the environment without having any legal competency recognised in the Treaty of Rome. The legal bases used after the declaration of 1972 are the articles 100 and 235 of the Treaty. The first articles concerning the environment appear in the Single European Act of 1986 (article 130R). They introduce guiding principles for the conduct of the EU environmental policy, i.e. the prevention principle, correction at source principle and polluter pays principle (de Sadeleer 2002). In 1992, the Treaty of Maastricht (article 130S) completes the orientation, adding the precautionary principle and the integration of the environment in sectorial policies. Finally, the Treaty of Amsterdam of 1999 (articles 174-176) extends co-decision to most environmental questions except water quantity for example. The WFD is the first legal text that benefits from the last institutional reform. Thus, today, the EU water policy is based on a sound legal base of constitutional level.

[13] Let us clarify the actual status of a directive. According to Article 189 of the EEC Treaty of Rome, a directive shall be binding as to the result achieved upon each Member State, but shall leave to national authorities the choice of form and methods.

is extended to informative (e.g. the harmonisation of labelling and packaging of pesticides), voluntary (e.g. the code of good agricultural practice) and economic instruments (more indirectly through e.g. fees on water discharges). Policy change is incremental. However, this second generation does not repeal the first but rather completes it, trying to use new instruments in order to reach the previous objectives. The Box 2.1 illustrates the different European directives that can be classified in these two main generations.

Box 2.1. Two generations of European Directives in the water sector

First generation: protection of water used for human activities

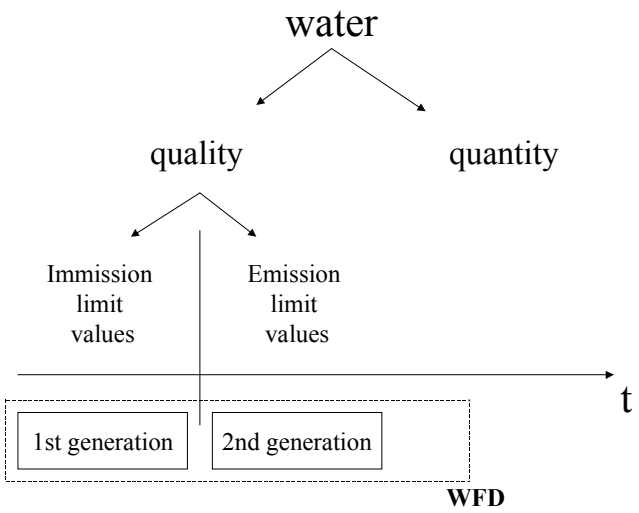
- Surface water directive (75/440/EEC) and its daughter directive (79/869/EEC)
- Bathing water quality directive (76/160/EEC)
- Dangerous substances directive (76/464/EEC)
- Fish water directive (78/659/EEC)
- Shellfish water directive (79/923/EEC)
- Groundwater directive (80/68/EEC)
- Drinking water quality directive (80/778/EEC) and its revision (98/83/EC)

Second generation: pollution prevention

- Urban waste water treatment directive (91/271/EEC)
- Nitrates directive (91/676/EEC)

Since 1995, a third phase has begun with the preparation and adoption of the Water Framework Directive, see Figure 2.1. Such an evolution is not only guided by a continuous depletion of water resources in the Member States, but also by broad changes in the philosophy of the European construction (e.g. the principle of subsidiarity).

Figure 2.1. Integration of the successive generations in the EU water policy



Source: Aubin and Varone (2003).

The shift to a renewed water policy is not so much due to a lack of outcomes than to the burden of the costs of conformation to the new requirements (an estimation of EUR 150 billion in 1994)[14]. Four circumstances lead to a reform[15]. First, financial burdens grow as the Economic and Monetary Union (EMU) requires budgetary austerity. Many escape financial difficulties with a (partial or total) privatisation of the water services (e.g. in UK). Second, the Member States have strong difficulties to conform to the EU water laws (Sbragia 1997; Liefferink & Andersen 2000). All of them face several condemnations from the Court of Justice. Third, the principle of subsidiarity, introduced by the Treaty of Maastricht, calls for more decentralisation of decision-making. Four, the Commission initiates three new proposals on drinking water standards[16], hazardous substances and the ecological quality of water[17]. The last proposal is coldly welcomed, as it brings more confusion to EU water legislation. Many

[14] The conformation to the drinking and bathing water directives was already much expensive.
[15] Kallis & Nijkamp (2000) are considering more or less the same circumstances: a piecemeal development of the directives, the absence of a global/integrated intervention model, various revisions on course, and the inclusion of the principle of subsidiarity and new environmental objectives in the EU Law.
[16] Council Directive 98/83/EC of 3 November 1998 in the quality of water intended for human consumption.
[17] Proposal for a Council Directive on the ecological quality of water, COM(93) 680 final, 8 July 1994, OJ C 222/6 of 10 August 1994. Based on the model of the water use directives of the first generation, the objective of the proposal is to protect surface water. The Member States are entitled to define the standards of a "good ecological quality", to set the objectives and to make appropriate programmes of measures for each water body.

people consider that it does not fit with an integrated water management at river basin scale, as discussed in the national and international arenas[18]. The proposal is repealed in July 1994 and the Council asks the Commission to prepare a reform of the EU water policy. The water framework directive is finally adopted six years later, in 2000. According to Kallis and Nijkamp (1999), this framework action provides the best approach to reconcile the quests of subsidiarity and environmental protection. The new water framework directive attempts to integrate all other legislative pieces under one common structure with the ultimate objective of a "good" status for all surface waters.

These three generations of the EU water policy are summarised in Table 2.1.

The measures should fight against all punctual and diffuse pollution sources issued from human activities, without more precision.

[18] See 1992 International Convention of Helsinki about Transboundary Rivers and Lakes and successful implementation on the Rhine, Meuse and Scheldt.

Table 2.1. Policy design of the successive generations of EU water directives

	1st generation	2nd generation	WFD
Logic of intervention	Immission limit values (ILV) Water quality standards	Emission limit values (ELV) Emission control	Combined approaches
Water bodies	Bathing water, fish water (etc.), groundwater Human-centred logic	Surface water, groundwater, drinking water Human-centred logic and partially eco-centred logic	Water resource Eco-centred logic
Uses	Drinking water Transport and absorption Navigation and support	Living environment Drinking water Production Transport and absorption	Living environment Drinking water Production Transport and absorption Navigation and support Recreation
Objectives	Preserve human health Protect particular water uses Harmonisation of national legislation Limit emissions of substances that cannot be diluted	Preserve human health, Fight against eutrophication, Put the most dangerous pesticides out of the market, Reduce industrial discharges, Preserve biodiversity and habitats	Good status for all waters, management at a river basin scale, as of 2015
Instrument mix	Prescriptions and information (minimum quality requirements from which emission limit values are set, harmonisation of controls, prohibition of listed dangerous substances, national programmes and reports)	Prescriptions, information and self-regulation (prohibition/authorisation of discharges, timetable for wastewater treatment, sensitive areas, list of substances, harmonisation of labelling, codes of good practice, action programme and monitoring, information of the consumers	All instruments, including economic incentives in the management plan: inventory, programme of measures, integration by full-cost pricing
Actors of implementation	Member States and the EC for some aspects (adoption of 'daughter' directives, revision of the emission standards)	Member States and the EC/EU (revise parameters)	Multi-level (EU, Member States and basin authorities) and Multi-sector (environmental, economic and public works)
Direct target groups	Industry, Drinking water producers, housings, nuclear industry	Farmers, Pesticide producers and users, Industries (nutrients and polluting substances), Public authorities in charge of sewerage, Drinking water producers	Industry, households, farmers, navigation (inland and sea)
Final beneficiaries	Drinking water consumer, End users (swimmers, fishers, etc.), Fauna and flora	Drinking water consumers, water industry, Drinking water producers, Other water users, Fauna and flora	All human users, Fauna and flora

Source: Aubin and Varone (2003).

II.3 Consequences of these combined evolutions on the water sector

The simultaneous evolution of the WSS service management and of EU water policy had obvious effects on the structure of the water industry, but also on institutional organisation of the water sector in numerous European countries: delegation of management to private operators, increasing scale of water management, regulation, interaction with conflicting stakeholders, etc.

The increasing technical complexity of water management forces local water management systems to share responsibilities and financing with professionals having the necessary expertise. This leads to the creation of specialised water management organisations which may be owned by the private or public sectors following national paths and traditions.

Water service operators become more and more centralised, since water management requires specialised professional skills, technological capabilities, financial solidity and credibility face to private capital markets. The increasing centrality of water professionals and water industry of course raises their market power and control of relevant information (Massarutto, 1997). Monopolies of this kind are likely to generate the well-known perverse effect of monopolies: power abuse, inefficiencies and excess profits.

Local communities and consumers need protection against monopolistic market power, and this is searched for sometimes through public property of assets and operation of services, in other cases through regulation and creation of 'quasi-markets' through competitive bidding, incentive regulation and other similar instruments. In any of these models water industry anyway maintains a strong information asymmetry, that can only be reduced and never eliminated by regulators because of trade-off between efficiency and rent extraction (Beecher, 2001; Cowan, 1997; Laffont and Tirole, 1993).

There is a need of water service management to interact with a larger number of conflicting stakeholders, with stronger emphasis to be put on the demand side rather than on the supply of new assets and technology.

As a result of these trends, one can already observe liberalisation processes - i.e. some forms of competition - in the water sector in several European countries. However, there has been no explicit European liberalisation policy for WSS services, contrary to other network industries where liberalisation comes from European Directives. In a strict sense, liberalisation should not be confused with privatisation or Private Sector Participation (PSP) although they are often linked. One can liberalise a sector while maintaining public ownership of the historical operator; and one can privatise a public monopoly, while maintaining its special of exclusive rights. Finally one can also lead these two processes together.

However, any liberalisation process should be adapted to water specificities: (i) the structure of natural monopoly, as networks cannot be duplicated; (ii) the local dimension of the services, meaning both that the services depend strongly on geographical characteristics and that the cost of transport exceeds the value of the good transported, so that production is close to distribution if possible; (iii) strong externalities on health and environment.

III OVERVIEW OF THE CONTENT OF THE DOCUMENT

Since there is empirical evidence of a liberalisation trend in the WSS sector of several European countries, this issue must be addressed now with a comprehensive approach taking into account the influence of the EU policy on the liberalisation of WSS sector. That is the objective of this document.

Hence, three fields have been identified, where existing European policies could have an impact on WSS services: 1) standards in drinking water and sanitation systems, 2) management of the natural resource (by way of WFD), and 3) liberalisation and services of general interest. Each of these three fields has been treated in moving on to the three following points: the review of the European policy and legislation (stressing on its dynamics), the assessment of the principles or notions emerging from the European policy and legislation (requiring a clear definition of these notions), and the illustration of these principles and their perspectives at the Member State level. Each of these fields has been

investigated in order to highlight to what extent they condition a future liberalisation of WSS services.

The remainder of the document proceeds as follows. Chapter two deals with the historical construction of European Directives on drinking water and sanitation systems, and shows that technological changes, financial aspects and the emergence of new stakeholders are important driving forces for the liberalisation of WSS services but with significant differences among Member States. Chapter three highlights the implications of the WFD. This constitutes the European policy for the management of water as a natural resource, and makes explicit the possible linkages between the WFD principles and the potential liberalisation of WSS services. Chapter four considers the European liberalisation policy in other network industries considered as services of general interest, and investigates to what extent the process observed and the concepts developed could be relevant in the water sector. As a conclusion, the last chapter makes a synthesis of the three approaches, underlining the synergies between explicit and implicit European policies, and building the framework for a possible liberalisation of WSS services.

CHAPTER 2 DRINKING WATER AND SANITATION STANDARDS

I. INTRODUCTION

The standards in the water distribution and sanitation sectors in the EU are most comprehensively covered by European directives. In this chapter, we shall first give a historical overview of these different directives, putting special emphasis on water quality and sanitation standards. Part 1 will focus on the evolution of drinking water standards, whereas part 2 will analyse preventive directives (corresponding to the second wave of directives). This overview is not a simple summary of the different standards (the description of the main directives can be found in Annex I). It analyses how these actual directives were created, and specifies what circumstances and what actors (EU institutions, national governments[19] and other actors) influenced the emergence and content of these directives. Moreover, the evolution of standards will be stressed with the example of drinking water standards: we shall explain how certain parameters in drinking water were added (or removed), and what the general trend of these standards was. In short, are drinking standards becoming more and more stringent?

One cannot only assess the impacts of these directives at "European level" as these impacts vary from one country to another. Therefore the third part of this chapter will focus on the impacts of these directives at national level. At this stage of the research, we will not go into organisational details of water management in each country, but analyse specific impacts of directives related to our liberalisation framework. Four countries will be studied: Italy, France, Germany and the Netherlands. The impacts differ in each case study country according to the development of legislation and water treatment infrastructure that existed before the European directives. Hence, for countries like Italy and France, impacts of European directives on water management were more visible and important than for Germany

[19]Among the national governments, opinions differ in how and what standards should be aimed for. For example, uniform minimum environmental standards have the advantages of preventing "pollution havens" and shaping a policy that takes account of high uncertainty regarding the impacts of emissions on human health and ecosystems (Turner, Pearce & Bateman, 1994). On the other hand variable minimum standards acknowledges the differences among the EC members states regarding the specific environmental and economic situations.

and the Netherlands (as these countries had already developed a strong environmental policy and had enacted appropriate national legislation).

II THE EVOLUTION OF DRINKING WATER STANDARDS

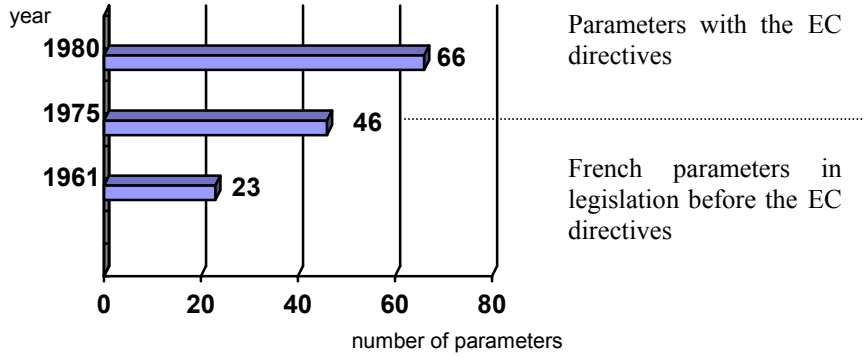
II.1 The first directives impose stringent standards

EEC directive 75/440/EEC was the first European directive to impose restrictions on drinking water. It lay down standards for surface water intended for human consumption, and was set up in response to the growing pollution of surface water, and in order to provide healthy water, and harmonise environmental and sanitary rules within the EC. The directives included 46 parameters[20] (see annex 1) for water quality, with guide and limit values. This directive was followed by another directive on the quality of water intended for human consumption (80/778/EEC). This directive applies to all water, whatever its treatment and origin (groundwater and surface water), and requires more restrictions: 66 parameters are now required for water quality.

When one observes the quick evolution of the number of parameters to be monitored, analysed and limited in drinking water, one can imagine the change it produced on the organization of water supply in terms of treatment costs and technical knowledge. The graphic below illustrates this increase in parameters throughout time for French water standards before and after the first European directives. In 1961 the French legislation included 23 parameters in 1961 (French decree n° 61-859). In only twenty years, the number of (chemical, physical or biological) parameters in drinking water standards almost tripled (see Figure 2.1.).

[20] The present text focuses on the evolution of the drinking water directives. More technical details on the content of the directives can be found in annex 1.

Figure 2.1. Evolution of the number of water quality parameters



Source: Lupton (2003).

Qualitatively, growing stringency can also be noted: the 1975 directive fixed different values according to three levels of water quality (see annex 1), whereas the 1980 directive selected the most stringent values of the former directive whatever the water quality. Moreover, analysis and sampling required in the 1980 directive is significantly higher[21]. Pesticides are also introduced in the directive: maximum admissible concentrations are established for individual pesticides (0.1 μg/l) and total pesticides (0.5 μg/l) [22]. The reason for this concern about pesticides can be explained by the fact that in the late 1970s, the effect of persistent organochlorine pesticides (such as DDT) was receiving lots of adverse publicity: "since public pressure was for drinking water to contain no pesticides at all, a standard was set at the minimum concentration at which organochlorine pesticides could be detected by scientific analysis" (Matthews and Pickering, 1996). Finally, the 1980 directive does not integrate much flexibility in its implementation: the directive was drafted in such a way that it is strictly an offence every time a standard is breached, no matter how transient the exceedance or how trivial any hazard to public health (ENDS, 1997)[23]. In addition, considering the important

[21] The directive (EEC/79/869) established minimal analysis and sampling requirements to apply the 1975 directive. But this directive only imposed very little frequency in analysis. For example, for a population of over 100 000, 12 analysis/year were required at most (for A3 water quality). But in the 1980 directive the minimal number was 60 analysis/year.
[22] This is the first time that mandatory standards are set for pesticides.
[23] Derogations exist in this directive but are limited in scope. Member States are allowed to breach standards if these are attributable to geological or exceptional meteorological conditions, but these are not given for microbiological or toxic parameters.

number of parameters introduced by the 1975 and 1980 directives, a relative short period was given to conform to these new standards (five and ten year compliance periods).

The stringency and scope of these first EC drinking water standards can seem quite surprising as the latter represented very hard constraints on water quality management for all countries. This had some bearing on privatisation trends in certain countries, as we shall see further on. According to Jordan (1999), this can be explained by the short term horizons of politicians and the relative ignorance of Member States on the actual implications of these directives. Directives were viewed as a "commitment of policy intention" not a "genuine legal obligation" (Macrory, 1992). Hence, politicians felt "confident enough to agree proposals they did not entirely approve of" (Jordan, 1999). Even though negotiations over the 1980 drinking water directive dragged on for over five years, "the differences between national negotiating positions were successfully papered over, not by altering the standards themselves, but by extending compliance deadlines, adjusting the sampling regime and allowing states to grant derogations in certain, very broadly specified, circumstances" (Jordan, 1999). Therefore at the end of the negotiations, the precise numerical values attached to the main parameters in the Commissions initial proposal for the directive (80/778/EEC) remained virtually unscathed (Jordan, 1999)[24].

II.2 Directive EC/98/83 and controversies over lead and pesticide thresholds

The first step to revision was taken at the European Council meeting in Edinburgh in December 1992, "at which guidelines were agreed for reassessing the scope of some aspects of European law in the light of the application of the subsidiary principle" (Matthews and Pickering, 1996). A review of the 1980 directive was then proposed in 1993 by the Commission that undertook to simplify, consolidate, and update existing texts on water to take new scientific data into account (notably with the 1993 WHO guidelines). The main initiative to seek revision of the drinking water directive came from EUREAU (the water industry's European federation) and certain Member States, particularly the UK government

[24] Another element that can explain high standards at that time is the fact that most countries that were part of the EC were Northern countries, in which there was more concern for health and environmental issues, and more eagerness to set up stringent standards.

which had consulted extensively with the National Rivers Authority (NRA), the Drinking Water Inspectorate (DWA) and the Water Services Association (representing the privatised water supply companies). Most Member States welcomed a revision of the directive as they wanted standards to be more in line with the *subsidiary principle*, in order to have more room to manoeuvre.

EUREAU sought to reduce parameters and limits for non-health parameters (in order to decrease analysis and treatment costs)[25], and also to increase flexibility in monitoring supplies (sampling frequencies should vary according to the type of supply and monitoring history).

During the negotiations, the most controversial issue was that of pesticides. The European Commission started by proposing that the individual limit (0.1 μg/l) should be maintained. But the UK particularly attacked this limit for individual pesticides, which incurred unnecessary expenditure on water treatment, and was out of line with (less stringent) scientific guidelines established by the WHO (Matthews and Pickering, 1996)[26]. This position was strongly backed up by pesticide manufacturers[27]. As for the UK water companies, the latter suggested that the cost burden of measures to prevent pesticide pollution should be placed upon pesticide users and manufacturers rather than the water suppliers (Water Industry Co-ordinator, 1994). However, their position regarding a relaxation in water quality standards was ambiguous. On the one hand, they supported a revision of the pesticide standards, but they also were reluctant to be thought to support a relaxation of health standards (Matthews and Pickering, 1996). This ambivalence can also be observed regarding EUREAU's positions, as they were not very clear in proposing a change of the absolute MACs compared to the

[25] EUREAU proposed that compliance regarding aesthetic parameters (colour, copper, taste, turpidity…) should be bared only on a percentage approach rather than strict adherence to maximum admissible concentrations (MACs). This would also avoid the legal implications of breaches that are bound to occur regardless of the amount invested in treatment and distribution (ENDS, 1992).

[26] The WHO derived health-based guidelines for pesticides based on available toxical information. Guideline values for pesticides usually ranged from 1 to 40 μg/l. Exceptional softer guideline values of 100 μg/l also existed (for pyridate and dichloprop) and also more stringent guideline values were fixed for chlordane (0.2μg/l) and heptachlor, aldrin and dieldrin (0.03μg/l) (Van Leeuwen, 2000). As one can observe, these values are *much* less stringent than values imposed by the European 1980 directive (with 0.1 μg/l concentration limits for individual pesticides, and a 0.5 μg/l limit for total pesticides).

[27] The pesticide manufacturers were particularly worried that, without change in the drinking water directive, they would suffer in the implementation of the 1991 Pesticide Authorisations Directive which limits the approval of new pesticides to the extent to which substances are likely to breach standards of the drinking water directive (Matthews and Pickering, 1996)

existing 1980 values, although they proposed that health related parameters be based on the latest toxicity data (WHO guidelines).

EC countries other than the UK did not give much support for change. They used the *precautionary principle* to justify their position: "since the precautionary principle is enshrined in the Article 130r of the Treaty on European Union (the Maastricht Treaty) there is no place for pesticides in drinking water at all if there remains any scientific doubt about their safety" (Matthews and Pickering, 1996)[28]. What is interesting here is that although less stringent standards were justifiable on a scientific and cost/benefit basis, most actors had readjusted their preferences over existing standards on pesticides (Jordan, 1999). One can postulate that most countries had already invested in pesticide removal technologies. Less stringent standards on pesticides were unlikely to provide major savings in running costs if the pesticide limit were relaxed. In addition pesticide removal technologies can also fulfil other purposes, such as removal of compounds causing taste and odour problems (ENDS, 1995). Hence, the values on pesticide limits remained unchanged in the new directive (see also annex 1).

Of all the amendments proposed by the Commission, possibly the most important, in terms of health and costs, was the limit proposed for lead[29]. The former 50 μg/l standard is suggested to be cut down to 10 μg/l, following the recommendations of the Commission's Scientific Advisory Committee on Toxicity and Ecotoxicity of Chemicals, and of the 1993 WHO guidelines. This would induce significant costs linked to the removal of lead pipes in the EC, estimated at around 69 769 million euros (CEC, 1995). The highest estimated costs concern France (19 500 million euros) and Italy (14 750 million euros) in which lead pipes are widely used (CEC, 1995). This explains why these countries objected to this proposal and demanded a longer delay for compliance to this new standard (20 years instead of 15). But their position was out-voted. In order to soften the effect of the new standard, breaching of standards attributable to domestic distribution systems were made the responsibility of the householder.

[28] Countries such as Denmark and the Netherlands particularly defended the values of the 1980 directive, as they rely heavily on groundwater, in which pesticides used in agriculture can be found in high concentrations, and for which it is difficult and very costly to clean-up pesticide-contaminated water (ENDS, 1994)
[29] Lead is a cumulative toxicant that can cause neurological and behavioural effects, particularly in young children (van Leeuwen, 2000)

Hence the costs to change domestic plumbing are directly borne by householders. Some costs are also incurred by the water companies in replacing lead supply pipes (estimated at 10 253 million euros). However these are much less important than the costs likely to be incurred by householders (59 516 million euros).

All in all, one can note more participation and weight of Member Sates and pressure groups in the directive's making. EUREAU's lobbying was effective in reducing binding standards to health parameters, in line with the subsidiary principle. The 1980 directive standards for aesthetic parameters and certain physico-chemical parameters are now relegated to an annex on non-binding indicator parameters: where these are exceeded Member States must decide whether there is any risk to human health and take remedial action accordingly (ENDS, 1997). In addition, the number of parameters has fallen from 66 (1980 directive) to 48 (new drinking water directive 98/83/EC); however this does not mean that the new directive is much less stringent, but that it focuses mainly on health-related parameters. Certain parameters have been added like acrylamide, benzene, and bromate. Other all ready existing parameters have been tightened for arsenic and antimony for example[30]. Whilst certain microbiological parameters have been suppressed, the directive states that drinking water must be free from micro-organisms and parasites, and any substance that represents any potential danger to human health (article 4a, EC/98/83). Another change is the flexibility given to member States regarding breaches: the new directive's provisions on derogations are more realistic than the former directive, and acknowledges the difficulties of keeping drinking water continuously fully compliant with standards. It creates a more pragmatic regime which allows time for breaches to be corrected (ENDS, 1997)[31]. Finally, monitoring requirements in the new directive are generally less stringent than the 1980 directive[32].

The new directive which will have to be applied from December 2003 will not represent significant additional costs on water treatment and monitoring, apart from the lead parameter

[30] For more details, see annex 1.
[31] First of all, Member States will be able to ask for a longer period than the five years for compliance with the new standards. Such requests to the European Commission may only be for exceptional circumstances and for geographically defined areas. These derogations may last up to three years, and another three-year extension may be allowed. Secondly, if exceedances of a standard arise unexpectedly, Member States will be able to authorise exceedances of standards set for chemical (but not microbiological) parameters for an initial three years (this can be extended for a further three year period).

(CEC, 1995). The modifications of the directive should therefore enable countries to implement the directive at least cost and with much more flexibility[33].

III MORE PREVENTIVE DIRECTIVES BASED ON EMISSION LIMIT VALUES

This part mainly focuses on the Directive 91/271/EEC on urban wastewater treatment. This directive established a timetable for the mandatory construction of wastewater collection systems and treatment plants, and defined the level of treatment required in areas, varying according to the size of the populations and the type of receiving seas, rivers or lakes. The directive shows how a set of different principles in formulating environmental policy, based on emission limit values, can be applied to Member States and involves a variety of actors within the European Community. We shall describe the potential principles that can be used in the making of directives within the EU (section 2.1). The history of the development of the Directive on urban wastewater treatment will be described (section 2.2) and the actors involved in the process of policy development and implementation analysed. The application of principles will then be examined (section 2.3). Finally, the Nitrate Directive, the Directive on pollution caused by discharges of certain dangerous substances and the Directive on the protection of groundwater against pollution caused by certain dangerous substances will be reflected upon. Differences and similarities in the application of principles will be illustrated (section 2.4).

III.1 Principles

Preventive measures can be established according to various principles, which are more or less costly. Because of the unfeasibility of zero-release goals, other perspectives are more realistic and can be summarized as follows:

- **The critical load concept**. Standards are based on the degree to which emissions and their deposition are acceptable to the environment without disrupting ecosystems.

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[32] See annex 1.
[33] Whereas the former directives neglected cost impacts of different standards, the new directive integrated cost-benefit analyses (Pearce, 1998).

- Standards based on the concept of **Best Available Technology (BAT)**. This is interpreted as standards met by technologies that are available. As nations differ in defining what technologies are available, the economic implications of compliance to standards become key points of consideration.
- Standards based on the concept of BAT with explicit modifications to prevent excessive costs (**Best Available Technology Not Exceeding Excessive Costs, BAT NEEC**). Defining the term excessive costs enrolls into different opinions. It can be referred to as the economic cost that should not be excessive in relation with to the environmental protection achieved. Otherwise it can also be interpreted by looking at the financial costs to the polluters or as economic costs to society.
- The **precautionary principle**, which explicitly recognizes the existence of uncertainty (environmental and social) and seeks to avoid irreversible damages via the imposition of a safety margin (safe minimum standards) into policy;
- The **non-degradation principle**, which implies that directives may not directly or indirectly lead to the deterioration of areas;

Within the EU the economic and/or financial costs of compliance to standards are considered in the process of standard setting. Different basic principles may steer this process of standard setting (Turner, Pearce & Bateman, 1994). The following principles may be followed:

- The **polluter pays principle (PPP)** that forces those creating the pollution to pay the costs of meeting socially acceptable environmental quality standards;
- The **precautionary principle** (see glossary for a definition). It may also seek to prevent waste generation at the source, as well as retaining some end-of-pipe measures;
- The **economic efficiency/cost effectiveness principle**[34], applying both to the setting of standards and the design of the means (policy instruments) for attaining them;
- The **subsidiarity principle**, to assign environmental decisions and enforcement to the lowest level of government capable of handling them without significant residual externalities;
- The **legal efficiency principle** that precludes the passage of regulations that cannot be realistically enforced.

[34] This principle signifies that objectives are achieved at minimum cost.

III.2 The history of the Urban Waste Water Directive

The treatment of urban waste water was not subject to community legislation until the late eighties (Hansen and Kraemer, 2000). At that time, the provisions for collection and treatment facilities for urban waste water within Europe were very unequal. Treatment standards differed substantially between member states. In a study undertaken for the European Commission[35], it was stressed that only 45% of the total organic load generated in the territory of Europe entered sewage treatment plants in 1984. The need to regulate urban waste water treatment with the aim of achieving a high level of sewage treatment standards for the whole territory of the European Community was highlighted (Hansen and Kraemer, 2000), notably on the occasion of a European Environment Ministers' Seminar in 1988. This led to the second wave of legislation related to water issues, in particular the Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment, and the Council Directive 91/676/EEC of 12 December 1991 (Enthoven, 1998) which we will analyse in section 2.4.[36]. Table 3.1., presented by Hansen and Kraemer (2000), gives an overview of the stages during the development of the Directive concerning urban waste-water treatment.

Table 3.1. Development of the Urban Waste-Water Treatment Directive

27/28 June 1988	European Environmental Ministers Seminar in Frankfurt a. M.
13 November 1989	First proposal for the Directive by European Commission
25 April 1990	Opinion of the Economic and Social Committee
13 September 1990	Opinion of the European Parliament
25 October 1990	Amended proposal by European Commission
21 May 1991	Notification
30 May 1991	Published
27 February 1998	Amendment by Directive 98/15/EC

Source: Hansen and Kraemer (2000).

[35] COM(89) 518 final: Proposal for a council directive concerning municipal waste water treatment/* COM/89/518FINAL*/ Official Journal C 001 , 04/01/1990 P. 0020

The purpose of the Directive is to stimulate the Member States to invest in the collection and treatment of urban wastewater in order to reduce nutrient inputs into European water. The Directive includes minimum requirements for the treatment of urban wastewater, and for the disposal of sewage sludge. Emission limit values or minimum percentage reductions of secondary and tertiary treatment must be met. The Directive lays down the reference methods for monitoring and evaluating the results and sets emission limits for nitrogen and phosphorus discharges from treatment plants to designated sensitive areas. According to the three categories of receiving water (sensitive, normal and less sensitive areas), different minimum standards for treatment requirements are set. The Directive introduces mechanical-biological treatment as a minimum standard and further treatment (i.e. tertiary treatment) in sensitive areas. In less sensitive areas, basic mechanical treatment ought to be sufficient. Indirect emissions are also to be controlled and the dumping of sewage sludge at sea stopped by the end of 1998. We refer to the Annex I for a more detailed description of the Directive. The Directive leaves the Member States ample freedom in their implementation of the provisions. For example, they may choose between applying limit values for treatment plant effluents or percentage reductions, and are confronted with a choice of either reducing phosphorous or nitrogen. Member States are basically free to choose among different approaches of how to apply "more stringent treatment" in sensitive areas. One of these options opens the possibility for emissions trading within an 'emissions bubble' (Hansen and Kraemer, 2000).

Smaller towns or villages (< 2000 p.e.[37]) are required to provide 'appropriate' treatment, sufficient to ensure compliance with quality objectives or the requirements of other relevant Community legislation (Hansen and Kraemer, 2000).

Derogations and exceptions to the general rules of the Directive concerning the installation of collection systems are possible in case it involves 'excessive costs' and alternative systems giving the same degree of environmental protection (Hansen and Kraemer, 2000).

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[36] Furthermore, the Directives concerning drinking water and bathing water were revised and propositions for new Directives were submitted, which resulted in the adoption of the Council Directive 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control (Enthoven, 1998).
[37] p.e stands for "population equivalent".

Bowler (1999) explained that in order to comply with the Directive, Member States have been forced to set up new, alternative methods of urban waste water disposal, often with much higher treatment costs. Sludge recycling, for example, becomes increasingly important as the directive bans the dumping of sewage sludge at sea. The need to deal with this ban triggered a set of actors to become involved. The linkages are so strong and persistent that one can speak about a network of actors[38]. Table 3.2 illustrates the main participants in the actor network for recycling sewage sludge on farmland in the UK. This network is not only relevant for the implementation of the directive but also to the process of development as the amendments of the directive are regarded as being part of the development process. The actors listed in Table 3.2. are divided between primary and secondary dimensions based on a subjective assessment of their power in the network (Bowler, 1999).

Table 3.2. Actors in sewage sludge recycling on farmland in the UK

Dimension	Actors	Intermediaries
Primary		
	European Union (DG XI)	EU directives (91/271/EC)
	UK water companies	Scientific knowledge
	Scientists	(books/papers/technical documents)
	Farmers	Sewage sludge
	OFWAT regulator	
Secondary		
	Environmental groups	Technical equipment
	Manufacturing industry	UK national regulations
	Urban population	UK national codes of practice
	Environmental Agency	
	Courts of law	

Source: Bowler (1999).

Table 3.2 mentions sewage sludge and technical equipment as intermediaries, which form important influencing factors in the development of the Directive on Urban Wastewater

[38]For example, an analysis of the network of actors in the UK reveals that the government-appointed regulator of the privatized water companies in the Office of Water Services (OFWAT) played a significant role in these actions. The regulator controls the pricing of the water and sewerage services provided to industrial and domestic customers by privatised companies. It was observed by Bowler (1999) that the regulator's downward pressure on prices is claimed by the water company directors to have limited the financial resources available to invest in sewage treatment and disposal systems, encouraging them to take least-cost decisions, even though they may not be the optimum decisions as far as the government is concerned. Through his analysis of network behaviour, Bowler (1999) explains how the regulator proposed to the UK government to take action in Brussels, to renegotiate the EU regulations on standards of water quality and delivery, so as to make them less costly for UK water companies.

Treatment. The technical processes involved in treating sewage sludge largely determines the chemical and biological characteristics of the sludge. These then mould the relationships between the actor responsible for treatment and farmers who might consider the use of sludge on their farmland (see also Linster, 1991).

In addition to the role of technology, pricing and regulation were crucial factors in the development of the directive. The UK case shows how the process of pricing water and sewage treatment frames the context in which measures are taken to comply to the standards imposed by the Directive.

III.3 An overview of applied principles in the Urban Waste Water Directive

In this section a number of principles that are applied in the Urban Waste Water Directive will be identified. Although the principles are addressed separately it should be mentioned that each principle is typically applied in conjunction with one or more of the other principles. Therefore, the application of policy principles is characterised by the specific configuration of these principles. Within water directives, "prevention at source" was a key strategy. This strategy seeks to prevent waste generation at source, as well as retaining some end-of-pipe measures. It results from the environmental preference of preventing pollutants from entering the environment at all, following the precautionary principle, but also draws on the consideration that economic efficiencies can be realized by fostering pollution prevention, instead of end-of-pipe solutions.

Polluter Pays Principle and process of standard setting

As the history of the development of the urban wastewater directive shows, the polluter pays principle is applied in the directive. However, it is noticed that the process of licensing in the member states integrates a weak version of the Polluter Pays Principle. For example, within the UK approximately 5000 licences permit the pouring of certain toxic effluents, by volume, into public sewers as no charges were yet raised at that time of the development of the directive. In this respect, Bowler (1999) speaks about a "dilute and disperse" policy because a significant proportion of topics and organic compounds in sewage sludge originates from industrial waste.

The BAT NEEC[39] approach

Although the first and second draft of the Directive mentioned that the collecting systems have to be designed according to the best technical knowledge, the final Directive states that collecting systems have to be designed according to the best technical knowledge not entailing excessive cost (Hansen and Kraemer, 2000).

The non-degradation principle

The Directive on urban wastewater does not explicitly incorporate the general non-degradation principle, whereby the implementation of the directives should not directly or indirectly lead to deterioration of waters at stake. Emission limits for nitrogen and phosphorus discharges from treatment plants are applied to distinguished sensitive areas.

Economic efficiency/Cost effectiveness principle

Clearly, with the wording "overall load entering all urban waste water treatment plants in that area", the Directive opens the possibility for emissions trading and thereby enhances economic efficiency[40]. Moreover, the distinction between different areas (sensitive, normal, not sensitive) introduces an element of cost effectiveness. The Directive does not have one strict uniform standard but differentiates requirements according to areas. Finally, there are variations in deadlines for compliance with standards, according to the type of area and size of agglomeration. This variation reduces costs of compliance and enhances the principle of economic efficiency.

Subsidiary Principle

The subsidiary principle manifests itself, as Member States should classify the areas as being sensitive or not. Different area classes (sensitive, normal and less sensitive) are specified in the Directive. When an area is classified as sensitive, significant reductions of nitrogen and/or phosphorus are required. This can occur either when the receiving water is subject to

[39] Best Available Technology Not Exceeding Excessive Costs, see 2.1
[40] Emissions trading represents an interesting mechanism in order to reduce pollution at least cost: this does not represent additional costs for firms but is an incentive to pollute less. However, the organization of emissions trading requires a serious administrative control of the mechanism, and this could be very costly. Moreover,

eutrophication, or when it is used for drinking water abstraction, or requires more stringent standards than secondary treatment in order to meet other EU Directives. A member State has the possibility to designate its entire territory as a sensitive area under Article 5 paragraph 8. Areas where sewage is discharged into sea, coastal or estuarial waters without adverse effects on the environment, may be designated to be less sensitive. However, a fairness goal is heavily supported through the provision of urban wastewater collecting systems (sewerage) and treatment plants for all agglomerations above a population of 2000 inhabitants. This measure is a representative indicator of the interventionist policy of the European Union and its attempt to supply the European territory with equal standards.

Legal efficiency principle and flexibility

The development of the Directive shows that the implementation deadlines vary from 1998 to 2005 as a result of negotiations between Member States and the EU. Because the Directive allows this flexibility, the formal and technical obligations with which the Member States are confronted are adapted to the specific conditions of the members, regarding the transposition of the Directive into national laws, regulations and administrative provisions. This enhanced emphasis on the legal efficiency principle did in fact result in a weakening of the timetables of the original draft. These had been so strict that the Member States were unable to meet them.

III.4 Other preventive directives

European water legislation also includes other directives that are based on pollution prevention. Some of these directives are addressed in this section. To start with, the Directive on pollution caused by discharges of certain dangerous substances (76/464/EEC) will be discussed. Subsequently, the Directive on the protection of groundwater against pollution caused by certain dangerous substances will be looked at. This will then be followed by a reflection on the nitrate directive (91/676/EEC);

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apart from these theoretical considerations, one must actually experience this type of market to assess its actual economic efficiency.

3.4.1 Directives related to discharges of certain dangerous substances and the groundwater directive

The first text of law concerning limiting emission values specifically was the Council Directive 76/464/EEC of 4 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community. This directive is considered as a key directive in the development of European legislation. A number of "daughter" directives on specific substances and the directive regarding the discharges into groundwater (COM 80 68) are also established. Pollutants are divided into two classes: those pollutants that must be eliminated (List I) and those that should be only reduced (List II).

For the substances mentioned in List I the "daughter" directives provide emission limit values, or quality standards in the receiving waters that must be respected prior to the authorisation of discharges. The substances mentioned in the List II are dealt with differently and require Member States to come up with integrated programs for the reduction of their emissions. The same approach regarding the differences in substances is reflected in the groundwater directive (80/68/EEC). Regarding the processes of standard setting one can notice that for List I substances, the directives provide mandatory minimum requirements based on best technical means (the BAT approach), implying the application of the Precautionary Principle. For list 1 substances, the subsidiary principle is less important, in contrast to the List 2 substances (as reflected in the need to develop integrated programs at the level of individual Member States).

3.4.2 Directive 91/676/EEC on nitrates from agricultural sources

The European Community has been taking measures relative to nitrogen pollution in waters for over twenty years. Whilst the initial directives were concerned mainly with water for human consumption, more recent directives, such as Council Directive 91/676/EEC on nitrates from agricultural sources and Council Directive 91/271/EEC on urban wastewater treatment, have placed increased emphasis on the environmental effects of nitrogen excess, particularly eutrophication (European Commission, Environment DG, 2003). Unlike the

urban waste water directive, the nitrates directive concentrates on the largely diffuse source of nitrogen pollution, involving a large number of individual farmers (Goodchild, 1998)[41].

The nitrates directive has the objective of reducing water pollution caused by nitrates from agricultural sources and of preventing further pollution. Water already polluted and waters to be affected if no action is taken are to be identified by the Member States, according to criteria that are set out in Annex I (EEC, 1991b). Beside the concentration of nitrates laid down in accordance with Directive 75/440/EEC, those criteria also address (potential) eutrophication. All areas of land that are known to drain into those waters and that contribute to the pollution have to be designated as vulnerable zones by the Member States. Subsequently, a review should take place every four years. In these areas, Member States are required to establish Action Programmes, containing mandatory measures concerning land use and the storage of fertilisers. In addition, each Member State has to draw up at least one code of good agricultural practice, to be implemented on a voluntary basis throughout their territory (Goodchild, 1998)[42].

The directive is one of the first environmental measures to regulate agriculture directly and to apply EC environmental principles to agricultural activities. It applies the polluter pays principle and the principles of rectification at source and preventive action to agricultural production. In doing so, it helps to apply the important integration principle, that is, to integrate environmental consideration into agricultural practices (Grossman, 2000). The Commission noted that the polluter pays principle is important in the Community and for the nitrates directive, "this means that the cost of the measures necessary to change current practices to reduce pollution should be borne by the agricultural operators themselves." (Grossman, 2000). Farmers in vulnerable zones must comply with the compulsory measures under the directive without compensation.

[41] Farmers are directly responsible for nitrate and phosphate pollution linked to excessive fertilization (chemical fertilizers and manure or slurry). This is particularly the case in regions with intensive husbandry, like in the Bretagne region in France, or in Holland.
[42] In order to reduce the emissions associated with agricultural activities, three types of actions are promoted in the annexes to the nitrates directive, regarding codes of good practice and the action programmes. These include, for example, the use of fertilisers and manure with a balance between crop needs, nitrogen inputs and soil

If the measures referred to in paragraph 4 of the directive are insufficient to achieve its objective, additional measures or reinforced actions have to be taken. According to the directive, Member States, when selecting these measures or actions, have to take into account their effectiveness and their cost relative to other preventive measures (EEC, 1991b). Member States are allowed a degree of flexibility in both choosing extra measures that may be necessary as part of the action programmes, and in determining to which areas these action programmes should apply (Goodchild, 1998).

The directive is based on the principle that prevention should occur at the source. It requires, for the first time, that farmers themselves take the measures necessary to control the pollution of waters by nitrates that they are likely to have caused. Under the directive, Member States have significant responsibilities: most importantly, to establish a code of good agricultural practice, to identify and designate vulnerable zones, and to establish and implement an Action Program. Because the directive is intended to protect the environment, rather than harmonise Member State laws, States have wide discretion in identifying waters affected by pollution and designating vulnerable zones. The flexibility that Member States enjoy under the directive ensures that applying the directive does not violate the principle of proportionality (Grossman, M.R., 2000).

What is most interesting is the fact that the legal efficiency principle is somewhat pushed away, as the implementation of the directives implied drastic reforms at the level of the individual Members States. As Kallis and Nijkamp (1999) conclude: Governments that previously were accustomed to deal with environmental issues in a “closed” and discretionary manner, were obliged to report for their activities to a “higher”, European “arbiter”. Only if drastic changes in administrative structures in the Members States take place, will imposed standards be enforced in the way sought by the directives. In this respect, it was noted (STOA, 1995) that all Member Sates, even those with more developed environmental protection structures, employed obscure clauses, or imprecise definitions of standards to “relax” the impact of the legislation.

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supply; general limitations per crop for both mineral and organic nitrogen fertilisation; and sufficient manure storage (European Commission, Environment DG, 2003).

III.5 The Water Framework Directive

This directive will be analysed extensively in the next chapter. Here, we shall just mention its implication for the directives we have just discussed. As Table 3.3 shows, the water framework directive induces a major change in all resource-related directives. Those based on setting drinking water or sanitation standards remain in force.

Table 3.3. Directives which will remain in force and those to be repealed as a result of adoption of the water framework directive

Directives to remain in force	**Directives to be repealed**
Bathing water quality directive(76/160/EEC) Drinking water quality directive (80/778/EEC) and its revision (98/83/EC) Urban waste water treatment directive (91/271/EEC) Nitrates directive (91/676/EEC)	Dangerous substances directive(76/464/EEC) Surface water directive(75/440/EEC) and its daughter directive (79/869/EEC) Fish water directive (78/659/EEC) Shellfish water directive (79/923/EEC) Groundwater directive (80/68/EEC) Groundwater directive (80/68/EEC) Information exchange decision (77/795/EEC)

Source: European Commission (2000).

IV IMPLICATIONS AND IMPLEMENTATION AT NATIONAL LEVEL

In this part we explore the implementation of the European policy in the Drinking Water and Sanitation systems. At a European level, there is a clear gap between the intense activity triggered around the implementation of the drinking and bathing water-related directives and the poor impact of the fish, shellfish and pollution-control directives. Drinking water quality standards and sanitation requirements fostered further research for technologies to comply with standards and for improving the scientific validity of the standards, which in turn have highlighted new issues and approaches (Kallis and Nijkamp, 1999). However the impact of these standards in different Member States are quite different, and one cannot speak of a liberalisation trend in all countries.

For example, in some countries like the U.K, France and Italy, huge investments were required. This led to significant institutional reforms in water management (i.e. privatisation

of the service, establishment of new monitoring bodies, etc.). Hassan (1995) argues that the high investment costs related to the European water directives have been a major driving force for the re-organisation of the U.K. water industry. In order to expand the financial capacity for conforming with the directives' requirements the water service was transferred from the public to the private sector (extending the financial base through shareholders). In other countries, water management was not as strongly influenced by European directives. These countries already had well developed environmental protection structures: environmental standards were already high, and water management was already very well organized. This is the case for the Netherlands, Germany, Denmark, Sweden, and Austria. This partly explains why private sector involvement did not significantly increase with the implementation of EU standards in these countries.

Therefore instead of analysing impacts at European level, we shall analyse the impacts of the standards in four different countries: Italy, France, Germany and the Netherlands. We shall first analyse France and Italy, considering the important influence EU directives had on their water sector. And then we shall analyse Germany and the Netherlands, as these countries had more developed legislation prior to EU legislation. We shall check the following hypotheses in order to highlight impacts on private sector involvement.:

a) EU standards lead to growing technological complexity which results in an increasing professionalization of the water sector. Can this induce more private sector involvement?

b) Directives represented increasing costs on treatment. Does this increase in treatment costs encourage private sector involvement?

c) Directives put pressure on water resources management (change of scale, concentration, network expansion): does this have an effect on private sector involvement?

d) Directives lead to the involvement of new stakeholders: do new stakeholders influence water liberalisation?

Many factors influence the development of national water management systems and their pattern of industrial organization and technical change. Geography and hydrology, for example, constrain local development since they shape patterns of quantitative and qualitative availability, determine the territorial size and the technical complexity of water infrastructure, require to a larger or smaller extent appropriate institutional developments in the model of

water governance and so on. Hence, it is difficult to isolate the sole impacts of European legislation on national standards and water management. Nonetheless, in this part, we focus mostly on the financial implications for the European directives, the impact of legislation on technological complexity, and the emergence of new stakeholders.

IV.1 Italy and France: water sector largely influenced by European Directives

Italian and French water legislation have been greatly influenced by European directives. Box 4.1. summarises the national legislation based on European Directives.

Box 4.1. Italian and French legislation based on European Directives

ITALY

- Drinking water: the directives 75/440, 78/869, 80/778 have been implemented by the law *dPR* 515/82 (three water categories and water treatments) and law *dPR* 236/88 (water quality requirements for drinking purposes); Directive 98/83/CE implemented by the law *Decreto legislativo* n.31/2001;
- Groundwater: Directive 80/68 implemented by the law D*ecreto legislativo* 132/92 for groundwater protection from polluting emissions;
- Swimming water: Directive 76/169 and law *dPR* n.470/82 concerning the quality of swimming water;
- Waste water: Directive 91/271/CEE and D*ecreto legislativo* n.152/99 and n.258/2000 that have introduced more clear aspects into the sector;
- Dangerous polluting substances: directive 76/464 and law n.41/92 concerning the water pollution by highly dangerous pollutants; directive 91/676/CEE and laws *Decreto legislativo* n.152/99 and n.258/2000 (the same as for waste water).

FRANCE

- dir. 75/440/CEE and 80/778/CEE by the decree n. 89-3;
- the same decree was modified by the decree 2001-1220 in December 2001, in order to consider the Dir. 98/38/CE;
- the dir. 271/91/CEE implemented by the law 92-3 and the decree 94-469, concerning the treatment of wastewater.

Concerning the Italian case, despite some important success stories on the "demand-side", the impact of legislation on water policies in Italy has been mostly concentrated on the supply side (i.e. in collecting and treatment of wastewater). Developments in the legislative

framework have originated much more from the European level than from internal pressures. The relative weakness of national technological water industry, the fragmentation of the water industry and its poor financial grounds are undoubtedly related to this. On the other hand, the construction industry (licensee of technology, mostly imported), professional consultants (very often in close relation with Universities, especially for advice on regional planning) and water service operators have been the most important drivers of technical change, capturing the implementation phase. In Italy and France, private sector involvement developed with this scissor effect (Rachline, 1995): municipalities were confronted with the task of meeting increasingly stringent standards, but were financially unable to achieve these new objectives.

4.1.1 Hypothesis 1: EU directives enhance technological change

In Italy, a simplistic model of market development in the environmental industry postulates that an improvement in the required environmental performance means that an improvement in the technological and industrial basis of the management system is needed, with related economies of scale; and that large and already established firms can therefore expand their business, in this particular case by attracting less developed areas into their orbit. This model inspired the reform of law 36/94. In fact the evolution of the market is not that straightforward.

The environmental standards imposed by the directives have implied a recourse to strong technological investments and knowledge. This is one of the main reasons for the slow transposition of EU directives. Indeed Italy has almost never respected the transposition deadlines imposed by these environmental directives. The demanding constraints imposed by the European directives have not necessary implied a straightforward privatisation of local utilities, as the "*municipalizzate*"[43] have demonstrated high performances in fulfilling this task (thanks largely to their know-how and their capability to finance themselves). Along with the consideration above, it is important to add that many structural indicators show improvement of the quality associated to the service i.e. the rapid diffusion of automated quality control systems, and the progressive endowment of chemical analyses, emergency units and procedures, and sophisticated treatment.

[43] i.e. local public utilities.

In France, innovation dynamics depends on the functioning of water management. The traditional regulation on public procurement has indirectly influenced the path of innovation. Companies were relatively free to combine technologies and introduce new devices, once complying with administrative specification, and budget and environmental indicators. As a result, French water engineering companies have progressively developed a strong innovative capacity. Simultaneously, since the 1980s the urban water management has been faced with new environmental challenges (particularly with the protection of the receptor milieu and protection of the water resources). A growing awareness to environmental problems led to a stronger interest toward "green innovation". In this respect, the strategy of water industry has been to anticipate the domestic demand led by European Directives and environmental legislation, in order to take the productivity gains drawn from new technologies. A greater role to the private sector was given by other factors, such as the increasing complexity of available treatment and monitoring technologies, the strengthening of environmental regulation, policies limiting public employment, and privatisation which eroded the internal know-how of the municipalities. Municipalities, especially the smaller ones, are not as qualified as private companies - who have much more qualified personnel enabling them to assume the design, construction, and management of the most complex systems. The EU directives also stimulated innovative behaviour in large local communities. These municipalities want to keep highly skilled internal staff, thereby enabling them to formulate technological options more independently and participate in the innovation process. Hence, they avoid becoming completely dependent on the private expertise and are able to keep control on investment decisions.

4.1.2 Hypothesis 2: Financial pressure on municipalities

In Italy, financial issues have become even more important in recent years. Until the 1990s the financial weakness of the municipalities was offset by regional and state budgets, which covered all investments established by water basin agencies. This was not the case after the 1990s as public finance constraints became more stringent. For this reason, the Law 36/94 imposes financial autonomy at ATO level[44] together with *full-cost recovery*. This means that

[44] ATO stands for *Ambiti Territoriali Optimi*, which means Optimal Management Area, OMA hereafter

water industry has to cover all costs associated with the provision of WSS services through tariffs.

Thus, while legislation and water resources planning still seem to have an important role in the design of new water supply schemes, in order to increase available resources (south) or reduce the reliance on vulnerable resources (north), the decisive argument against new «big works» in the field of water seems to be that the public budget is by no means ready to cover the cost anymore. To comply with EU directives it has been estimated that around 50 billion Euros of investment will be required over the next 8-10 years (very rough estimates). Out of this 25-30 billion Euros would be needed to comply with Directive 91/271/EEC. In order to guarantee financial self-sufficiency of the water management system this new investment has to be added to the full cost of the existing water facilities.

In the past, the typical situation is the one in which the water operator holds most of the relevant information, the regulatory system is very weak, and most of the finance comes through the public budget and is administrated through regional planning. The new system aimed at by law 36/94 reduces the role of planning and delegates most of the responsibility for implementation to the OMA (Optimal Management Area) and places the financial burden on consumer tariffs. The key issue then becomes the effectiveness of the regulatory system and the capacity of OMAs to define and later enforce asset management plans with the operators. Municipalities will generally have just a "political" overview on the price-setting process. In other words they will be able to deny an increase, but only at the expense of quality and investment.

On the one hand if this happens to be true, a potential conflict between environmental/quality and economic regulation is likely to emerge, with the local authorities possibly resisting a price increase – hence lobbying against environmental quality improvements that require extra costs. On the other hand, as long as some degree of competition will be maintained and a plurality of visions will be confronted in the decision boards, this effect would probably be weaker. At the same time the *municipalizzate* have become more market oriented in their activities, competing at the same level with private firms willing to enter the Italian market.

In France, considerable efforts were made in the 1990s to comply with European directives. Further investments are necessary - especially with regards to sludge treatment facilities, pipes network extensions, and the renewal of old section in many urban centres. There is a growing concern for better optimisation of existing equipment. This required works concern with modernisation or renewal of existing networks and improvement of plant performances. According to Elnaboulsi (2001), "the ongoing increase and restriction in EU Directives and National legislation (quality and environment), which are financially and technically difficult to meet, have led local municipalities to delegate their services." (2001). This can be illustrated by observing the impacts of the first drinking water directives on water management in some French towns, in which companies were previously working "*en régie*"[45].

Most towns have delegated the sanitation service as well as the water supply service to the private sector. Toulouse for example required major investments in the sanitation system, and in equipment for water treatment and distribution with the new water directives. Saint-Etienne also had to conform to sanitation and water quality requirements deriving from European directives, and chose to delegate these services to the private sector. This is also the case for Toulon, Brest, Montpellier, Bordeaux, Blois and many other towns (Pezon, 2000), as they were also faced with important investments to conform to the European directives on drinking water[46].

At present, there is a growing concern about how to meet the requirements of the European Directives: the total investments required are estimated at 13 bn Euros per year over the next ten years. In many cases investments appear insufficient (in particular for sewage). This is despite the fact that the Agencies' subsidies have been used to extend the sewage network considerably.

[45] A company working "*en régie*" means an internal public entity within a municipality, defined by a set of accounts.
[46] Moreover, this trend was also amplified after the 1st of January 1987, as municipalities were confronted to the deregulation of water prices, and all services had to ensure a balance between revenues and expenditure, which put financial pressure on municipalities, that preferred to delegate the water and sanitation service to private operators.

4.1.3 Hypothesis 3: Pressure on the scale of water resource management

In Italy, first directives, as mentioned in the previous point, did not produce any relevant impact on the organisation of WSS services. In fact, other regulations influence this pattern. To this extent, it is also important to mention the law 36/94. This introduced a comprehensive reform of the WSS services. In particular the Italian water industry - in parallel with other local public utilities- is still undergoing a process of transformation from the traditional public management arrangements. In the present phase, the system is in the transition to a framework, set up in 1990 (for what concerns public services) and in 1994 (for what concerns WSS services), whose pillars are the collective responsibility of municipalities (within territorial units specified by the regional government) and management alternatives that entail formal privatisation, legal privatisation and delegation (with the first two being in dominant, and the latter being only of residual importance).

The law, whilst still not implemented completely, should have reformed the water system towards a more concentrated structure (see box below), that is meant either to ease the achievement of self-sufficiency or to afford full-cost pricing. A problem of governance is emerging from the Galli law implementation, as planning was traditionally a matter of regional authorities (responsible of the investment coverage). From now on, this becomes a duty of the OMA operator which is responsible of investment planning through the *Piano d'Ambito*[47].

Box 4.2 The Italian Model of WSS services Management

- Full intermunicipal responsibility for public supply and sewage within geographical areas individuated by the regions (Optimal Management Areas, OMAs);
- Vertical integration of responsibility on the whole water cycle;
- For each OMA, a single operator would be in charge of management of the whole water cycle.

Source: Massarutto (2000).

[47] i.e. usually 30 years investments plans.

In France, the creation of Financial Water Agencies following the 1964 Water Act was motivated by environmental and fiscal reasons (polluter-pays principle) and to enlarge the territorial unit of water management (water basin). They have progressively gained the leadership in the rationalisation of water uses. The 1992 Water Act gives them a major role in the planning mechanism. In order to comply with the waste water directive, the law has defined planning procedures on a territorial basis, related to water use and protection. These legal obligations are consistent with the WFD, which imposes management of water resources at basin level.

Planning consists in two basic instruments: the six SDAGE[48] plans (corresponding to each river basin), which are compulsory, and optional SAGE[49] plans (at local level). In this second case, the conflict of interests between actors makes it difficult to reach a consensus. The SAGE have to be coordinated with other types of planning documents and translated into local town plans[50]. The SAGE contents vary. In some cases these mainly concern flood control and river maintenance, in others, point-source pollution and sewerage are the principal concern. In the French case, EU directives did not have an impact in the scale of resources management. In fact, the co-ordination of measures at supra-municipal level is guaranteed by the private firms that have received delegation from the municipalities for management of WSS services.

4.1.4 Hypothesis 4: the emergence of new stakeholders

It is important to consider the relevant actors playing a decisive role in the water management system. In Italy, some of these actors come from outside the water operator system bringing key resources for the development of the sector. It is possible to consider the following stakeholders: education and professional associations, external consultants, planning officers, suppliers of technology, public research institutions, and independent institutions. The system has evolved toward a model that stresses the divisions of duties between the different stakeholders. For instance, on one side the Regions are responsible for controlling that the water standards are enforced by water users. On the other, the water operator has to comply

[48] SDAGE stands for: Schéma Directeur d'Aménagement et de Gestion des Eaux, i.e. Water Management Master Plans
[49] SAGE stands for: Schéma de Gestion des Eaux, i.e. Water Management Plan

with standards imposed by law (in the past, instead, this separation was not considered and public authorities had the duty to comply with EU standards requirements).

In France, the change in managing water resources, from a supply-side approach to a demand-side, has brought the emergence of a new stakeholder: the water consumer. During the 1990s French water tariffs increased by 50%[51]. This was largely driven by investment expenditures as a result of the European Directives. The water price increase has generated a strong opposition from consumers, accompanied with the debate about the consequences of "privatisation" of water industry (market power) and the lack of transparency of municipal management. The public opinion shows a growing sensitiveness toward health protection and quality of tap water, calling for more sophisticated water treatment processes, prevention of pollution risks, and the protection of the resources. It requires an improvement in professional expertise. This rising awareness towards environmental protection and the protestation against the excessive weight of discretionary power in local projects has raised the question of public participation in local decision process in France. A form of participating democracy was institutionalised with the creation of the Water Agencies in the mid 1960s, and with the "Water Parliament" (in the Basin Committee were all users are represented). However, the determination of prices, planning of investment, technical performances remained in the hands of municipalities, water agencies and private operators, so consumers do not have the final word on this issue.

IV.2 Germany and the Netherlands: weak influence of European Directives on the water sector

Germany and the Netherlands are different to Italy and France as they are examples of countries with well-developed national environmental legislation. Germany especially has a long history as a world leader in water quality management. This means that these countries can afford to push for stricter environmental rules, both to satisfy domestic pressure, and to

[50] *Plans d'occupation des sols.* In the past, town plans did not take into account rain and wastewater.
[51] According to the French Ministry of Finances (DGCCRF), the price of water including all taxes and charges for 120 m^3 went from 187 euros to 318 euros between 1991 and 2000.

create a level playing field[52]. Germany and the Netherlands were already ahead in many instances of the standards set by the European Union. Contrary to countries like the UK, France and Italy, although European directives did represent important investments concerning notably urban wastewater treatment, this did not enhance private sector involvement as much in the water sector for these two countries.

Germany and the Netherlands both had the administrative and monitoring structures in place for water management and hence found it relatively easy to comply with the European Union directives. Germany tends to be ahead of other European Union countries. A case in point is the nitrate directive, where it was one of the only five countries which had established a genuine action programme (CEC, 1997).

[52] However, one must add that Germany, in the past a fast mover in the field of environmental policy, after the unification of East and West Germany and the emerging problems with its economy has become more inward looking.

Box 4.3. Dutch and German legislation based on European Directives

THE NETHERLANDS

- *Drinking water: directive 75/440/EEC* is incorporated in the 'Waterworks Decision' and the 'Decision on Quality Objectives and Measurement of Surface Waters' (Koninklijk besluit, 02/04/1984). Directive 80/778/EEC is incorporated in the 'Waterworks Act' (*Waterleidingwet*).
- *Wastewater: directive 91/271/EEC* is incorporated in the 'Environmental Management Act' (*Wet milieubeheer*) and the act concerning 'Pollution of surface waters' (*Wet verontreiniging oppervlaktewater*).
- *Nitrate directive 91/676/EEC* is incorporated in the 'Soil Protection Act' (*Wet bodembescherming*) that was implemented in 1987, and the 'Nitrate Directive' (*Nitraatrichtlijn*). The whole area of the Netherlands has been designated as vulnerable zone in 1994.

GERMANY

- *Drinking water*: For the first key directive of 1975 (COM 75 440), Germany already had extensive legislation, notably with the Federal Water Act of 1957. The other legislation is integrated in the Oberflächenwasserqualitätsverordnung (1997).
- Concerning the *discharge of dangerous substances* into the aquatic environment, contrary to some other European countries, Germany had already followed an emission control approach for a long time in the regulating regime under the act on the Regulation of Matters Relating to Water of 1957 (Federal Water Act).
- *Wastewater*: directive 91/271/EEC is transposed in the Reinhalteordnung kommunales Abwasser (1993)
- Nitrate directive is transposed in the Düngeverordnung(1996) and the Anlagenverordnung (1994)

4.2.1 Hypothesis 1 and 2: EU directives enhance technological change and increase financial pressure on municipalities

European directives did enhance technological change, and represented quite important investments especially from the 1990s onwards, but this did not radically change the organization of water management.

Concerning Germany, the competence and professionalism of municipal authorities have enabled a high quality supply of water, often based on high technology. Therefore, the EU directives did not in this sense encourage more private sector involvement as German WSS services were already well organized and provided by municipalities. In Germany, important investments were required in the 1990s, to meet EU wastewater standards: in Duisberg in the

Ruhrverbrand, re-equipping the two-year old treatment plant to meet the new nutrient standards (nitrate and phosphorus) required investments of DM 200 million. However, these investments were managed in western Germany through public financing, and through a rise in pollution charge levies and the price of water. It did not change public sector management. Eastern German municipalities have more difficulties raising capital to enhance their infrastructure. This is generally much less sophisticated and developed than in western Germany. The ground-breaking involvement of the private sector in eastern Germany occured in the city of Rostock. In 1993 they signed a concession contract for 25 years for water and sewerage services with Eurowasser. A World Bank report (Briscoe, 1995) suggested that a growing private sector involvement would be required in eastern Germany as a result of both the important investments needed and the need for technically skilled labour force. This is still a highly controversial issue, as private sector involvement is only one alternative amongst others .

In the Netherlands, the water sector finds itself in an era in which investments are likely to increase substantially over the coming decades with EU requirements. The expected increase in required investments[53] is due to a number of factors (Braadbaart and Hoogwout 1999):

- Continuing aggregation of companies: it is generally expected that the current 15 water companies will be subject to future mergers. The number of remaining water companies is expected to be between 3 and 6. These mergers are likely to involve considerable additional investments.
- Increase in cost of new treatment plants: new plants tend to be fitted out with costly advanced water treatment technologies. This is partly explained by the pollution problems mentioned above as well as the need to adhere to increasingly stringent environmental procedures.
- Increasing cost of raw water: the deteriorating quality and availability of groundwater is likely to drive up treatment costs. Groundwater regulation will probably force companies to shift from groundwater to surface water (which requires more extensive treatment).

[53] The total costs for water management in the Netherlands amount to EUR 5.67 billion per year (Ministry of Transport and Public Works 2000). More than half of this amount goes to water supply provision and water quality management. Financing of water management activities derives from six sources (based on Perdok 1995): Central Government budget; Water Board charge, Pollution levy; Groundwater taxes; Drinking water

Intensive agriculture has polluted groundwater sources and has therefore also complicated water treatment.

A direct confirmation of the hypothesis of increased private sector involvement can be seen in the case of the Delfland wastewater treatment plant. In 2002, the Water Board Delfland awarded a Design-Build-Finance-Operate (DBFO) contract to the Delfluent consortium for the construction and operation of one of Europe's largest wastewater treatment plants which should be operational in 2008 (as well as upgrading an older treatment plant).[54] The concession has a duration of 30 years. The decision to involve the private sector rested on the need to build a new treatment plant (in light of the need to meet European guidelines on urban wastewater discharge).[55] The Water Board Delfland believes the DBFO scheme will at least provide efficiency gains of 10%. With the awarding of the first DBFO contract, private sector financing has made its first entry into the Dutch water sector. At present, this is the first and only project of its kind. It remains to be seen to what extent private sector financing will grow over the coming decades. Because of the investments required, water utilities and Water Boards are more and more dependent on external financiers. However, water supply companies offer attractive prospects for capital investment and this has contributed to the development of a close relationship between Dutch water utilities and financial institutions. Braadbaart and Hoogwout (1999) conclude that because of this the Dutch water utilities are slowly bringing their financial recording and reporting procedures in line with private sector standards to meet the demands of external financiers.

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charges; Private project financing. The Water Boards collect the water board charges and pollution levy. The water supply companies collect the drinking water charges.

[54] The Delfluent consortium incorporates Vivendi Water, DELTA Water, Water Company Europoort, Rabobank, Heijmans Groundworks and Civil Engineering and Strukton.

54 Presentation Mr. J. Geluk, project manager DBFO project, 6/12/2000.

[55] Different forms of privatization can be distinguished, ranging from a complete divestiture to privatizing only certain stages of the production process (Van Dijk and Schulte Nordholt, eds, 1994). Only certain functions, such as the management, may be privatized, or certain tasks could be contracted out to private partners. Finally, involvement of the private sector is also possible by using management or service contracts or through concessions. In this case the property is not transferred, but only the management. An early summary of experiences of involving the private sector in the supply of urban services, such as water supply and sewerage can be found in Roth (1989).

4.2.2 Hypothesis 3: Pressure on the scale of water management

In the Netherlands, one can observe a change of scale in water management: government-owned drinking water companies undergo a rapid process of concentration. This could be partly due to the need to implement EU standards (as concentration of companies can enable heavy investments). This concentration may allow the improvement not only of customer service quality, but also the companies' finances. However, this does not have any influence on private sector involvement as the government prohibited the privatisation of the water supply in January 2000 (EEB, 2001).

In Germany, this hypothesis is not valid. Germany has a very decentralised structure of water resources management with around 20 000 autonomous municipalities running 7000 water supply and 10 000 wastewater utilities (Finger and Allouche, 2002).

4.2.3 Hypothesis 4. The emergence of new stakeholders

In the Netherlands, stakeholders participate directly or through representation to make good management possible. The functioning of the Water Boards is based on people's participation *and* on the 'profit principle' (Huisman, 1997). Who benefits will pay, but also gets a say, or in plain Dutch: "wie profiteert betaalt mee, maar betaling geeft zeggenschap!" Due to the increasing number of directives and their implications, one of the new stakeholders are the consultants. Consultants are increasingly used by the Water boards and water companies to help them apply these regulations. This trend is reinforced by the drive for more efficiency in the 1990s, which led many water companies to doing away with staff departments and hire consultants instead. This facilitates public water management (and has of course no impact on private sector involvement).

V CONCLUSION

If preventive measures were not always correctly implemented by member states, drinking water and urban waste water directives were more successful. Improving the quality of drinking water and wastewater can be considered as one of the most ambitious part of the EU environmental policy. But it is also proving to be the most expensive. After having analysed

the impacts of these directives in Italy, France, Germany and the Netherlands, one can reply to the previous hypotheses advanced in part 3. One can observe the following trends regarding liberalisation and private sector involvement:

- *Hypotheses 1 and 2: Increasing standards led to technological complexity, increasing costs on treatment and changing cost allocation between actors*. In France and Italy, this clearly boosted private sector involvement (in Italy this is true for the second generation of directives). Municipalities were confronted to growing complex treatment systems that they were not always cable of understanding and financing, whereas private companies were financially stronger, had qualified personnel enabling them (especially for the French companies) to assume the design, construction, and management of the most complex systems. This private sector involvement is much less pronounced in the other two countries (Germany and the Netherlands) that had a better developed environmental legislation and infrastructure. However, financial impacts have not been inconsequential: private sector involvement has increased with the development of public – private companies in Germany, and a growing dependence on external financiers can be observed in the Netherlands. However, the Dutch government prohibits the privatisation of the water supply.

- *Hypothesis 3: Increasing European standards led to a change in the scale of services*. In Italy, it was the national regulation and not EU legislation that pushed towards a more concentrated structure of water management. In the French and German cases, this hypothesis is not valid. In the Netherlands, EU directives may have enhanced the move towards the concentration of drinking water companies.

- *Hypothesis 4: New stakeholders emerge with the evolution of water management*. In countries where private sector involvement is strong (e.g. France), the increasing price of water has highlighted the lack of public participation in local decision processes. The question remains as to whether this trend lead to more public sector involvement in the future?

After this analysis, one can clearly note that there is not one path towards liberalisation, and according to countries, the implementation of EU water standards does not drive necessarily

to more private sector involvement. The sole impacts of EU directives on water liberalisation are very tricky to isolate, as many other driving forces can push a country towards more or less private sector involvement (national legislation…).

The following tables summarise the results of the chapter.

Table 5.1. Impact of European Directives on Standards

Countries where the impact of European Directives on Standards is important on Water sector				
HYPOTHESES	**ITALY**		**FRANCE**	
	Countervailing forces against liberalisation of WSS services	Driving forces towards liberalisation of WSS services	Countervailing forces against liberalisation of WSS services	Driving forces towards liberalisation of WSS services
Technical complexity and need of professionalism	The "municipalizzate" have demonstrated high performances in acquiring the technology. → *First directives did not push on technical private sector involvement*.	In the case of direct labour provision of services, the new technical requirements lead to purchase technology outside, by involving the private sector to supply the necessary technology.	Small municipalities have developed sewage system with the technical support of State Engineer. In other words, in these cases public procurement is still qualitatively important	*Companies were relatively free to combine technologies and introduce new devices, once complying with administrative specification, and budget and environmental indicators.* → *First directives pushed on technical private sector involvement*
Increasing costs and financing pressure	Availability of public finance support did not enhance the necessity to recur to private capital. → *First directives did not push on financial private sector involvement*	Water industry has to cover all costs associated with the provision of WSS services through tariffs. Public utilities with good rating are able to get capital from new investors (stock exchange…). → *Second waves of directives stimulate financial private sector involvement.*	The State cut off its subsidies to urban sewerage sector in the 1970's. These have been replaced by the mutual funding system of the Water agencies (*Agences de l'eau)*.	The ongoing increase and restriction in EU Directives and National legislation (quality and environment), which are financially and technically difficult to meet, have led local municipalities to delegate their services.
Regionalisation		The new system created by law 36/94 reduces the role of planning and delegates most of the implementation machine to the OMA/operator, and the financial burden on tariffs.	The creation of Financial Water Agencies following the 1964 Water Act was motivated by environmental and fiscal reasons (polluter-pays principle) and to enlarge the territorial unit of water management (water basin).	The co-ordination of measures at supra-municipal level is guaranteed by the private firms that have received delegation from the municipalities for management of WSS services.
Emergence of new stake-holders	The system stresses the divisions of duties between the different stakeholders. Ex: Regions are responsible for controlling that the water standards are enforced by water users who are committed to enhance the necessary structural assets.			The water prices increases have generated a strong opposition from consumers, accompanied with the debate about the consequences of "privatisation" of water industry (market power) and the lack of transparency of municipal management.

	Countries where European Directives on standards had a weak influence			
HYPOTHESES	**GERMANY**		**THE NETHERLANDS**	
	Countervailing forces against liberalisation of WSS services	**Driving forces towards liberalisation of WSS services**	**Countervailing forces against liberalisation of WSS services**	**Driving forces towards liberalisation of WSS services**
Technical complexity and need of professionalism	The competence and professionalism of municipal authorities in Germany enable to manage water and wastewater services well, often based on high technology. *Directives did not have an influence on private sector involvement.*		Technological complexity was dealt with by hiring consultants. However, *this had no impact on private sector involvement*	
Increasing costs and financing pressure	Costs are managed and borne by municipalities through levies and through water price.	German municipalities are prepared to transfer the construction, financing and temporary operation of sewerage treatment plants to private operators, if they cannot realise investments from their own funds.		The Netherlands were faced with important investments with the wastewater directive. Water boards are more dependent on external financiers, and private sector involvement has started to make its entry in the water sector.
Regionalisation	The competence of municipalities enable them to cope with water management at local level.	Expensive water treatment requires a high level of operational competence and often the creation of larger operational units.	Government-owned drinking water companies, undergo a rapid process of concentration. However, the government prohibited the privatisation of the water supply in January 2000.	
Emergence of new stake-holders				

CHAPTER 3 MANAGEMENT OF THE NATURAL RESOURCE

I INTRODUCTION

The European Union (EU) has affected numerous aspects concerning the water sector in Europe for thirty years. Standards concerning both quality of water bodies and emission limits derive mainly from the EU water legislation. The Water Framework Directive (WFD)[56] rationalises EU water policy around the single objective of good ecological status for all waters and introduces the concept of integrated river basin management. In this chapter we focus on an assessment of the underlying "intervention logic" of the water framework directive (WFD). Moreover, we aim to identify and analyse some challenges resulting from the linkages between the new resource perspective of the WFD and a possible liberalisation process in the water sector. First, we isolate and describe the broad principles of the WFD (section 2). For each of them, we look at the liberalisation issues that could come up in their respect (section 3). After that, the WFD is put into the context of pending directives (section 4).

II PRINCIPLES AND CONTENT OF THE WATER FRAMEWORK DIRECTIVE

The water framework directive (WFD) initiates a reform of the EU water policy. This corresponds to the wish of the Member States to reduce the financial burden and the complexity of action due to the many fragmented EU-water related directives. The WFD considers water according to a 'resource approach'. All the EU water directives are grouped together and the objectives of quality and limitation of emissions are combined. Its objective is to reach a good ecological status for all waters as of 2015 through an integrated water management at (international) river basin scale. The WFD sets up guidelines and leaves a large room for manoeuvre to the Member States during implementation. It defines the issues at stake for water management in the Member States for the forthcoming years. According to

the principle of decentralised action, the WFD defines detailed objectives, but leaves the Member States with the duty to set the mechanisms of implementation for reaching these objectives.

The WFD targets the preservation and improvement of the aquatic environment of the Community as the ultimate goal. The Member States determine the '*good status*' of all waters. When the 'good status' is already achieved, it has to be maintained. At the same time, due to the "no-deterioration" clause of the WFD, a worsening of the environmental status of a water body is prohibited. The core objective of a 'good status' is applicable to all kind of waters, i.e. inland surface waters, lakes, estuary waters, coastal waters and groundwaters. The 'good status' should allow for the improvement of the aquatic ecosystems, land and wetland ecosystems[57]. *Protected areas* require a more stringent protection (e.g. areas of conservation as defined in the 1992 Habitats directive). In contrast, lower environmental objective are defined for water bodies designated as *artificial or heavily modified water bodies*. The Member States have the duty to protect, improve and restore the water bodies in order to reach the 'good status' as of 2015. These objectives are legally-binding (article 4).

In addition to the 'good status' requirements, the WFD determines organisational objectives. It organises the planning and development of knowledge on the resource at the scale of river basins with an objective of international cooperation. The territorial unit retained for the water management is the *river district* (article 3). The river district corresponds generally to the river basin or watershed. The river basin is a territory where all running waters, including rainwater, flow into the sea at the same estuary[58]. Examples of river basins (not only the river but also the territories around all its tributaries) are the Rhine basin, the Seine basin or the Danube basin. The river district is an administrative territory. Sometimes its borders do not perfectly fit with the watershed, particularly for groundwater.

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[56] 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.
[57] The 'good status' is not defined in absolute terms. Only a few elements are presented (annex V) but are defined more precicely through the work in the Common Implementation Strategy (see chapter XXX).
[58] Article 2.13 defines the river basin as: "the area of land from which all surface run-off flows through a sequence of streams and, possibly, lakes into the sea at a single river mouth, estuary or delta".

The WFD proposes to set up an *integrated water management*. The directive is not explicit on defining this term, but some elements help to delineate the concept. First, integration means that water is considered as a resource (resource approach). Water policy is not sector-based anymore (e.g. belonging to transport, agriculture, public health or environmental policies). Second, integration means administrative coordination. Policies are conducted through a single guiding document (planning approach) for the whole river basin (territorial approach): the management plan. The management plan contains a description of the resource, broad policy objectives for the river basin, all national and European water legislation affecting the river basin (combined approach) and a monitoring programme. It also describes the cost-effective set of measures that will be taken in order to satisfy the objectives for all water bodies in the river basin district. Third, integration means rationalising and co-ordinating all policy interventions in the water sector. Integration here is a meta-principle developed in the more operational principles that will be described later on.

Such integration is built on the development of the knowledge base and *management plans*. The Member States make an inventory of the basins present in their territory. For each water district or national part of an international district, they collect information and make an analysis of the characteristics of the basin, a study of impact of human activities on water, and an economic analysis of the water uses (article 5). They provide a register of the protected areas (article 6). Monitoring programmes are put in place (article 8) with an objective to make a complete appraisal of the status of water in each district. In each district, either national or international, a management plan is elaborated (article 13). In the case of an international district, the Member States are entitled to coordinate in order to produce a single management plan for the district. With the updating of the management plan, an assessment of the former management plan and a justification for the unimplemented measures complete the frame. The management plans can be supplemented by specific plans for tributary basins or particular problems.

The main instrument of the WFD is the programme of measures. A *programme of measures* is elaborated for each (or the national part of a) water district. It inventories and contributes to implement measures necessary to reach the 'good status' (article 11). The measures must fit the characteristics of the district presented in the management plan. The possibility to adopt

national measures is maintained. The programme of measures integrates the requirements of national/regional and European legislation in a single document. It is composed of compulsory and complementary measures. The *compulsory measures* encompass the measures required by the European legislation, measures concerning the distribution and use of water (i.e. cost recovery, promotion of a sustainable use, prior authorisation and control of wells), the measures of control and authorisation of recharges of groundwater, a regulation of pollutant discharges, a prohibition of discharges of pollutants in groundwater, and the regulation of the hydromorphological conditions of the water body. It also includes a regulation and control against diffuse pollution, a prohibition of discharges of pollutants in groundwater, measures to eliminate emissions of priority hazardous substances and measures of prevention against industrial hazards. The *complementary measures* are left to the discretion of the Member States (facultative measures). They are introduced in order to reach the objective of a 'good status' for all waters (see above). They include all kinds of public policies affecting (directly and indirectly) water quality/status. If the measures of the programme of measures are not sufficient to meet the objectives, they are revised and eventually supplemented by new complementary measures.

The Member States have to implement the WFD gradually, but according to a precise time schedule (see Table 2.1.). However, they have to set new institutional arrangement up quite quickly. In fact, the first deadline is December 2003 with the transposition of the directive into national legislation and the designation of water district authorities. After that, the programmes of measures and control are progressively put in place and implemented. Good status for all waters in 2015 thus requires early action by all the Member States.

All in all, the WFD is (to be) understood as a directive on the ecological quality of water. It rationalises the EU water policy and coordinates national water policies following a resource approach (as opposed to a sector-based or problem-based approach). The reforms that are currently conducted in the context of its implementation still raise many questions. The challenges raised by the WFD are approached through three perspectives: the ecological perspective, the economic perspective and the institutional perspective.

Table 2.1. Schedule of implementation of the WFD

Deadline	Implementation steps	Articles of the WFD
2000	Entry into force of the water framework directive (22.12.2000)	Directive 2000/60/EC
2003	Transposition of the directive in the national legislation Designation of the competent authorities in river basin districts	Article 24 Article 3
2004	Register of the characteristics of the river basin district Register of protected areas	Article 5 Article 6
2006	Implementation of the monitoring programme	Article 8
2009	Publication of the management plan Publication of the programme of measures	Article 13 Article 11
2010	Taking into account cost recovery of water uses and incentive water pricing	Article 9
2012	Entry into force of the programme of measures Combined approach of the emission controls for point and diffuse sources	Article 12 Article 10
2013	Repeal of a set of former EU water directives	Article 22
2015	**Good status for all waters**	Article 4
2019	Review of the directive	Article 19
2024	Prohibition of emissions of priority hazardous substances (at the latest)	Article 16

III. From WFD principles to the issues raised by the liberalisation process

While economic principles play an important role in the WFD, it should be stressed that the directive does not call for a one-dimensional "economisation" of European water management and protection. This manifests itself foremost in article 1 of the directive: "Water is not a commercial product like any other but rather a heritage which must be protected, defended and treated as such". At the same time, the question arises if the WFD does entail any information on preferable market structures for the provision of WSS services in light of the discussions on liberalisation/privatisation of these services in Europe. Overall, the WFD does not specify how the water supply and sanitation sector should be organised in the different Member States. The Directive can thus neither be considered as being per se in favour nor against a privatised or liberalised water sector. It leaves this point deliberately open.

As introduced in section II , the WFD is based on a number of main guiding principles. The following section examines the relationship of some of the WFD principles to the market situation in which they are applied. It highlights issues that are of importance to different liberalisation scenarios as well as their possible impacts on future developments in market structures (regulation, environmental safeguards etc.). Hence the following section will not examine all the principles that underpin the Directive. Rather it will concentrate on those principles that could be relevant for the future discussion of different liberalisation scenarios. In the following, ecological, economic, and institutional principles anchored in the WFD will thus be reviewed and their linkage to liberalisation will be analysed. In order to illustrate the theoretical reflections on the different principles, where appropriate stylised examples will be presented.

III.1 Ecological sustainability

3.1.1 Sustainability of the water resource

The introduction of the principle of sustainability brings a new emphasis to European water policy. It reinforces the more general principle of water protection, recommending attention to the protection of the water resource in a long-term perspective (article 1 of WFD). In particular, water is considered as an ecosystem. This consideration is reflected in the standards of water quality. With the priority given to the conservation of the aquatic ecosystems, the traditional concept of water quality is reformed. Until the WFD, the quality of the water as resource was based on physical and chemical parameters. With the WFD, biological parameters enter in the definition of a good quality of water. This shift means that the policy objective of the WFD is not only to reach a good quality of water but also to guarantee or restore the aquatic ecosystems. Thus, it would be more appropriate to talk about an "ecosystemic logic" instead of a "resource logic" in order to assess the paradigm shift introduced by the WFD. The basic principle of sustainability entails several new concepts, goals and criteria in the matter of water management, involving other principles.

Non deterioration principle. This new principle is in force since December 2000 when the directive was published. The aim is to avoid any possible policy that could induce any significant deterioration in the present ecological state of the ecosystems. This principle states

firstly the prevention and protection of the state of aquatic and terrestrial[59] ecosystems (article 1.a of WFD), then its improvement and the sustainable use of water (article 1.b of WFD).

Principle of integration. Sustainable use of water requires the transversal analysis of all uses, applying the principle of integration. This principle states that the environmental protection must be integrated into the definition and implementation of the community policy actions (article 6 of TEC). For this reason, the WFD advocates a greater integration of protection and sustainable management of water in other community policy areas, such as energy, transport, agriculture, fishing, regional policy and tourism (preamble 16 of WFD).

Principle of planning and rational management. The *Principle of Planning and Rational Management* (articles 5 and 11 of WFD) is a consequence of both the ecosystem logic and the principle of integration, leads to it. The WFD requires the development of an integrated ecosystemic approach based on the river basin, that would bring more coherence to water policy.

Box 3.1. The dynamic on course in the Segura River Basin, an example of unsustainable development under subsidised supply strategies and alternatives under demand management strategies

In the last decades, the growth of the intensive agribusiness and the tourism industry in the Spanish Mediterranean Coast has produced a spiral of demands; most of them out of any sustainable land planning and even legal control. In the Segura River Basin, this growth has led to the overexploitation of surface and underground natural resources. The priority of the economic growth, without any consideration about sustainability, leads one to frame the problem as a *"structural deficit"* issue. Under the traditional *supply strategy*, the solution is based on new and bigger public works (dams and inter-basin transfers) under massive public subsidies.

During the 70's a big aqueduct was projected to transfer 1000 hm3 per year from the Tajo River to the Segura River Basin for compensating this "deficit" and extending 51000 new hectares of irrigated lands. Ten years later the number of new irrigated hectares was double (most of them irregular and even illegal irrigated lands), stressing the overexploitation of the aquifers. At that point the Government assumed this growth as a positive issue, projecting a new transfer from the Ebro River, with new subsidies. This is how this supply strategy fed a spiral of demands based on an unsustainable model of development, inconsistent with the general approach of the WFD.

[59] With regard to their water needs.

An alternative approach, under the coherence required by the WFD, must to be based on a clear statement of resources availability under restrictions of sustainability. These restrictions must guaranty the health of the aquatic ecosystems in the river basin. On this base, it is necessary to deal with scarcity from *demand management strategies* at the river basin scale. A reduction of the irrigated area under compensations (until reaching a sustainable level of demands) costs on average 0,2 € per saved cubic meter. In contrast the cost of water transferred from the Ebro River is 0,7 € per cubic meter. Under this perspective, a Water Bank, similar to the one of California, would manage the scarcity, under restrictions of sustainability. The estimated level of prices in these Banks would be around 0,3 €/m3 for the next future. This is in fact the coherence of the alternative proposed by the *Foundation for a New Water Culture* in the debate with the Spanish Government in the European Commission (DG-Environment).

Source: Arrojo (2003).

The WFD places the problem of water management in the area of the environmental issues. Water cannot longer be considered as a simple *productive input* and must be conceptualised as an *eco-social assets* (where *"eco"* synthesises the *eco*nomic and the *eco*logic values involved, recovering the global concept of *oikonomia* by Aristotle). Under this approach, the value of water goes further on the monetary value of its productive utilities.

The fact of dealing with environmental, social, cultural and ethic values, which very often are inconsistently measurable with money, makes it difficult to manage them by markets. In other words, the complexity of handling the principle of integration with so many different fields involved and the complexity of managing the water under the territorial scale of the basin does not fit well with the market ethos.

3.1.2 Good status: a new concept for new goals

The main objective pursued by the WFD is to recover and conserve the health and functionality of the aquatic ecosystems. The traditional concept of quality, related until recently with just the physical and chemical characteristics of the water, is focused now in the biological health of the ecosystems. From this approach the level of quality of a water body – a section of river, a lake, wetlands, etc. - is related with its potentialities as habitat. To define the status in each case, it is necessary to compare it with a similar ecosystem in a natural ecological state. A river is not anymore a canal of H_2O, but a complex set of habitats, related and linked one each other, depending on a flow regime of water but also dependent on a flow

of sediments (solid flow) and a flow of nutrients. The state of a river section depends of course on the state of precedent sections upstream. But it also depends on the riverside ecosystems, the riparian forests, the geomorphology of the river bed, etc.

Under this new perspective, physical and chemical quality remains as very important references, but not the only, and very often not the most significant. In the Mediterranean countries, where problems of scarcity are relevant, the traditional concept of "ecologic flow" is not accepted anymore. From a quantitative point of view the preservation of an *environmental regime* (far from the concept of "ecological flow") looks for conserving a regime similar to the natural one, as one of the most important issues in the natural cycle in a river. In many cases recovering the old shape of the river bed, with the old meanders and riparian forests, became the key for reaching the *good state*. In this case the geomorphology relates to the natural functions of the river dynamic, preventing floods or improving the biodiversity and the quality of the water.

In short, the concept of *good ecological status* is without any doubt the most important and new concept introduced by the WFD[60]. Unfortunately the Directive in its final form, is open to contradictions specially in relation to the implementation of the objectives of reaching and conserving this Good Ecological Status. Leaving the responsibility for establishing these environmental targets to the Member State Governments guarantees a contradictory process of implementation for this Directive. The possibility of declaring any water body as *Heavely Modified* will give Member States the opportunity to reduce the objectives in order to reach an ambiguous *Maximum Ecological Potentiality.*

The risk of a fuzzy implementation of the *good ecological status* will produce uncertainties that will evolve depending on social environmental conscience. The requirements introduced by this new concept (Good Ecological Status) will have an evolutionary concretion in the next decades. This lack of concretion doesn't fit with perspectives of liberalisation and markets, introducing uncertainties about water availability and guaranties in the concession rights.

[60] Definition of the good status: "an expression of the quality of the structure and functioning of aquatic ecosystems associated with surface waters, classified in accordance with Annex V" (art. 2 WFD).

Box 3.2: Restrictions in water availability for transfers imposed by the conservation of a Good Status in the Ebro Delta ecosystems

During the last few years there has been an active debate around the requirements for guarantying the Good Status in the Ebro Delta. The arbitrary *"ecological flow"* stated by the Spanish National Hydrological Plan is 100 m^3/s, that would imply 3 hm^3/year. This must be now reviewed with scientific bases to satisfy the new WFD approach.

The assessment presented by the University of Barcelona and the Foundation for a New Water Culture, under the new concept of *environmental regime*, presents a complex analysis around the main degradation dynamics on course or as future risks: salty wedge in the river bed, anoxia phenomenon, subsidence and growth of the sea level by climate change, impacts on the fisheries in the coastal platform, etc.

The final results lead to ask for a regime that implies a total flow of 10,000 hm^3/year. Under these requirements there is no availability of water for the projected big transfers from the Ebro River.

Source: Prat (2001); Arrojo et al. (2003).

3.1.3 Basin management under an eco-systemic approach

The river basin management principle has its origins in the report of the International Law Association[61] about the use of the waters of international rivers. Later, the regulations laid down in Helsinki in 1966 also included a reference to this principle in its article II, stating that the river basin is an indivisible hydro-geological unity.

In the WFD the basin is definitely assumed as the basic territorial scale for elaborating the *Management Plans.* This ensures coherence with the aims of sustainability and the conservation of aquatic ecosystems. The Basin is the territorial framework of the natural cycle of continental water. To respect this cycle implies to assume a complex eco-systemic approach.

On a basin scale, the systemic interdependence among the flows of water, sediments and nutrients with respect to the different ecosystems is especially relevant in relation to deltas, estuaries and coastal ecosystems. This question is explicitly taken up in the WFD which, in

[61] Report adopted in the 48th Conference of the International Law Association held in New York in 1958.

article 3, defines the concept of a *river basin district*, including estuaries, deltas and coastal platforms.

During the last decades most of the rivers have been deeply changed in their beds, in their regimes and in the quality of the flows. The main consequences have been suffered downstream in the low basins, in the deltas and along the coasts: major floods; a crisis of sustainability in the deltas; a crisis of sand in the beaches; a dramatic reduction on fisheries…

Box 3.3: Impacts of the Aswan Dam in the Delta of Alexandria and coasts

During the next years and decades after closing the flood-gates of the Aswan Dam in the Nile River, several big impacts have been suffered and studied:

1. Crisis of sustainability in the Delta of Alexandria: the collapse of sediments in Aswan has cut down the solid flow that compensated the natural subsidence of the delta. Otherwise the diminishing flow of fresh water induced the progress of the sea water with salinisation processes.
2. Breakdown of the sands of the beaches and regression of said beaches. Today it is known that most of the sand on beaches does not come from coastal erosion but from continental river erosion.
3. Drop in catches of sardines and anchovies in the order of between 85 and 95 % in the Oriental Mediterranean Sea. Today it is well known that these species spawn in the mouth of the big rivers taking sustenance from the nutrients coming from the continents during the flood periods.

Several studies have been published in the last two years on the influence of the Rhone River and the Ebro River on the Mediterranean fisheries along the Spanish and French coasts

Source: Palomera (2002).

This requirement implies serious problems for a possible process of liberalisation, as it demands an extremely complex management framework (article 5 and annex 7 of WFD) and is subject to systemic uncertainties that can only be dealt with by using suitable institutional mechanisms.

3.1.4 Environmental principles

A key aspect of the development of the principle of protection of the waters logically centres upon the analysis of the causes that can or do endanger the state of the aquatic ecosystems that are being protected. In this case the *preventive action principle* appears as a key concept of the development. It is found in the constituent treaty (article 174.2 of TEC) and in the

WFD (preamble 11 of WFD). One principle also developed in the Water Framework Directive derived from the prevention is that of the *correction of environment damages, preferably at the source itself* (article 174.2 of TCE).

However, the WFD in the development of the *preventive action principle* tends to explain with precision the prevention of the factors of contamination from a fundamentally qualitative perspective. The quantitative aspects tend to be forgotten. Specifically, the prevention of the dynamics of the overexploitation of the waters or of the fluvial ecosystems tend to remain marginalised. The result is usually that, because of the lack of precision in the characterisation and treatment of these types of situations, and the problems of unacceptable concentrations of contaminants, the simple argument that there is less water in the Mediterranean areas has the option of being considered a receipt of the unjustifiable that is not only the unsustainable use of the water ecosystems. In this area, the EU will have to develop its efforts to specify the principles of the protection of the waters and of the preventive action principle, from the perspective of the sustainable development paradigm.

The *precautionary principle* is established in the constitutional treaty (article 174.2 of TEC) and is reiterated in the Water Framework Directive (preamble 11). It is applicable when determining the dangerous and priority substances, especially when determining the potentially negative effects that arise from the product and upon realising the scientific evaluation of risk (preamble 44 of WFD).

Box 3.4. The Climate Change under the Precautionary Principle perspective

Climate Change assessments have at present a clear agreement about previsions on temperature increasing evolution for the next decades. However the previsions on pluviometry give a wide range of forecasts. In the different Basin Management Plans approved in Spain this uncertainty was the reason for ignoring the prevision of serious flow decreases for the next decades.

Under the Precautionary Principle it would be necessary to count on these decreases taking in account the most pessimistic range of the existing serious forecasts.

The prevention principle, in the way that it refers to contamination factors and clearly described impacts on their consequences (although in many cases not in all), can be located in the area of liberalised management of markets through the normative correspondents that the

business world easily integrates into its predictions and calculations of costs. However, the *precautionary principle*, as it works with risks and uncertainty, is going to assume serious obstacles and disincentives to the management model of the market.

III.2 Economics

3.2.1 Polluter pays principle and cost recovery

The Polluter Pays Principle (PP principle) has long been an element of European environmental policy.[62] Although the principle was only embedded in the EC Treaty in 1987 by the Single European Act, references to it in EC documents date back as far as 1973.[63] However, the EU Water Framework Directive (WFD) is one of the first directives in which the PP principle is explicitly incorporated (preamble 11; article 9), and it plays a significant role in the directive's overall implementation. In general, the main elements of the principle can be summarised as follows:

- Those who damage the environment should bear the cost of such damage;
- The price of a good or service should include the cost of environmental damage that results from the production process by charging polluters for the environmental externalities of the production of a good or service.[64]

By making polluters-pay compensation for ongoing activities that deplete resources or otherwise impact on the environment, this instrument implicitly provides incentives not to pollute and to introduce more environmentally sensitive practices.[65] Furthermore, if the PP principle is applied through environmental taxes or charges, it generates revenue that can be employed (and earmarked) towards the recovery of costs associated with the administration of environmental or resource management policies.

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[62] Early references to the PP principle in EC environmental policy can be found in e.g.: EC Action Programme on the Environment (1973), Council Recommendation (75/436), Waste Framework Directive 75/442.
[63] Coffey, C. and J. Newcombe (2001).
[64] Markandya, R. P. et. al (2001).
[65] This point is anchored in Article 9 of the WFD, which outlines that water pricing policies should provide "adequate incentives" for users to use water resources efficiently and therefore contribute to the overall environmental objectives of the WFD. Water pricing policies can thus form an integral contribution to a full implementation of the PP principle, by setting appropriate price signals.

In the context of the WFD, the polluter pays principle is strongly connected to the provisions concerning cost recovery of the water services. According to article 9(1), Member States have to take into account the principle of cost recovery of water services (including environmental and resource costs[66]) in accordance with the polluter pays principle by 2010. This formulation does not extend as far as originally wished for by the European Commission: the directive's text does not imply that full cost recovery needs to be achieved. Lower cost recovery rates can be justified on social, environmental and economic grounds, as well as due to geographic or climatic conditions (article 9).

It is important to note that cost-recovery applies to water services and not to all water uses. Therefore, the distinction between these two water-related activities is important. *Water services* (as a sub-group of water uses*)* are defined in article 2(38) of the WFD as:

"Water services" *means all services, which provide, for households, public institutions or any economic activity:*

- Abstraction, impoundment, storage, treatment and distribution of surface water or groundwater,

- Wastewater collection and treatment facilities, which subsequently discharge into surface water.

As this definition leaves room for interpretation, the specification of which activities constitute a water service has initiated discussions among Member States. The WATECO[67] working group (as part of the "Common Implementation Strategy", see section IV.1.) clarified the definition in its guidance document for the economic analysis. Yet, as the guidance documents are legally non-binding, the national interpretation is still up to the Member States.[68]

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[66] Environmental costs have been defined by the Commission of the European Community in the communication *COM (2000) 477 final* as representing "the costs of damage that water uses impose on the environment and ecosystems and those that use the environment". The same document defines resource costs as the "costs of forgone opportunities which others suffer due to the depletion of the resource beyond its natural rate of recharge or recovery".

[67] The "WATer ECOnomics" working group (under the lead of France and the Commission) consisted of approximately 40 members, most of them water economists from EU-Member States and Accession Countries. Its task was to clarify the understanding of the economic aspects of the WFD with a focus on the requirements for the economic analysis due 2004 (article 5, Annex III) and provide guidance on how to practically implement the requirements of the WFD. From the set-up of the working group (December 2000) until the finalisation and endorsement of the WATECO-guidance document by the water directors of the Member States in June 2002, this group met 6 times.

[68] In specifying which activities constitute water services, two main issues were discussed: Self-provision and impoundments for other/additional uses than water supply only (e.g. hydropower, navigation). According to the consensus reached at the Water Directors level, s*elf-supply* is to be considered as a water service, if it has a

An additional important element within the issue of cost recovery is that Member States have to ensure that each of the different water uses (disaggregated at least in industry, households and agriculture) contributes adequately to the cost recovery of water services. This is in line with the polluter pays principle and would mean (if full cost recovery was to be achieved) that the agricultural sector for example would have to pay for the costs produced by diffuse pollution for the provision of drinking water.

In practice, the case of diffuse pollution illustrates the difference between the polluter pays principle and the cost recovery principle due to cross-subsidisation between sectors. Normally, agriculture does not contribute to the recovery of costs it induces to water supply; rather, the increased costs due to diffuse pollution are borne by the water service users (households etc.). This is in contradiction with the polluter pays principle. At the same time, cost recovery (up to now, of financial costs of the water service) is (in many cases) achieved.

Box 3.5. provides an illustration of the German sewerage charge. A sewerage charge is the amount of money paid for indirect discharges, that is domestic sewage or effluents discharged into the sewer system (European Parliament, 2001). Sewerage charges constitute an important step towards the realisation of the polluter pays principle, as they make households pay for the services they use. In the German case, sewerage charges are furthermore subject to the principle of cost-recovery and intended to set pricing incentives for efficient resource use. Such an instrument can also contribute to the internalisation of environmental and resource costs into the price of the water service according to the principles of the WFD. But in the German case, the focus is mainly on the recovery of financial costs.

significant impact on the water status. With regard to *impoundments* (or reservoirs), it was decided that only impoundments for water supply constitute a water service.

Box 3.5. Making the Polluters Pay: Sewerage Charges in Germany

In Germany, the user charge for discharges of water to the sewerage system by households is generally based on metered freshwater consumption. Yet, municipalities are free to collect fixed contributions regularly (in some *Länder* even basic monthly charges) in addition to the volume-based charges (Euro per cubic meter, or in the case of rainwater Euro per square meter) (Speck, 2000).[69]

Four basic principles guide the setting of charges (Buckland and Zabel, 2002):

- Charges are set in proportion to the services provided (metered consumption);
- Charges reflect the benefit a user derives plus the costs incurred in providing the service (charges for new connections are borne by the property owner);
- Charges should not differentiate between users;
- Charges should be set at cost recovery rate, that is revenue should not exceed costs.

In 1997, the average sewerage charge was 2.36 Euro per cubic meter of freshwater consumption. The collection of charges is set in the *Kommunalabgabengesetze* (Municipal Charges Laws, KAG) of the various federal *Länder* on the principle of cost-recovery: the revenues collected by a particular community may not exceed the actual costs of the sewerage services, and conversely, the charges should be set at such a level that no deficit arises.

In recent years the unit prices for sewage treatment plants have been reduced due to a general downward trend in costs for construction and equipment, technological advancement, and the cost-cutting pressure of competition and rationalisation.

Source: Kraemer, R.A. et. al (2003): "Economic Instruments for Water Management in Latin America, IDB Working Paper.

Several issues are raised when considering the implementation of the polluter pays principle and the associated principle of cost-recovery in the context of a liberalised water market. Firstly, the recovery of the financial costs of water services by definition needs to include long-term investments and long term costs. In a liberalised market setting with an increased number of private actors, stricter (less "voluntary") safeguards will be needed to avoid short/middle term planning based on short-term costs. In their investment and pricing decisions, private actors will aim at maximising profits for their anticipated operation period. As the firm's best planning horizon may thus not necessarily coincide with the timeframe needed for ensuring long-term cost-recovery, appropriate safeguards will be needed.

[69] Revenue obtained through German sewerage charges is earmarked to finance collection and treatment infrastructure.

Secondly, situations may arise in which e.g. due to scarcity, higher water prices would lead to a more efficient use of the water resource. As it will not be in the interest of a private entity to limit the consumption of its product, ways must be identified in which the state can influence the price setting of private providers without distorting competition.

A third issue arising in this framework relates to the practice of cross-subsidisation. In a situation of limited competition, water prices are often "averaged" between e.g. urban (cheap) and rural (expensive) areas on solidarity grounds. Liberalisation could lead to an increased fragmentation of the market with private investors "cherry-picking" the profitable areas where costs are easy to recover and e.g. environmental and resource costs are low. This could raise issues of affordability as well as of reduced provision of service in certain areas demanding appropriate safeguarding activities which are closely linked to the definition and practical use of the notion of "services of general interest" in the water sector.

In order to support incentive pricing (as well as internalising environmental and resource costs), certain environmental charges/taxes might have to be applied more intensively in the future. A strong regulatory framework and contracts with a sufficient degree of flexibility will be needed to allow for this development with private operators in the market.

A further issue arising from the interlinkage of liberalisation, the principle of cost-recovery and the polluter pays principle is access to information. Making the polluter pay necessitates access to the relevant information for e.g. assessing operation and maintenance costs. On the one hand, the more the market is characterised by competition, the greater the difficulty will be to acquire the necessary information/data for the calculation of actual costs and the degree of cost-recovery. Accordingly, a strong "regulator" will be needed for ensuring that the information is made available to the competent body. On the other hand, if such a regulator is put in place, increased competition in the water sector can lead to stronger financial transparency.

3.2.2 Selection of Cost-Effective Measures

According to the WFD, in case there is a gap between the projected water status in 2015 and the "good ecological status" which is the general WFD-aim for all water bodies, cost-effective

sets of measures have to be developed and integrated into the first River Basin Management Plan for 2009 (articles 11 & 16). The set of measures has to identify the necessary actions in terms of implementing existing legislation and any other activities to be carried out by the competent authority for bringing the water body up to the required standards within the timeframe laid down by the Directive.

At the moment, the selection of cost-effective measures does not yet have a prominent position on the national and European agenda, as earlier deadlines shift this issue down on the implementation priority list. The considerations of how administrations could deal with this issue in a pragmatic way are still in their infancy and important questions remain to be resolved. Up to now, some of the pilot studies dealing with the economic aspects of the WFD that have been conducted in different river basins have touched the issue of measure selection. The following example of the river Cidacos basin in Spain details the importance of choosing the right spatial scale for the development of the set of cost-effective measures.

Box 3.6: The Issue of Scale in the Cidacos Scoping Study

The Cidacos River is 44 km long, and drains a catchment of 500 km^2. Except for its initial part, the river runs through a plain, which is mainly agricultural (225 km^2). Animal farming is associated to farming with a total of 86 production facilities. Agricultural production is supplied with surface water and groundwater. The basin has 14 small population centres, with two small cities (Olite and Tafalla) and 17,000 domestic users. These are supplied with water from a small dam in the first stretch of the river, and also from two springs and some wells. These have water quality problems, from hard water and nitrates. The main industries are located in Olite and Tafalla, and industrial permits for water abstraction have been denied due to a shortage of good quality water supply.

The Cidacos scoping study distinguished between three water sub-basins: upstream, downstream and a middle stretch. In order to achieve good ecological quality (GEQ) an improvement to the water flow was considered, increasing flows by 20, 80 and 100 litres per second in the upper, middle and lower sub-basins respectively. The total costs of achieving the objective for each sub-basin independently can be obtained simply by aggregating the costs of the measures for the three areas. However, because the three sub-basins are connected, the cost of obtaining the GEQ in stretch II depends on the quantity of water it receives from the upstream basin (stretch I) and the cost of GEQ in the downstream basin (stretch III) depends on the ecological status of both stretches I and II. Therefore, the least cost programme of measures must take into account the externalities involved in the simultaneous improvement of the three interconnected sub-basins and cannot be done independently for each sub-basin, as it would exclude any shared benefits and costs of the programme of measures. By improving the water flow above the minimum standard, it was

shown that the marginal cost of achieving the required increase in the water flow in the middle and downstream sub-basins could be avoided. The (avoided) costs of the measures that would have been needed for stretches II and III were shown to be higher than the cost of increasing the water flow in stretch I.

In Cidacos, the overall cost of the action plan obtained this way would be €0.56 million (or less than 50 per cent of the total cost of treating the three water bodies as independent). Consequently, when considering the scale of the analysis the river basin as a whole must be used. The analysis cannot be done independently for each sub-basin, as it would exclude any shared benefits and costs of the programme of measures.

Source: Ministerio de Medio Ambiente, Gobierno de Navarra: "Virtual Scoping Study of the Cost Effectiveness Analysis in the Cidacos River", WATECO Guidance Document.

When linking the selection of cost effective measures with the liberalisation of water markets, some important issues are raised. From a theoretical point of view, the term *cost-effective* implies that a given target is to be reached at minimum cost. The example above on the Cidacos River Basin has shown that the scale at which the principle of cost-effectiveness will be implemented may be decisive. In addition to the effects described in the example above, the decision on the appropriate scale could also affect stakeholders: If the principle of cost-effectiveness is applied at a river basin scale, then certain stakeholders might be "disproportionately" hit although the macro-solution is cost-effective. Within a liberalised, fragmented and competitive market, reaching a consensus will then be more difficult to achieve compared to a situation where a public, large scale provider is operating. It still remains to be resolved whether, in the case where certain stakeholders are "disproportionately" hit by an "optimal" solution, compensations could be regarded as a valid instrument to reach a consensus. Objecting to this solution is that stakeholders not receiving subsidies will then be disadvantaged in the case of strong competition.

Furthermore, it may be decisive how the consensus on the optimal solution, i.e. the optimal set of measures, is determined. An unequal distribution of bargaining power could lead to a sub-optimal solution, in which large private providers strive for the minimisation of their own investments/costs. Therefore, a balanced negotiation process has to be ensured by a strong river basin authority.

Finally, the issue of the confidentiality of information arises again under the principle of cost-effectiveness: In order to choose the optimal/ most cost-effective solution, all costs and

required investments connected to possible measures need to be assessed and integrated into the calculation and ultimately into the decision-making process. The more competition there is in the market, the greater the difficulty will be to acquire the necessary information/data for the calculation and selection of cost-effective measures. Only the presence of a strong water authority can increase transparency on the financial costs of measures.

3.2.3 Applying Economic Considerations to the Derogations of Environmental Targets

The WFD aims at achieving a good water status of all waters by the year 2015. However, recognising that in special cases it will not be feasible to reach this goal within the ambitious timeframe set by the Directive, article 4 of the WFD includes provisions for the assessment of different derogations from the environmental objectives of good water status. These include:[70]

- The designation of Heavily Modified Water Bodies (HMWB) and Artificial Water Bodies (AWB), for which lower objectives can be proposed;[71]
- An extension of the timeframe in which the objectives have to be reached (beyond 2015);
- Less stringent environmental objectives due to unfeasibility or disproportionate costs of measures necessary to reach Good Ecological Status (GES);
- New modifications and new sustainable economic activities that lead to a deterioration in water body status.

For each of these derogations, a number of "derogation tests" have to be applied as input into political decisions. These derogation tests require information, expertise and knowledge on a wide range of issues (biophysical, social etc.) At the same time, economic considerations play a predominant role.

The content of these derogation tests is only described in general terms in the WFD and needs to be specified and operationalised further. Until now, only two of the possibilities for derogation have been discussed at the European level:

- The designation of HMWB (article 4.3 WFD), where a detailed approach has been developed within the HMWB-guidance document. Furthermore, annex IV.II(b) to the

[70] Interwies, E. and E. Kampa (2003).
[71] Actually, HMWB and AWB are not a derogation, as their status is equivalent to that of the four natural surface water categories. However, for the purpose of this paper, HMWB and AWB and their objectives are considered as a type of derogation.

WATECO Guidance Document discusses in more detail the use of economics in this designation procedure. A "pragmatic" approach (timing, detail of work/information needed, screening procedures) to conducting these tests has to be established at national river basin level.

- Lower environmental objectives due to new activities/modifications (article 4.7) have been discussed in annex IV.II(a) to the WATECO Guidance Document with a special focus on the input of economics to this issue. It needs to be noted that this annex has not been discussed into details at the European level, so certain issues have remained quite general. The important question on when these tests have to be conducted (when new modifications/activities are planned, in the preparation of the first RBMP, etc.) has not yet been answered.

The issues of time (article 4.4) and objective (article 4.5) derogations have so far not been discussed, necessitating further clarifications and procedural guidelines.

Pilot studies have been conducted mainly in the context of HMWB designation in order to explore and test possible guidelines and procedures for the designation of derogations on environmental targets. Box 3.7. illustrates how the assessment of "disproportionate costs" of alternative measures in the context of the HMWB designation has been dealt with in the pilot study on the Haringvliet Estuary (The Netherlands).

Box 3.7. Assessment of Disproportionate Costs in the Haringvliet Estuary (The Netherlands)

The Haringvliet Estuary represents an example for transitional waters with a strong influence by human activities and substantially changed character. The rivers Rhine and Meuse form a combined estuary in the south-west of the Netherlands, whose southern outlet is the so-called Haringvliet Estuary. After completion of the Haringvliet Dam in 1970, this area changed from a dynamic brackish tidal inlet into a semi-stagnant freshwater area. The flow regime is regulated by sluices to ensure a minimum water flow in the Rotterdam Waterway.

The main beneficial objectives served by the modified characteristics of the estuary are safety against flooding and secondly the supply of fresh water. The HMWB case study on the Haringvliet Estuary identified the following alternative as the most realistic and environmentally preferable one to the existing use:

Construction of a different dam supplemented with measures to mitigate the salinisation of the water.

This alternative maintains the objectives of both safety and freshwater supply. Table 1 summarises the costs and benefits of the existing use and the proposed alternative.

Table 1:Alternative option to safeguard safety and supply of fresh water

	Present situation: Haringvliet	Alternative + supplementary measures
Costs	Maintenance, operation and replacement value costs	Destruction of the Haringvlietdam, operation, maintenance and capital costs of new dam, mitigation measures for loss of fresh water supply, remediation sediments
Benefits	-	Ecological benefits of reaching Good Ecological Status

It is difficult to conduct a full comparison of costs and benefits for the alternative, as the ecological benefits associated with this option are difficult to quantify in monetary terms. This is however necessary in order to make a comparison with all other costs possible. Table 2 presents the estimated costs implicated by the alternative (1387 Millions Euro in total).

Table 2: Estimated economic costs for alternative water use

Measures	Estimated costs (in million Euro)	
Destruction present Dam	n.n.	
Adjustment of the design of the dam	450	
Dredging and disposal of contaminated sediment Haringvliet	512	
Total costs for mitigating measures	962	
	Future	Present
Agricultural water supply	410	0
Drinking-water supply	15	0
Total costs for alternative water uses	425	0
Total estimated economic costs	1387	0

In the estimation of costs associated with the remediation of polluted sediments it is only required to compare the alternative's costs with the present way the beneficial objectives are met. Thus not all measures to be undertaken to reach GES need to be considered. Moreover, as Dutch policy already foresees a partial remediation for the Haringvliet sediments covering almost 1/3 of the presented costs, the costs analysed under the designation test will be reduced by 1/3 *512=170 Million Euro.

As Table 2 indicates, the total economic costs for the alternative option amount to (around) 1387 – 170 = 1217 Million Euro. Even when taking into account the difficulty to compare the ecological benefits of GES with the associated costs, it is likely that 1217 Million Euro are to be considered as disproportionately costly. Accordingly, the water bodies in question are designated as HMWB.

Source: Backx, et al. (2002), Heavily Modified Waters in Europe - Case Study on the Haringvliet Estuary, RIZA Dordrecht.

When linking the derogation of environmental targets and the assessment of disproportionate costs with the liberalisation of water markets, some important issues are raised. As the example on the scoping study on the river Haringvliet Estuary in Box 3.7 has shown, assessing disproportionate costs of an alternative option requires to monetise the associated costs and benefits. In the case of a liberalised market, the difficulty to acquire the required information for assessing the disproportionality of costs of all relevant alternatives (investment, operation costs etc.) may be even higher.

The main issue arising in the interplay between liberalisation and the provision for derogations of environmental targets is the fear that increased competition will lead to a surge in derogated water bodies, with accrued costs being classified as disproportionate too easily. Private operators could lobby for derogations as reaching GES could entail disproportionate costs for them, affecting their competitiveness on a liberalised water market. They will thus support a "case-to-case" approach instead of looking at the disproportionality at the river basin scale, which might lead to a large number of water bodies being derogated. This issue on how to consider economic aspects in the derogation tests has not been tackled so far by any EU Member State, with Scotland being the only slight exception where first explorative steps have been initiated.

III.3 Institutional design

The institutional design of the WFD is built around three components: an evidence-based policy principle, participation of the public and a management basin authority. For each of these components the content of the principles is discussed, an example given and the issues linked to the liberalisation process are raised. Nevertheless the definitions on the necessary institutional design are not very precise in the WFD. Most of the principles are only mentioned in general terms, mostly in the preambles. The institutions and organisations necessary for the development of the integrated water policy are not clearly set, e.g. the basin authorities and mechanisms of participation. So, the required institutional design for water management remains quite vague. This is not surprising, since the existing institutional structures in the Member States are so different. So "room for manœuvre" is needed in order to implement the WFD within the given national contexts. The WFD mentions a fourth aspect, i.e. the social principles, in a very general manner. Water is recognised as not being a commercial good[72] like any other. However the WFD does not set objectives for the protection of the water consumer equity or service of general interest[73]. Nevertheless the social debate around water management could emerge. One can imagine a claim against pricing not considering social effects[74], echoed in the participation process. The claim would draw on information that transparency makes available, contesting the equity of the existing or proposed water pricing system as well as the distribution of the costs of needed measures for reaching the environmental objectives of the WFD. Thus social issues remain central to sustainable resource management.

3.3.1 Evidence-based policy

The WFD sets principles of knowledge development, diffusion and justification that can be referred to as evidence-based policy. Evidence-based policy includes both data gathering and diffusion. It is developed at three stages: inventory of actual human use and initial status of

[72] "Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (preamble 1).
[73] However, some general principles are mentioned in the Preambles, concerning the economic and social cohesion of the Community (preamble 12) and the fact that water provision is a service of general interest (preamble 15).
[74] Pricing is and will be important, everybody agrees on this; the question is only how much social issues are going to be taken into consideration.

the resource, measures taken and their implementation and finally their outcomes and induced effects. It is about both data gathering and communication towards the water users and the European Commission. Knowledge increase is required in many dispositions, particularly those about data collection, management plans and programmes of measures. First, "[it] is necessary to undertake analyses of the characteristics of a river basin and the impacts of human activity as well as an economic analysis of water use » (preamble 36), as developed in article 5. Knowledge about the resource (status and human uses) must be collected on a comparable basis in order to enhance the coherence of the different policies.

Programmes of measures are designed according to the information gathered, with the objective to reach the good status of water (article 11). They compile the whole range of policies and measures to be taken inside the river district into a single document. All information, objectives and measures are presented in river basin management plans (article 13). Decision criteria, e.g. about derogations (preamble 30), are made transparent.

The collected information is provided to the Commission on the one hand, and to the water users on the other hand (preamble 46). The Member States report regularly to the Commission on operational objectives, measures taken and progress in implementation (article 15.3). Concerning users, they are informed in due time about the timetable of work, draft decisions and outputs (article 14). Upgrades in the management plans are made explicit. The "assessment of the progress made towards the achievement of the environmental objectives", including the monitoring results, is made public. Moreover, non-action must be justified. The Member States give "an explanation for any measures foreseen in the earlier version of the river basin management plan which have not been undertaken" (annex VII B). Then, evidence-based policy has a broader scope than transparency. It contains elements of justification of the public action, particularly on the outcomes of the policies and on non-implemented measures (annex 7B). Data must be collected and treated all along the process.

Box 3.8. Integrated water management planning in France (SDAGE)

France has moved towards integrated water management since 1992. The SDAGE (*Schéma directeur d'aménagement et de gestion des eaux*) is a master plan for water development and management drawn at the scale of the river district. It ensures planning and management of the water resource both in quality and quantity. The plan is based on a qualitative assessment of water. The SDAGE is negotiated between the representatives of the different water users in the frame of the Water Agencies (*Agences de l'eau)*. Co-ordination is managed by the Governement's representative at the regional level (*Préfet de Région*). He will become the basin authority according to the WFD.

Source: Sangaré & Larrue (2002).

Box 3.9. Regional administration of the environment in Belgium (Wallonia)

In Wallonia, most of the water competence is grouped into a single department, the DGRNE (*Direction générale des Ressources naturelles et de l'Environnement*), belonging to the Ministry of the Walloon Region. The DGRNE collects information on the quality of surface and groundwater, delivers the withdrawing permissions and raises taxes on water pumping and discharges. However in the perspective of the implementation of the WFD, providing an overview of the resource status proves to be difficult, as revealed by the first attempts to make management plans at the tributary river basin scale.

In the process of identification of the different water users required by the WFD, the databases in the department were not producing coherent figures. The total volume of withdrawn water according to the permits was significantly different from the figure based on taxation information. Such difficulties in inventory are difficult to tackle, more particularly in case water competence is spread into many administrations. Reorganising the administration from a sector-based approach to a resource approach is not that easy.

In case the WFD is fully implemented, evidence-based policy, with the amount of information it makes available, could have an influence on the liberalisation process. This influence will be dependent upon the scale at which information will be collected. First, information could reduce *information asymmetries*. Information is made available about many aspects of the water policy. For instance, the stakeholders better know about the volumes of abstractions and discharges of the operators, about the pressure discharges put on the resource and about the protection levels necessary to drinking water production. Evidence-based policy benefits the public authorities since they are able to reform water policies considering the real pressure existing on the resource, e.g. protect effectively drinking water production without excluding other uses. They can better balance investments in prevention (e.g. protection of wells) and

correction (e.g. building of prior treatment plants). The more knowledge public authorities have about the resource and its uses, the more leeway they get for regulating the water operators.

Second, transparency could also have an influence on *unbundling* in the water sector. But here again, it is an issue of scale. Many requirements of the WFD, especially on the economic analysis, have to be fulfilled at the river basin scale. Thus it would produce too "aggregated" information for making business opportunities directly visible. Information is made public about the organisation of the water sector, e.g. on the volumes produced, transported and consumed. In this context, the unbundling of the water uses allows a re-design of the water sector. Unbundling is a precondition to liberalisation as it makes business opportunities more visible. Historical operators in monopoly position on the whole cycle will probably oppose such a move, keeping information not publicly available. Current practise in the water sector could be made more visible through evidence-based policy.

At this moment, the degree of transparency that will be actually reached is not clear yet. Will there be a total transparency on all costs and financial flows and, if yes, at which scale? Not only is the unbundling of organisation a precondition of liberalisation. Financial unbundling is also necessary. *Financial unbundling* means an imputation of the full costs to each operation with a division in accounting. Every operation, such as water abstraction, prior treatment and transport, is separated in accounting. The cost of the use of the pipes can determine access pricing. It is the functional equivalent of "financial unbundling" in other network sectors, such as electricity, telecommunications and railways. Transparency in finance is not made clear in the WFD (see annex III). It would set the preconditions to competition, but not necessarily support it. There is no direct causation between transparency and liberalisation, even if the second needs the first to develop.

3.3.2 Pro-active public participation

Public participation is mentioned in the WFD, but not precisely defined. Participation is a large concept that includes various degrees of public involvement in the decision-making process. Participation ranges from information and consultation to co-decision with a veto right for the public. For its part, the WFD sets the objective of public participation without

specifying which form it should take. It talks about "information, consultation and involvement of the public, including users" (preamble 14). Participation should be organised at two levels, the European and local levels, mainly about the production of the management plans. "Member States shall encourage the active involvement of all interested parties in the implementation of this Directive, in particular in the production, review and updating of the river basin management plans" (article 14). In order to inform the public prior to the decision (preamble 46), they provide "a timetable and work programme for the production of the [management] plan including a statement of the consultation measures to be taken" (article 14). This information is completed with an overview of the significant issues and draft copies of the management plan before it enters into force. Water users are invited to send written comments on the draft plan[75]. Working documents are made available upon request (article 14). At the European level, the Commission organises a conference of the parties (article 18.5). Finally, the WFD creates only an incentive for change. The form participation should take is not clear enough[76]. Mobilisation of the citizens at national level will be necessary to make participation effective.

[75] Consultation at the local level concerns also the determination of the quality standards, i.e. the standards that precise what good status means (annex 5 1.2.6.iv).

[76] Some precision were made public in the legally non-binding guidance document (European Commission, *Guidance document on public participation in relation to the Water Framework Directive*, December 2002). It defines public participation as "allowing people to influence the outcome of plans and working processes" (p. 3). The Commission distinguishes between the stakeholders and the wide public. The first should be consulted while the second be more directly involved. The WFD only requires measures of information supply and consultation. However, active involvement is encouraged but left to the discretion of the Member States. It corresponds to "participation in the development and implementation of plans. Interested parties participate actively in the planning process by discussing issues and contributing to their solution" (p. 20). Active involvement would be open only to the stakeholders. The public authorities would select them according to a 'stakeholder analysis'. The question of scale for stakeholders' involvement in the decision-making process is not decided yet.

Box 3.10. Public participation at the local scale in Belgium (Wallonia)

The river contracts (*contrats de rivière*) are set at the local level. They are managed by local associations and composed of representatives of the regional authorities, the municipalities, the water operators and most of the local users (e.g. fishers, environmental associations, etc.). Participation is voluntary. The objective is both to enhance knowledge and awareness about rivers or tributary basins and to improve the quality of the water bodies. Participants draw a list of voluntary actions that is implemented over a period of three years. The agreement is informal, non-binding and self-financed by the participants. The public authorities only finance the coordination costs. Even thought the river contracts are considered as a success, they are still not entitled to participate to the investment decisions in the water sector (sewage networks, withdrawing permission, etc). Participation is limited to secondary issues.

Such a design of public participation is unfortunate as the example from Flanders testifies. There, the localisation and design of the water treatment plants was made without any form of local participation. Throughout the Region plants of a high capacity were built, connected to the countryside with main sewers on long distances. Today, the result is that Aquafin, the company which manages the networks, has poor yields of purification in the rural areas. In fact, rainwater is mixed to wastewater and water self-purifies during the journey. The involvement of locals would have certainly contributed to more tailor-made and efficient solutions.

Public participation could have implications on the liberalisation process in two ways. The first way, is the *public consent to the liberalisation process* itself. The second way concerns operational decisions in a liberalised environment. Theoretically, participation is one way to agree on liberalisation. Public consent to liberalisation in the water sector could be given at the European level. The procedures of participation that the WFD sets at this level could be used as arenas to decide on the entry or not in the liberalisation process. People would be asked if they are willing to liberalise water. Also, one could imagine participation procedures to define the required level of service of general interest in the water sector, a prior requirement for a sector-based regulation. For instance, people may be consulted on which form the right to water should take, either a differential pricing (e.g. first x m³ water for free), a social fund or an intervention of the public budget. Such a mutual consent could enhance the legitimacy and acceptance of the policy. In another way, it is also very plausible that liberalisation will remain a 'political game' and that the participatory elements of the WFD will not be mobilised.

This is to be expected, for example, as public discussions would reveal the political aspects of price setting for a service of general interest. It would contrast with and challenge any 'technical' and 'objective' calculation method. Furthermore, the public participation could interrupt the liberalisation process. For instance, one can imagine environmental associations using a veto on a BOOT contract for a sewage treatment plant. In Switzerland, the citizens blocked the liberalisation of the electricity sector with popular referenda.

3.3.3 Management basin authority

As a third institutional principle the WFD organises water management at the scale of the (international) river basins and puts it under the competence of a river basin authority. First, let us consider the territories. "'River basin district' means the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under article 3.1 as the main unit for management of river basins" (article 2.15). The delineation of the river basin does not take the national borders into account and can expand abroad. It is guided by hydrological concerns, even if adapted on borders for institutional purposes[77].

The second aspect is the designation of the competent authorities inside the river district. If possible, the WFD requires one single basin authority for the whole international river basin or at least the national part of the basin. The Member States designate the competent "authority or authorities" (article 2.16) for each river district (article 3.2). Cross-border basins are integrated into one single international district, with a competent national authority for each national portion of the district (article 3.3). The Member States can identify an existing national or international body as the authority (article 3.6).

The crucial issue raised by the cross-border institutional design is: Who will control water operators in a possible liberalised context? In the upcoming institutional design, a set of authorities with different logic and territories could overlap. The *river basin authorities* are

[77] For instance, the river basins of the Somme (F) and IJzer (B) are integrated in the Scheldt international river district. The decision fits the existing organisations in charge of water management, such as the French *Agence de l'eau Artois-Picardie*.

protecting the water resource at the scale of the (cross-border) basin based on a resource logic. The *water service regulator* is national or regional (i.e. sub-national) monitoring the activities of the operators in the water sector. Its logic is the public interest and the preservation of the services of general interest. The *competition authority* also controls the operators while its competence is national or European (supra-national) and follows a logic of competition. It watches over the good functioning of the market and the conformity with competition rules Finally, the operator's view is more complex to delineate both in scope (profit-making, technology development and marketing, diversification in services) and in scale (local to international). Then different actors act on different territories with different aims. This raises the question of how these different approaches and scales will be combined in a way that leads to an integrated approach to water management.

IV CONCLUSION: NEXT STEPS OF EU WATER POLICY

Looking forward a few years, the EU's water policy will mainly be determined by the implementation of the WFD, for which the Common Implementation Strategy process (CIS) has been initiated. At the same time, certain further policy decisions are expected at the European level.

IV.1 Common implementation strategy

The implementation of the WFD raises challenges that are widely shared by Member States, although the specific circumstances vary to such extent that "national approaches" will be necessary for implementing the WFD. With many European river basins transcending territorial and administrative boarders, concerted and co-ordinated action, a common understanding and a joint approach are considered prerequisites for a successful and effective implementation. Therefore, a common implementation strategy has been agreed upon at the EU-level and entered into force five months after the Directive, to allow for a coherent and harmonious implementation of the WFD as far as possible.

The CIS process can broadly be structured into four activities:[78]

1. Information sharing;
2. Develop guidance on technical issues;
3. Information and data management;
4. Application, testing, and validation.

For the first phase of the CIS process, more than 15 European expert and working groups have been set up within this strategy on different areas of the WFD. This complex work programme started in May/June 2001. The main outputs of the working groups are practical guidance documents that should assist the implementation process, most of which haven been finalised by late 2002.[79] The guidance documents are informal and of a legally non-binding character for the Member States.

For the second phase of the CIS process, in the light of the need to move towards a more integrated approach for the practical implementation of the WFD, the Water Directors agreed in November 2002 to combine the working groups of phase 1 under four thematic groups (thus creating four new working groups). These are:

1. Ecological status
2. Integrated river basin management
3. Groundwater
4. Reporting

In addition, a number of integrated pilot river basin projects (e.g. Odense (DK), Moselle-Saar (F, D, LUX), Marne (F), Scheldt (B, F,NL), Pinios (GR)) will take place throughout the EU and will give insights on the combined implementation of the different elements of the WFD and the corresponding guidance documents.

[78] http://www.fcihs.org/INFO/DMA/strategy.pdf
[79] http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents&vm=detailed&sb=Title

Besides supporting the implementation of the WFD itself, the CIS process will support the EU-Commission in delivering on its obligations for further policy developments (e.g. daughter directives on groundwater and on priority substances).

IV.2 Future policies

4.2.1 Further development of EU-policy regarding Groundwater protection: the new Groundwater Daughter Directive

Policies for the protection of groundwater were initially meant to be covered by the WFD as well. Since agreement on specific EU-wide measures could not be reached, the issue was separated from the WFD and is now addressed in a separate Groundwater Daughter Directive. At the same time, the WFD contains some general specifications for the design of groundwater protection in the EU, mainly referring to qualitative aspects. The Groundwater Daughter Directive is supposed to take up, elaborate and specify these general requirements. It was scheduled to enter into force by the end of 2002. However, since the negotiation process has been delayed by disagreements about conceptual issues, the daughter directive is expected to be ratified in the course of 2003.

Above all, the Groundwater Daughter Directive contains specifications on good chemical status. These have been the most contentious issue in the past, taking the form of either common indicators and concentration ranges, or of fixed quality standards.

Other elements specified in the directive are the combined approach to diffuse pollution and to pollution from point sources. This approach requires member states to prevent the discharge of more hazardous pollutants, whereas the input of other substances must be limited.

In addition, the directive demands the identification and designation of risk management zones where groundwater is affected by historical point sources of pollution, typically contaminated sites. For such risk management zones, tighter monitoring requirements apply, whereas the restoration obligation is limited.

4.2.2 Water pricing in the EU

Since the annex III of the WFD is not very specific and does not offer sufficient interpretation of article 9 (WFD), it is possible that the pricing policy communication of the Commission from the year 2000 will constitute a basis for a new daughter Directive to the WFD. The aim will be to further specify the issue of appropriate incentives through water pricing policies for the sustainable use of water resources as well as a more detailed understanding of cost recovery issues. So far, the work on such a Directive has not started.

4.2.3 Hazardous Substances

Article 16 of the WFD aims at establishing harmonised quality standards and emission controls of substances that pose a significant threat to the aquatic environment[80]. It requires a further sub-classification of the listed substances. Substances classified as *priority substances* will face tough restrictions but will remain in circulation. Those substances classed as *priority hazardous substances*, however, will have to be phased out entirely within 20 years. The adopted list of priority substances is subject to a review procedure every four years.

In November 2001, the list of 33 priority substances or groups of substances has been adopted, including selected existing chemicals, plant protection products, biocides, metals and other groups like polyaromatic hydrocarbons (PAH)[81]. Up to now, 11 groups of substances are identified as priority hazardous substances (e.g. mercury, cadmium, hexachlorocyclohexane or pentachlorobenzene). The classification of other 14 priority substances into hazardous or non-hazardous remains to be undertaken by the Commission. The original deadline was November 2002 and has been postponed to the end of 2003 the earliest.

[80] In the longer run, article 16 is intended to replace the emission control policy established under Council Directive 76/464/EEC.
[81] Decision No 2455/2001/EC of the European Parliament and of the Council of 20 November 2001 establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC (*OJ L 331, 15/12/2001 p. 1*).

CHAPTER 4 LIBERALISATION AND SERVICES OF GENERAL INTEREST

I INTRODUCTION

In most network industries (electricity, natural gas, telecommunications, postal services, urban transport, air and railway transports) and in many countries, new dynamics such as the questioning of the role of State in economic activities have led to an unprecedented opening up to competition and private sector participation. With the development of a single European market, the in-stages liberalisation process of public utilities observed in the European countries has spread to almost all sectors[82].

However, the water sector has been excluded until recently from the restructuring processes achieved in other sectors. The EU-Water Framework Directive (WFD hereafter) considers water as "a heritage which must be protected" and water supply as "a service of general interest"[83]. It also suggests the use of economic instruments like the principle of cost recovery. Because of its environmental, social and equity aspects, water supply and sanitation are very sensitive topics for public opinion and need to be debated in order to define - or not - a European policy.

Our purpose in this chapter is to analyse the European policy in the liberalisation of the public utilities in general, in order to answer two main questions:

- Why has the water sector not been treated like other network industries and what makes the water industry 'special' from a European point of view?
- To what extent does the European liberalisation policy of network industries influence a possible European policy in the water sector? Will the water sector follow the same path as electricity or telecom, or will it follow its own original path towards a regulated liberalisation?

In order to answer these questions, we propose two analysis frameworks: one to describe the nature of utility networks and one to describe liberalisation process. Thus, we will first offer a

[82] See, for example, European Commission (1999).

general analysis of network industries: we present their specificities as 'services of general interest', and analyse the recent liberalisation processes, considering both empirical evidence and doctrinal evolution. Then we will look more specifically at the water sector, underlining its own specificities. Finally we shall discuss the extent to which the processes and doctrine elaborated for the network industries in general could also be relevant in the water sector.

II SPECIFICITIES OF NETWORK UTILITIES CONSIDERED AS SERVICES OF GENERAL INTEREST

Telephones, electricity, gas and water are all examples of goods that are delivered to consumers through networks (e.g. pipes, wires, and cables) that are designed to satisfy the demand of several users. Consumption or exclusion thus depends on being connected to the network that delivers the service to the consumer. The nature of these network infrastructures and associated consumers can be characterised from an understanding of the following four factors:

- Factor 1: the ***nature of the good*** involved, as determined by its subtractability and its excludability. Goods that are both excludable and subtractable are private goods.
- Factor 2: the ***characteristics of the production*** as determined by high sunk costs, the existence of monopoly conditions and externalities (negative and positive).
- Factor 3: the ***existence of social objectives*** reflecting essential nature of services (e.g. universal access to minimal level of service) and equity considerations.
- Factor 4: the ***characteristics of demand,*** and their influence on supplier power, as determined by the elasticity of demand, the availability of substitutes, and access to information on level of service.

II.1 Nature of the good : goods traditionally provided by public utilities

The argument in favour of the direct public provision of goods through network utilities such as telecom, electricity, gas and water supply, has traditionally been based on the assumption that

[83] See glossary and discussion in paragraph 4.3.2.

they are 'public goods'. Although in common parlance a 'public good' is usually defined as any good or service that is provided directly by the public sector, the theoretical definition of what constitutes a public good is far more restrictive. The essential properties of public goods are non-excludability (that is, if provided for one person, it is automatically available for everybody else) and non-rivalry (that is, the good is not less available for any one person because another person is enjoying it). According to economic theory, it is these properties that should dictate whether collective provision is made at zero direct cost to the individual consumer, with the cost financed instead out of general taxation.

Any attempt to determine the "marketability" of utility infrastructure activities according to these two criteria does not generally result in a simple yes/no answer. It will depend on the technology, the level of congestion and the costs of exclusion. This will vary between (and within the sub activities of) each utility sector.

In practice excludability is determined by an assessment of economic costs and benefits. Only in exceptional circumstances is it not technically possible to exclude individual consumers from utility infrastructure activities. However, in some Member States the exclusion of consumers from certain essential utility networks is restricted legally (i.e. there is an obligation to supply and a ban on disconnections). This is because some governments have determined that the economic costs (re public health, social obligations) outweigh the economic benefits (re preventing free riding) of exclusion.

The extent of the subtractability of individual infrastructure activities is more difficult to determine as it will partly depend on infrastructure capacity considerations. These considerations may change over time – both in the short run as a result of regular fluctuations in demand and in the long run as the physical capacity of the existing infrastructure is reached. Indeed there is an argument that most network utilities (that have been optimally designed) will exhibit both high and low subtractability during any given year.

This reflects the time jointness of network utilities where services supplied at any given time are, in a significant sense, different to services supplied at any other time. This makes the allocation of capacity costs particularly difficult and therefore contradicts the alternative,

more operational, definition of this criterion for private transactions – that the costs of consumption by a specific individual can be identified.

The degree to which networks are able to cope with periods of excessive demand will also influence the extent of rivalry.

Hence, goods provided through network utilities are more likely to be tollable (or possibly when congestion is apparent) private goods. They are generally not considered as public goods or common pool goods. They are usually characterised by excludability and, at certain times of the year, rivalry. In most network utilities it is feasible and in fact common practice both to charge users and to exclude non-payers. Although collectively provided, there are few cases in the world where telecom, electricity or water supply have been provided at zero direct cost to the consumer, as is normally the practice for pure public goods.

However, although network utilities are invariably private or tollable goods, they have three major production characteristics – natural monopoly, strong externalities and high sunk costs - that give rise to the likelihood of 'market failure' (that is, the inability of an unregulated market to achieve economic efficiency). It is these features that have historically justified the direct provision by the public sector of these goods, as well as important social and legal aspects (see section II.3).

II.2 Characteristics of the production

2.2.1 High sunk costs

Network utilities that have grown and extended geographically over many years are also characterised by high levels of sunk costs, most notably in the form of transmission infrastructure which account for a high proportion to total costs. In the case of telecom, electricity, gas and water these sunk costs arise because investment in pipes or cable is neither recoverable nor can be used for other purposes. These sunk costs create major barriers to entry for potential new suppliers because of the enormous investments that would be required. As such they reduce the extent to which network utilities operate in contestable markets.

In the event that direct provision is carried out by the private sector, the different production features of network utilities provide a strong argument for public sector regulation in order to correct market failure and to counter possible divergences between private and social costs and benefits.

2.2.2 Natural monopoly and artificial (historic) monopoly

Network utilities have for long been considered as intrinsically uncompetitive because they display strong natural monopoly characteristics. The large economies of scale associated with wire (landline telecom), pipe (water and gas supply) or cable (electricity) networks means that competition would be wasteful since it requires the duplication of expensive distribution grids. Because unit costs decline sharply as production increases, a single firm can produce at lower average cost than can be achieved by two or more competing entities. This 'natural' monopoly is determined by the underlying technology. When this technology changes, as in the case of mobile telephony, it can radically alter the competitive nature of the sector.

These increasing returns to scale are not simply a function of the cost of duplicating the provision of network infrastructure but are also linked to the volume of the network transmission product. As a result of these factors, operating costs per network connection are usually inversely proportional to the number of connections. However, technological change can transform a natural monopoly into an artificial monopoly: that is the case of telecom, where dramatic technological change has lowered the threshold for new entrants, enabling real competition between operators.

Usually only one part of the vertical chain of operations – transmission/distribution network – is naturally monopolistic and infrastructures can not be duplicated. Many of the other parts – such as generation/abstraction, access to the network by competitors and maintenance and billing – can be competitive. For instance, the production of electricity is no longer a natural monopoly, while transport and distribution remain naturally monopolistic. In these circumstances, if monopoly exists it is often 'artificial', the result of the legal and other strategies that companies use in order to maintain barriers to entry rather than by 'natural' costs conditions. The juxtaposition of artificial and natural monopoly in network utilities increases the difficulty of building effective regulatory mechanisms. Access to the natural monopoly distribution network

is essential for potential entrants in order to access consumers. Hence its ownership is of critical importance and is often used as a powerful tool for keeping potential competitors out of non-natural monopoly activities.

The public policy issue from natural monopoly arises because inefficiencies will result if the monopolist drives up the price above marginal cost and less will be produced than is necessary to maximise consumers' benefits. Central to any regulatory solution is some mechanism that attempts to move the monopolist's output to a position on the demand curve that is closer to that of the competitive market – in other words, lower prices and higher output.

2.2.3 Existence of externalities

Externalities occur when the behaviour of one producer or consumer affects that of other parties. Where the total benefits and/or disbenefits of an activity cannot be 'captured' in market prices, an unregulated market system will result in a sub-optimal allocation of resources. Network utilities may have both positive and negative externalities. By facilitating the growth of energy-intensive manufacturing, electricity networks offer positive externalities for long-term economic development. Similarly, the provision of a rapid and efficient communication system that enables private companies to compete more effectively in the global economy is considered to be a major positive externality of telecom utilities. However, for instance, the production of energy creates high negative externalities on environment.

II.3 Social objectives

2.3.1 Equity considerations

If we move away from production features to a consideration of their consumption features, we find that the issue of equity and 'social cost' have also been important considerations in policy formulation towards network utilities: should everyone have access to the same service? If not, what is a fair distribution of services? Pareto criterion is designed to ensure that resources are allocated efficiently among competing uses and provides a rationale for public sector intervention in network utilities in order to counter production features such as natural monopoly and externalities. However, there are as many different Pareto optimal outcomes as there are different distributions of incomes. Hence there are strong arguments for public provision of

network utilities on the grounds of equity that are quite separate from the arguments based on economic efficiency criteria. This is because network utilities tend to deliver 'basic necessity' goods such as water, electricity and gas that provide the foundation for ensuring a minimum acceptable standard of living. As such these goods represent a higher share of the disposable income of households on lower than average incomes, with a correspondingly higher marginal utility to these households than for households on higher than average incomes. This provides the rationale for public sector intervention in tariff setting that redistributes income in favour of poorer households, either through increasing block tariffs or direct subsidy.

2.3.2 Different understandings of general interest

Quite apart from the purely economic arguments considered above, the public provision of network utilities has historically been closely associated with the fact that they have been considered prime examples of 'general interest' or 'public interest' activities. This consideration originates with the French legal doctrine at the end of the 19th century that expounded the view that the objective of the 'public service'[84] is to satisfy those needs in society that have a 'general interest'. Although the determination of what constituted this 'general interest' was often vague and imprecise, it was basically defined by default, i.e. those activities that were not intrinsically identified with private and individual interests. However, in practice the State itself legitimated its intervention in particular cases by itself constantly revising the definition of what constituted the 'general interest'.

A parallel but somewhat different legal approach towards network utilities emerged in Anglo-Saxon countries and was associated with the concept of 'public utility'. Based on the common law tradition, this emphasised the importance of State control over those activities that were considered of 'public interest'. In practice the definition of what constituted 'public interest' differed little from the definition of 'general interest' under the French legal tradition. However, the recent application of this concern for the 'public interest' manifested itself far more through external controls by the State over private activities rather than through any strong legal obligation on the State to assume direct responsibility for provision.

[84] Pierre Bauby (1997).

Thus, most European countries have linked network utility sectors to concepts of *service public*, *public utilities* or *Daseinsvorsorge* in a complementary and comprehensive way. The concepts, history, institutions, culture, and doctrines differ from one country to another, but one can find the same complementary objectives[85]: guaranteeing each inhabitant's right to have access to basic goods and services (e.g. health, education, transports, communications); promoting economic, social and territorial cohesion and solidarity as an expression of general interest at each level (local, regional, national, European); creating the conditions of a sustainable development which is at the same time economic, social and territorial, thus satisfying the interests of future generations.

In order to avoid any confusion between services related to general interest and their provision by a public or private operator , EU has chosen to use 'services of general interest' and 'services of general economic interest'[86]

II.4 Characteristics of demand

The network industries are characterised by important network effects also called network externalities. This means that the satisfaction gained from the network service depend positively on the number of users of this service. First, there are direct effects. Hence, the interest got from the telephone depend directly on the number of speakers with who an user will be in communication. Second, the network effects may apply indirectly to the quality and the variety of services. Hence more important the demand is, more important the supply of services will be. Indeed, the increasing demand makes the network more attractive for the suppliers and may incite them to provide new services. This indirect externality does not apply only to physical networks and exist on many markets in the guise of club effects. In this case, the satisfaction of each user increase with the number of users but the club size may have a negative impact on the quality of the good provided to its members.

[85] Pierre Bauby (1998).
[86] The Green paper on services of general interest (2003) does definitively clarify these different terms, see glossary.

III EMPIRICAL EVIDENCE AND DOCTRINAL EVOLUTION IN THE LIBERALISATION PROCESS OF NETWORK INDUSTRIES

III.1 Driving forces and extent of liberalisation across sectors and countries

Until recently, due to the specificities of network industries developed above, national network markets in Europe were in the majority of cases characterised by national or local monopolies, where the incumbent was State or local authority-owned. However, since the mid-1980s, liberalisation has become an important trend in these industries, clearly calling into question the State's role as a single monopoly provider. These liberalisation processes are initiated with two main objectives:

- to construct a common market for each sector of services of general economic interest defined by each Member State (communications, transports, energy, but not water or sanitation).
- to encourage greater efficiency to the benefit of users of these services, by introducing competition in fields that had often been "protected" by monopoly situations or by exclusive rights at the local, regional and/or national level.

Unlike many other industries in Europe, the liberalisation process in network industries has been taking place unevenly, but it is an undeniable reality. This liberalisation process was supported by significant changes, namely:

- technological development (particularly in telecommunications and electricity),
- diversification of needs and of demand : users have new requirements concerning services, quality, and the satisfaction of their diverse needs and desires,
- failure of public management and dysfunction of previous types of organisation and regulation,
- potential competitors as industrial strategies led to a growing search for competitiveness,
- growing influence of neoliberal ideology and virtues of competition proclaimed by the EU (internal market).

The impact of these driving forces varies, so that the liberalisation process in network industries has been taking place unevenly (see Table 3.1). Furthermore, another reason for

this unevenness is the fact that these industries were not part of the 1992 internal market programme, and only later an (*ad-hoc*) approach has emerged.

Table 3.1. Main driving forces for liberalisation in six network industries

	Technological Development	Changes in Demand	Failure of Public Management	Potential Competitors (e.g., TNCs)	EU (e.g., internal market)
Non-reserved postal services					
Telecom (business)					
Air Services					
Telecom (residential)					
Electricity					
Reserved postal services					
Gas					
Railways					
Water					

Notes: The vertical arrow means that sectors on the bottom of the arrow are less liberalised than those on the top.

As Table 3.2. below illustrates, the liberalisation process in the European network industries varies greatly between sectors. The telecommunications sector on the whole is the most advanced in terms of liberalisation (especially for the business segment). It has mainly been driven by rapid technological change and the strong growth in demand. The European institutions reacted promptly imposing full competition by January 1998[87], both in the market, and on and between networks. At the other end of the spectrum, are the cases of water and railways (especially passenger transport), where there has been a major problem to introduce free entry and competition. In railways for example, the major problem has been mainly due to network compatibility problems, to strong anti-competitive habits, and to powerful labour unions[88]. Directive 91/440/EEC[89] on the development of the community's railways was a first step towards establishing a single railway market.

At the same time, and because liberalisation in network industries remains mainly a national issue, it also varies greatly across countries. The liberalisation process is more advanced in the northern European countries (e.g. the UK, which was a precursor in terms of privatisation

[87] Commission Directive 96/19/EC amending Directive 90/388/EEC.
[88] Jacques Pelkmans (2001b).
[89] Amended by the Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001.

starting from early 1980s, and Scandinavia) than in Southern Europe[90]. Table 3.2 illustrates the disparities found in terms of the degree of liberalisation (low, medium and high) both between sectors and across seven selected European countries.

Table 3.2. Degree of liberalisation in six network industries in selected European countries[91]

	Germany	Spain	France	Italy	Sweden	UK	Switzerland
Telecom	H+	H	H	M	H	H+	H
Air Transport	H	M	M	H	H	H	M
Energy	M	M+	L	L	H	H+	L
Railways	L	L	L	L	H	H+	L
Postal Services	M	H	L	L	H+	M	L
Water*	M	H	H+	L+	L	H+	L

Source: adapted from Bergman et al. (1998).
Notes: * refers to opening competition for the market.

III.2 A cross-sectoral analysis of the liberalisation process in network industries

Liberalisation is a means of establishing the conditions of market rules and competition, and its rational lies on the recognition that, in principle, competition is more prone to achieve efficiency than monopoly. Although it is difficult to analyse these different industries within a general liberalisation framework, we suggest the following framework:

1) the different routes to liberalisation: competition in the market, for the market, comparative competition and self-supply;
2) the possible means of implementing competition and liberalisation: private sector participation, unbundling and breaking down national borders;
3) the accompanying mechanisms (positive and negative) that can be observed in competitive situations: a customer driven approach and cream-skimming of the market[92].

[90] European Commission (1999:15).
[91] This table resumes the actual opening of markets per sector according to the available data. Nonetheless, one must take into account the opening of markets that is officially mentioned in laws and rules, but also examine what happens in reality to competition. For example, one often remarks that the German market concerning electricity is 100% open compared to the still protected French market, whereas in fact a bigger percentage of industrial consumers changed suppliers in France compared to Germany.
[92] "Cream-skimming" refers to a situation where new entrants tend to target the most lucrative markets

3.2.1 The routes to liberalisation: introducing different forms of competition

Competition in the market

In the case of competition in the market (*ex-post* competition) operators compete for end users. Therefore, network compatibility (which may be achieved by standardisation), access and pricing[93] are fundamental to establishing a competitive environment in the market. Competition is normally fierce at the early stages – to persuade users to use the network. Due to switching costs, competition between operators after the first stage is more limited. The entry of a new operator into a mature network industry is likely to occur only in the event of a significant technological improvement.

Since the late 1980s, the European Commission has been trying to build an internal market and to introduce competition in the electricity and gas markets for generation and supply. However these attempts have largely failed. The main impetus to liberalisation came from national plans in the U.K. It was not until the late 1990s that electricity and gas directives[94] were agreed upon. These called for competition in the market, although in practice energy networks remain fragmented and largely based at national level. Nevertheless, at least for electricity, there is already a long tradition of national co-operation, with frequent power exchanges through interconnections[95]. This suggests that the main constraint to full liberalisation may not be technical. Concerning access to the network, both directives set out several possibilities, regulated third-party access being the most commonly adopted[96].

With regard to air transport, there is a need to distinguish between charter, cargo and scheduled passenger traffic. The first two market segments are lightly regulated and benefit from a highly competitive market, while competition in the last is still limited by bilateral agreements that regulate world air transport[97]. The air transport sector has been gradually

[93] The exceptions are postal services and airlines, which are logistical and not physical networks [Jacques Pelkmans (2001a: 445)].
[94] COM 96/92/EC and COM 98/30 respectively.
[95] European Commission (1999:93).
[96] The options regarding access to the network are single-buyer system, and negotiated and regulated third-party access (TPA). TPA is where producers and consumers contract supplies directly with each other [Lars Bergman (1998:67)].
[97] Chicago Convention of 1944.

liberalised in Europe since the 1980s, following three packages[98] of liberalisation measures in 1987, 1990 and 1992 that enabled greater competition to take place in the market.

Competition for the market

Due to strong economies of scale or to the obligation to provide services of general interest (SGI)[99], some segments or markets cannot be opened to full competition. The solution in these cases is to institute competition *ex-ante*, i.e. competition for the market. For instance, water supply and sanitation are sectors where large-scale competition in the market is unlikely to develop because many segments are characterised by natural monopolies.

Comparative competition

When direct competition can not be created, a method currently used is to compare performance of different companies operating on different geographical areas but on similar services. This is called yardstick or comparative competition. The comparisons can be made for segments of the utilities' operations and can cover a range of variables such as capital maintenance costs, operating costs, prices, quality of service, etc.

Self supply

A definite good may be obtained from a public supply or may be self supplied. A user may decide to get himself the good. He may construct his own network within a legal basis for his own final use. For instance, this is the case of a firm that needs a large quantity of this good but the connection to the public network is more costly than self-suplying.

3.2.2 Means of implementing competition and liberalisation

Private Sector Participation

The private sector may be an important source of capital and new investment that are relatively scarce for many economies. It also brings management expertise, new technologies and knowledge which may not be presently available.

[98] Council Regulations No 3975/87 and 3976/87 of 14 December 1987; Regulations No 2344/90 and 2367/90 of July 1990; and Regulations 2407/92, 2408/92 and 2409/92 of August 1992.
[99] Services of general interest will be developed in the following section.

Under the traditional public procurement model, public authorities can utilise the services of the private sector for design, construction and management of network utilities, with the award of individual contracts made on a competitive basis. The delegation of services poses a certain number of problems. First when the contract is written and then at the time of contract follow-up. The main stake is the clear definition of the responsibilities of each part but also the reduction of informational asymmetries.

There are a number of ways in which greater private sector participation can be introduced. It is possible to create three classes for outsourcing former public functions to the private sector. These mechanisms present opportunities for the private sector to participate in varying degrees in the maintenance, operation and management of infrastructure improvements. These categories are concession, leasing and intermediary management (services contracts, operation and management contracts). The main feature of concession is that the infrastructure is financed by the private sector. The private firm also operates the service. Leases provide a means for private firms to purchase the income streams generated by publicly owned assets in exchange for a fixed lease payment and the obligation to operate and maintain the assets. Moreover, public authorities can enter into service contracts with private companies for the completion of specific tasks. Service contracts are well suited to operational requirements and may often focus on the procurement, operation and maintenance of a limited range of equipment. Management contracts are used to transfer responsibility for asset operation and management to the private sector. These contracts involve both service and management aspects and are often useful in encouraging enhanced efficiencies and technological sophistication.

Unbundling

Despite the fact that the need for compatibility and interconnection might suggest a pressure towards monopolisation and vertical integration, various segments may be exposed to some forms of competition. Therefore, there is the need for unbundling, i.e. for separating the network into its reserved (natural monopoly) and competitive elements. The definition and allocation of exclusive rights between these elements, as well as the prohibition of cross-

subsidisation, become key issues[100]. For example, in the electricity industry, recent technological change enables the efficient generation of electricity at a small scale, decreasing considerably the economies of scale at the generation level, while transmission remains a natural monopoly.

Breaking down national borders

Another aspect concerns the break-down of national borders, which is essential to the enforcement of the internal market, and in some cases is directly promoted by transnational corporations (TNCs). However the extent to which national borders have been broken down depends on the specificities of each sector and on the degree of liberalisation already achieved.

3.2.3 Accompanying mechanisms of liberalisation

Developing a customer-driven approach

As mentioned previously, the liberalisation process is about the opening up of network industries to competition. An increasingly competitive market also significantly strengthens the need to have a more customer-driven approach. This becomes critical in order to lower costs and to attract new clients (i.e. through marketing, reputation and trust). In the postal service, the main impetus to opening up some segments to competition[101] stems not only from the increasing potential for substitution of traditional mail products (created by rapid technological change), but also from the considerable pressure coming from new customer demands (in terms of quality and type of services). The ability of postal operators to respond to these changing demands is becoming critical for their success.

Cream-skimming the market

When entry is made possible, new entrants tend to target the most lucrative markets ("cream-skimming"). Prices tend to fall the most in markets where this selective form of competition is active[102]. The problem is that other segments of the market which are essential to fulfil social objectives or for the proper functioning of the entire economy may become under-supplied.

[100] Jacques Pelkmans (2001a: 439).
[101] The 1997 Postal Directive[101] engaged the sector in a process of "gradual and controlled" liberalisation, leading in practice to a highly segmented market only partially liberalised.

Therefore, "cream-skimming" may justify the need to define the obligation to provide services of general-interest.

III.3 The Construction of a European doctrine: from deregulation to re-regulation

The liberalisation processes whose main characteristics were developed above led to important changes in ownership and in the market structure itself, representing major regulatory challenges. One can identify two main objectives for the regulation of network industries, depending on the way competition is considered: on the one hand, if competition is seen as the unique path towards efficiency, regulation should prevent the creation of artificial barriers to entry; on the other hand, if the limitations of competition are highlighted, the regulation should control the quantity, quality and pricing of the service provided, and the obligation to provide SGI[103]. From the beginning of the liberalisation process in the 1980's, the construction of a European regulatory policy for SGI took into account these two sets of objectives – although sometimes contradictory.

3.3.1 Separation between operators and regulators and creation of independent regulatory authorities

The liberalisation process in network industries was based on the separation between operators and regulators: regulatory authorities have been created in telecom, energy and postal sectors in several countries (see Table 3.3. for United Kingdom, Germany, Sweden and later France).

[102] European Commission (1999:33).
[103] European Commission (1999:38).

Table 3.3. National regulators in network industries

	Energy	Telecom	Postal services
United Kingdom	*Office of Gas and Electricity Markets* (OFGEM), 2000	*Office of Telecommunications* (OFTEL), 1984	*Postal Services Commission* (POSTCOMM), 2000
Germany	in project	*Regulierungsbehörde fur Telekommunication und Post*, 1996	
Sweden	*Energimyndigheten*	*Post & Telestyrelsen* (PTS)	
France	*Commission de Régulation de l'Energie* (CRE), 2000-2003	*Autorité de Régulation des Télécommunications* (ART), 1997	in project

The main mission of these regulators is to ensure that the access to networks is open to new entrants so that competition is fair. This objective has been partially reached for telecommunication: thus, for example, the incumbent in Germany (*Deutsche Telekom*) operated only 47% of long distance communications in 2000, while *British Telecom* in United Kingdom still had 60% of the market in 2000.

3.3.2 Introduction of concepts that limit the negative effects of competition

There cannot be a complete liberalisation process in the network sectors, by relying solely upon European competition law. In these sectors, competition tends to be oligopolistic, to undermine previous tariff structures (that explicitly sought to cross-subsidise in favour of lower-income citizens), and finally to ignore positive and negative externalities (both town planning and impacts on the environment).

As a result of these conditions, European rules - the result of debates, actors' initiatives and social movements - have been based on implementing a controlled, organised and regulated liberalisation, with the emergence of European concepts, both sector by sector and cross-sectoral. Consequently, two main concepts were elaborated, to introduce a minimum set of obligations (Universal Service Obligations), and to affirm the specificities of network industries considered as Services of General Interest.

Services of general economic interest (SGEI)

The first reference to service of general economic interest dates back to 1957: the article 86 of the treaty of Rome mentions the term of service of general economic interest subject to particular Public Service Obligations (PSO) defined by each Member State, according to their history, traditions and national institutions[104].

Jurisprudence of the Court of Justice of the European Communities acknowledges, since 1993-1994[105], that services of general economic interest come under other objectives, missions and types of organisation than general rules of competition. Later, the new article 16 of the Treaty of Amsterdam (1997) refers positively to the SGEI (common values, promotion of social and territorial cohesion), but has no direct juridical effect and has a limited impact: it does not modify the imbalance of the treaty that mainly focuses on competition policy. Article 36 of the Charter of fundamental rights (2000), proclaimed during the European Council of Nice, also highlights the importance of SGEI for citizens and residents of the European Union.

Service of general interest (SGI): a transversal approach, and Public Service Obligations defined by each country

The concept of service of general interest is developed in 1996 in the communication by the European Commission on the services of general interest (revisited in 2000) and later in a report at the European Council of Laeken (2001). Services of general interest cover market or non-market service activities, that are considered by national public authorities to be of general interest, and are subject for this reason to particular Public Service Obligations (PSO). It is important to notice that the scope of SGI and the content of PSO are defined by each Member State (for instance, some countries have included in the content of PSO for telecom the access to high-speed Internet, or the cover of the whole territory by mobile phones) However, one limit of the SGI is that this concept does not have any juridical foundation at a cross-sectoral level.

The difference between SGI and SGEI is clarified in the *green paper on services of general interest* published in May 2003. The distinction between services of an economic nature and services of a non-economic nature is important because they are not subject to the same rules

[104] See glossary for the definition of SGEI.
[105] See the Corbeau and Almelo judgements of 1993 and 1994.

of the Treaty. For instance, provisions such as the principle of non-discrimination and the principle of free movement of persons apply with regard to the access to all kind of services. However, the freedom to provide services, the right of establishment, the competition and State aid rules of the Treaty only apply to economic activities. Concerning the distinction between services of an economic nature and services of a non-economic nature, any activity consisting in offering goods and services on a given market is considered as an economic activity. However, this distinction between economic and non-economic activities has been dynamic and evolving, and in recent decades more and more activities have become of economic relevance. For an increasing number of services, this distinction has become blurred (CEC, 2003).

Universal Service Obligations (USO): a minimum set of obligations by sector

Along with the European Directives introducing competition in several network industries, the European Union was progressively led to define a **universal service obligation** in the sectors of telecommunications (1992 and 2001), postal services (1997), and recently electricity (2003), and also public service obligations for transports (article 73, Treaty of Rome, 1957).

The definition and guarantee of a universal service obligation) ensures, for all users and consumers, the accessibility and the quality of services during the transition from a situation of provision of services under monopoly to that of markets open to competition. Universal service, in an environment of open and competitive markets, can be defined as a minimal set of services of a given quality and at an affordable price, to which all users and consumers have access to, considering particular national circumstances. The content of this minimal set varies across sectors and is also likely to evolve. In the telecom sector, the European obligation is limited to the access to traditional telephone. In the postal services sector, the universal service is more ambitious, as it implies the collection and distribution of letters and parcels everywhere and 5 days a week. This content imposes itself to each Member State, contrary to the Public Services Obligations that can be defined at a national level.

The *green paper on services of general interest* (2003) specifies that during the last two decades, the concept of universal service has developed into a major and indispensable pillar of the Community's policy on services of general economic interest. However, this is quite

new, as this notion was considered as a transitory concept in 2000 and 2001 by the Commission.

Current debates on financing and organisation of PSO and USO

The *green paper on services of general interest* mentions that it has always been the core responsibility of public authorities to ensure that basic collective and qualitative needs are satisfied and that services of general interest are preserved wherever market forces cannot achieve this (CEC, 2003). Up to now, the crucial importance of this responsibility has not changed. However, what has changed is the way in which public authorities fulfil their obligations towards the citizens. Indeed, public authorities increasingly entrust the provision of such services to public or private undertakings or to public-private partnerships and limit themselves to defining public objectives, monitoring, regulating and, where necessary, financing those services. The green paper remarks that "this development should not mean that public authorities renounce their responsibility to ensure that objectives of general interest are implemented." (CEC, 2003, point 24, p. 8) The Commission intends to reaffirm this responsibility by stimulating a European debate on the political choices to be made concerning services of general interest at European level.

The national, regional and local authorities of each Member State are in principle free to define what they consider to be a service of general interest. Public authorities in each Member State retain considerable freedom to define and enforce public service obligations and to organise the provision of services of general interest. On the one hand, this allows Member States to define policies that take into account specific national, regional or local circumstances. But on the other hand, the absence of specific legislation can lead to legal uncertainty and market distortions: "in the water sector the absence of specific, relevant regulation has led to very different industry structures across Member States" (CEC, 2003, p. 25).

3.3.3 Guiding principles in the construction of the European Doctrine

From the various contributions and evolutions developed above come out several principles which constitute the core of the European doctrine.

Transparency and proportionality of means with respect to objectives

As mentioned above, each State and public authority are responsible for defining what comes under services of general interest, within the scope of its competence. This responsibility implies that missions of service of general economic interest be clearly defined on a regular basis with transparency and that subsidies be accorded proportionally to objectives defined.

Consumers as new stakeholders

The justification of liberalisation processes and the introduction of competition rest on the efficiency gains from which consumers will benefit. This would imply that regular, comparative and pluralistic (as for criteria chosen and assessment methods) assessments be conducted. This would also mean that consumers and their representatives be regularly consulted and associated to the definition of the trends as well as to their implementation.

Subsidiarity[106]

This principle is often incorrectly presented as giving priority to local levels in each circumstance. Some accordingly assert that the definition and organisation of services of general interest in the European Union should mainly come under States or infra-national authorities. In actual fact, article 5 of the treaty of the Communities specifies that one must assess *on a case by case basis* whether such objective must come under such level, and this is so for a matter of efficiency[107].

Neutrality

Article 295 of the treaty mentions the neutrality of European integration as regards property rights of operators, of nationalisations/privatisations: “This Treaty shall in no way prejudice the rules in Member States governing the system of property ownership”.

[106] See glossary for the definition of subsidiarity principle.
[107] Article 5 of the treaty of the communities : 'The Community acts in the limits of the competencies that are imparted to the latter and of the objectives that have been attributed to it by the actual treaty. In the fields that do not come under its exclusive competence, the Community does not intervene, in accordance with the subsidiarity principle, unless the objectives of a contemplated action cannot be adequately achieved by Member States and can therefore be better accomplished at community level, owing to the dimensions or impacts of the envisaged action. Action of the Community does not go beyond what is deemed necessary in order to attain the objectives of the present treaty.

III.4 New issues arising from the combined evolution of doctrine and practice

While EU internal market and competition policies have contributed to the opening of markets to competition in sectors so far protected by monopolistic situations and exclusive rights, it was stressed that other (non-doctrinal) driving forces have also contributed to the process. Nonetheless, the nature and degree of interactions between doctrine and practice towards the liberalisation of network industries are different depending on the sectors. For example, in the liberalisation of the telecommunications sector the main driving forces were the rapid technological change and strong growth in demand while the EU doctrine surged as a reaction to these main drivers. On the contrary, in the case of railway transport, the essential driver towards liberalisation came from the European Commission and the necessity to develop Trans-European Networks, i.e. strong networks properly linking the different European regions into a single market characterised by freedom of movements[108].

Independently of these dynamics, the fact is that the combination of the opening of network markets to competition and the construction of a European Doctrine is in every sector raising important challenges in two areas: regulation and restructuring of utilities.

3.4.1 The need to guarantee independent regulatory agencies and better coordination with competition authorities

The traditional approach to regulation relies on the assumption that effective competition will develop in network markets progressively weakening the role of regulation. Thus regulation would be needed only where natural monopolies prevent competition: in that case, regulation would try to do its best to reproduce competition (like pseudo-competition through comparison in water sector). However the move towards competition in network industries like electricity or telecom has created a need for better coordination with newly created independent regulatory agencies. Thus, when market failures in network industries (specificity of the assets, high sunk costs) prevent complete competition mechanisms, the need to guarantee independent regulatory agencies remains an important challenge, especially

[108] Under the terms of Chapter XII of the Treaty (Articles 154, 155 and 156), the EU aims to promote "the interconnection and interoperability of national networks as well as access to such networks".

in a context where only a few network industries have independent sector regulators (e.g. the water regulator in England and Wales).

Despite the great regulatory variety existing between sectors, the profound transformations that can be expected in these industries will bring about sufficiently common characteristics to justify equivalent responses regarding regulation. This means that transectoral regulation could probably arise in order to deal with the common need to introduce further competitive mechanisms; to develop integrated European markets; and to regulate segments that remain out of the competitive market and possible PSOs (including their financial issues).

3.4.2 Restructuring and the development of multi-utilities

The change towards a more competitive market progressively leads to the restructuring of former vertically integrated network industries. The need to "unbundle" the supply-chain to permit direct competition in appropriate businesses is leading to structural changes in these industries. Furthermore, the reinforcement of horizontal mergers, take-overs and joint ventures aimed at achieving economies of scale through cross-sectoral integration of similar activities, is leading to a high level of concentration[109]. This is also increasingly occurring between sectors, generating new structures known as multi-utilities. This new strategic concept of utility companies, normally operating at a global level, must be distinguished from the prior concept of municipal multi-utilities, which in Germany, Austria and Switzerland have been delivering local "multi-utility packages" since the 19th century[110]. The rationale on the basis of municipal multi-utilities is mainly based on economies of scope, i.e. on the belief that the average total cost decreases as a result of increasing the number of different goods provided. For global multi-utilities, the motivation to operate in more than one utility sector is based on the expectations to benefit from economies of scale. Efficiency gains and cost reductions are also expected from grouping activities with similar risk and return dynamics. The emergence of these global multi-utilities makes regulation a more difficult task, mainly due to rising problems of asymmetric information.

[109] This concentration phenomenon has been (at least implicitly) encouraged by the EU Directorate-General for Competition who has tended to treat each national market as the basis for assessment of dominance (Helm (2001:306)).

To ensure that the long-term objectives of liberalisation are achieved, the threat that further liberalisation efforts may engender the dominance of a small number of oligopolistic players needs to be addressed. Common challenges to all sectors are to make sure new entrants have competitive access to the markets and that they are able to sustain investment in order to ensure efficiency and sustainability.

IV EVOLUTION OF THE EU DOCTRINE AND PRACTICE: THE CASE OF THE WATER SECTOR

While electricity, telecommunications, postal services and transport have undergone significant changes due to a European liberalisation process, the water sector has until now been treated differently, and was not subject to the European policy of liberalisation of network services. The objective of this section is to underline the specificities of the water sector, using the same framework as other network industries, and to analyse to what extent the liberalisation processes described in III.2 and the concepts introduced in III.3 are meaningful for the water sector.

IV.1 Specificities of the water sector compared to other network industries

4.1.1 Nature of the good: a merit good and a quasi-public good

A merit good

Water supply and sanitation services (WSS) have strong merit good characteristics, meaning its social benefits exceed the private benefits (given the strong externalities). Therefore, if water provision and sanitation are left only to the private sector, it is likely that they are under-supplied, especially for the low income population. The public authority often has a greater understanding than consumers themselves of the benefits of clean water and proper sanitation to their health, well-being and to the global environment. Indeed, as noted in section II.1, governments may limit the potential of water utilities to exclude customers (from either connecting or being disconnected) on the basis of national social objectives. If this occurs then water and sanitation

[110] See Rothenberger (2002).

services increasingly look like quasi public or common pool goods (again the classification will depend on the supply-demand balance which may alter over time).

A quasi-public good

One difficulty to characterise the nature of WSS services is that it is often confused with the nature of water resources. On the one hand, water resources are subtractable when they are finite, and water infrastructures are subtractable when they are at the limits of their capacity. On the other hand, water resources are excludable when abstraction/discharge licensing and monitoring is in place, and water infrastructures are excludable when connection points are easily identifiable - as is the case with households. This implies that almost all water infrastructures are - depending on capacity considerations – theoretically private or tollable services. This is similar to the other network utilities. However, unlike some of the other network utilities, there is a high risk of market failure and a need for strong government involvement. Moreover, the important externalities and social objectives may, in practice, limit excludability. Hence when there is sufficient infrastructure capacity, water and sanitation services are possibly transformed into a quasi-public good.

4.1.2 Characteristics of the production: a natural and local monopoly and strong externalities

Natural and local monopoly

Whereas technological changes have allowed the distribution in the telecom sector to be competitive, the water sector has remained a natural monopoly. Contrary to electricity, the transport of water is very expensive (important irreversible sunk costs) compared to the value of the good in itself. Moreover, duplicating water networks (whether for raw water transfer or the delivery of potable water) is not realistic and is a real barrier to entry for possible competitors. The obligation of quality requires a relative proximity between water treatment and consumption place. Thus, it has traditionally been treated and even sourced locally. In the absence of any dramatic technological change, this situation is unlikely to change in the foreseeable future.

However, despite relatively high transport costs it is not uncommon in some Member States (the UK with its regional water companies and some large cities in southern Member States with local supply constraints) for raw water to be abstracted, stored and then transferred in

bulk to the treatment works from over 100 km away. In southern Europe it is also not uncommon for these bulk raw water transfers to be managed by organisations other than the municipality responsible for drinking water supply. Indeed the raw water so transferred may be sold and used for several different purposes – agricultural irrigation, industrial cooling and potable water supplies. Such a regionalisation (and hence diversification) of raw water resources has helped to improve water availability, and hence customer service, in times of drought.

Hence, whilst the water network utility has been justly described as the natural local monopoly *par excellence* (Littlechild 1986), there are some trends towards regionalisation (both in terms of management and remote resource development - as potable water demands grow and local water sources are fully exploited) which is extending the geographic impact of this so-called local monopoly. That is the main difference with other network services (e.g. electricity, telecom) that were historically produced and supplied at national (rather than local or regional) level. Consequently, the management of WSS services varies greatly across countries, as there are numerous local (or even regional) solutions. This diversity of management modalities is a specific characteristic of water sector.

Similar arguments about the high cost of transporting foul sewage and drainage water to the treatment works pertain. Indeed the preference for gravity based sewerage systems further encourages the development of small local monopolies. However there will always be opportunities for neighbouring municipalities to construct treatment facilities jointly (thereby gaining economies of scale). These economies of scale arguments are even more applicable to sludge management where regional sludge treatment centres are relatively common in the EU. So again, whilst a local monopoly, cost pressures are encouraging the formation of more regionally based sewerage monopolies.

Strong externalities on health and environment

Water supply is unusual among network utilities because it has strong positive and negative externalities that are health-related. The provision of clean water provides enormous positive externalities to public health through the control of water-borne diseases. On the other hand, water is part of a cycle, and needs to be cleaned before it is discharged back into the environment: the unregulated disposal of raw sewage by water utilities can cause enormous negative externalities in the form of disease and environmental contamination.

Important asymmetries of information between providers and public authorities

One important feature in the characteristics of WSS services is the asymmetry of information between the (public or private) provider and the public authority in charge of controlling the sector (local or national): their relationship is dominated by an asymmetry of information on costs.

4.1.3 Social objectives

Drinking water, its supply and sanitation services are considered as prime examples of 'general interest' or 'public interest' activities. Indeed water is essential for the life and the organisation of various economic activities. Most countries guarantees an universal access to water and/or to a minimal level of service. Moreover, environmental considerations are increasingly taken into account. This is in addition to the risks that poor water quality poses human health. It appears that water and hygiene education is necessary to improve and guarantee the population a high level of health. But extensive public participation is needed in order to become efficient.

4.1.4 Characteristics of the demand

Elasticity of demand

With ordinary economic goods there is a (negative) relationship between price and demand. The slope of the demand curve is called the price elasticity of demand. This is defined as the percentage decrease in demand resulting from a percentage increase in price. For primary uses of water, the elasticity is close to zero (inelastic) since these are essential needs of the user. For the most essential use of (drinking) water, few substitutes are available. For sectors such as industry and agriculture, demand for water is generally more elastic. This is because alternatives for water use exist in these sectors (e.g. introducing water saving production technologies, shifting to less water demanding products/crops). In urban water supply, price elasticity is low[111]. Poor consumers can often only afford to use small amounts of water, and any increase in tariffs will have little effect because they cannot do with less water. For richer consumers (that irrigate their gardens and wash their cars) their ability to pay is such that the

[111] See for instance Nauges and Thomas (2000)

need to save money on water is limited. The increasing block tariff system is considered by some as a compromise between efficiency and equity for domestic water. When the price elasticity of demand for water is low, as is the case for urban water, the unregulated water (monopoly) provider may raise tariffs since users are captive.

Important asymmetries of information between providers and consumers

The 'perfect market' model requires that consumers and producers have all the information that they require in order to arrive at rational decisions. But this may not be so in the case of water. For example, the producer often has a greater understanding than consumers of the quality of the water than consumers themselves.

IV.2 Processes visible in the water sector: their extent and their limits

Despite the fact that many parts of the water and sanitation sector are considered as natural monopolies, many of the features that are at the core of the liberalisation process of other network industries (see section III.2) can already be observed to some extent in several countries. We discuss in next paragraphs their relevance for the water sector.

4.2.1 The routes to liberalisation and competition

Contrary to other network industries, competition in the market is difficult for many reasons: natural monopoly (very high sunk costs and extensive economies of scope and scale), transportation costs predominate, extensive universal service obligations, geographical, environmental and local constraints. With possibly one notable exception, competition in the market has therefore not flourished across Europe, or indeed the world. Nevertheless, we can mention two main models that provide tools to foster competition for the management of the whole water or sanitation service: competition for the market (French model) and comparative competition (implemented in England and Wales).

Competition in the market: the experience of common carriage in UK

The separation of the management of infrastructure (mainly the pipe network, which is a natural monopoly) and the delivery of the commodity is one unique example of promoting competition in the water sector. In England and Wales, since the Competition Act 1998,

common carriage[112] has been possible. It occurs when for instance one company agrees to carry water through its pipes for another company. However, no such arrangements currently exist on a competitive basis. The main issue to solve here is the condition (notably the price) of access to the network. Common carriage will be formalised in the national legislation (the forthcoming water bill). However, it will be restricted (at least initially) to large water consumers (the threshold is currently set at 50 megalitres per year). This pilot experience in the UK is designed to encourage new (possibly more efficient) entrants into the water market. However, they will still have to become licensed (like the existing water companies).

Competition for the market

Competition for the market occurs when potential (public or private) operators bid competitively for what is called in France a delegation contract, otherwise known as a franchise contract. The winner of the competitive tender should be the bidder that proposes the best quality of service with the lowest price. The delegation contract can take various forms but the most frequent are concessions and leases. The competitive tendering[113] for private sector provision of water supply and sanitation is a growing mode of competition in numerous European countries (e.g. France, Spain and Czech Republic). This way of involving private sector financing and management is also strongly promoted by international lending agencies such as the World Bank, especially for developing countries.

However, there are important limitations on competition for the market[114]. First, competition for the market can only occur every 10 to 15 years because most contracts require a long duration to amortise the investments made by the operator. Besides, competition should be transparent and based on objective criteria (e.g. price, quality of water), whereas the delegation contract is a long-term relationship based on trust. Hence, there is a trade-off between transparency and quality of the contractual relationship[115]. Another significant problem is that only a small number of major private companies are involved in the international water market (oligopolistic competition). They are extremely powerful in their bargaining with municipalities and governments alike, and such companies can easily engage

[112] Common carriage occurs when one service provider uses another's assets, such as its pipe network or treatment works, see Ballance and Taylor (2001).
[113] This procedure is regulated by the European Council directive for the entire infrastructure sector that obliges water companies up for tender on a regular basis. See Directive 98/4/CE.
[114] See Ballance and Taylor (2001).

in collusion. Moreover, it is well known that there is an important advantage for the incumbent operator that arises from its detailed knowledge of the state of infrastructure and operating conditions, known as 'first mover advantage'. Finally, the specification of contract is a difficult issue to deal with because of problems of asymmetric information (e.g. incomplete contract, difficulty to monitoring) and uncertainty (e.g. on future investment and revenue stream). Should bidding for WSS services become compulsory, it is important to introduce not just one criterion on the price of water, but also criteria on quality of service.

Alternatively, it is possible to observe increasing competition for some parts of the vertical chain of activities in the water distribution process (e.g. network maintenance, leakage location, metering, billing and vehicle maintenance). With simple service contracts, it is possible to contract out some specific tasks to the private sector while the monopoly provider (private or public) remains responsible for the overall management of the utility. These contracts are typically for short periods - from six months to two years - and take advantage of expertise of operators. This strategy of breaking up water and sanitation services into smaller business units leads us naturally to consider the phenomenon of unbundling.

Comparative competition

Indirect competition through yardstick or comparative competition is another way to improve cost efficiency and the quality of service. It is an approach that has been adopted by OFWAT (Office of Water Services) in England and Wales. Key indicators of company performance are collected and published. Unit and marginal costs are also used to set price-cap formula and as the basis for periodic price reviews.[116] The objective of comparative competition is to 'mimic' the normal pressures of a competitive market environment. However, such comparisons require accurate information in order for the regulator to assess performance in a specific environment. Moreover, as the number of companies in England is decreasing because of mergers, the value of such an approach may gradually be eroded.

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[115] In France, the principle of free choice for the local community is called *intuitu personae*.

[116] See the report on "The role of long run marginal costs in the provision and regulation of water services" (Fletcher, 2001). See also the annual reports of OFWAT: "Financial performance and expenditure of the water companies in England and Wales"; "Levels of service for the water industry in England and Wales".

4.2.2 Means of implementing competition and liberalisation

Private Sector participation

Increasingly public authorities have been turning to the private sector for help in developing and delivering WSS services. They hope to take advantage of private sector wealth and knowledge to finance new investments and to improve the efficiency of existing services. As seen in the paragraph on competition for the market, the public-private partnership is carried out thanks to different types of delegation contracts.

Bundling and unbundling: scale issues

Unbundling refers to different industrial realities: vertical disintegration (between production and distribution of water), geographic disintegration or horizontal disintegration (between water and sewerage).

The objective of **vertical disintegration** is to separate the different constituents of the sector. For instance, the separation between water production and water distribution, or between collection and sewage treatment is possible. Different firms can operate each of these parts of the utility. Another example of vertical disintegration happens when private companies operate customer centres specialised in billing, and handling complaints. Such operations may be consolidated with similar customer management facilities for electricity or telecommunication utilities, thereby benefiting from economies of scope.

Geographical disaggregation can lead to indirect competition if a water regulator can compare the performance of separate companies. However, this may run contrary to claimed economies of scale. In many countries, the objective is to achieve the most efficient (minimum) size (in terms of average cost minimisation). Hence, the geographical service area is actually growing (e.g. intermunicipality in Belgium and France, optimal territorial basin in Italy (ATO, *Ambiti Territoriali Ottimali…*)).

Horizontal disintegration may destroy potential economies of scope. Is it efficient that the same operator is in charge of several urban services: water supply and sanitation, but also electricity and natural gas? For instance, a common billing could reduce costs. However, there

is no clear evidence of the benefits of horizontal disintegration[117] and experiences differ among countries. In Italy and in some municipalities of France, water and sanitation networks are operated by the same firm. In Germany, the same utility also operate other urban services. The emergence of multi-utilities abroad (e.g. Casablanca, Libreville), on the model of German *Stadtwerke* or *Querverbund* confirms this trend.

In any case, there is a need of strong coordination between the different activities. For instance, the production stage requires data from the distribution stage for the estimation of long-term demand. Thus, when unbundling is performed, there is a risk of loosing the benefits of economies of scale, scope and vertical integration.

Breaking down national boundaries via operators

As water transportation is costly, international transfers of water are not frequent (one of few examples is a long Californian aqueduct passing outside the State borders). Thus, the breakdown of national boundaries in the water industry arises mainly via **TNCs'** and not yet via infrastructure[118]. As noted by Finger and Allouche (2002), the TNCs presence in the water sector is highly concentrated with only four private companies and their subsidiaries controlling the privatised global water market. Table 4.1. shows the presence of these companies in every region of the world.

Table 4.1. Main global presence of TNCs

	Western Europe	Eastern and Central Europe	Asia	North Africa	Africa	South America
Suez - ONDEO	H	H	H	L	L	H
Veolia Environnement (VE)	H	H	H	L	L	H
SAUR international	M	M	M	L	H	M
Thames Water (RWE)	M	M	H	L	L	M
Aguas de Barcelona (Agbar)[119]	M	L	L	M	L	H

Sources: adapted from Silva, Tynan and Yilmaz (1998), Hall (1999) and TNCs web sites.
Notes: H, M, L are respectively for high, medium and low presence of TNCs.

[117] A paper by Hunt (1995) shows that there exist cost complementarities between water supply and sanitation on the one hand, and between water supply and environmental activities on the other hand. This means that there are significant benefits in terms of efficiency in joint operation of activities.
[118] See also the Rhone-Barcelona water transfer project.
[119] Agbar is owned 47.7% by Hisusa (owned 51% by Suez), 11.8% by Endesa, and 1.47% by SUEZ.

A common strategy of these groups is to increase their presence in different parts of the world by acquiring or increasing shareholding in affiliate companies. However, there are sometimes difficulties in buying the shares of these firms because of national constraints (e.g, Veolia Environnement in France in 2002). One last limitation to the breaking down of national boundaries is that the international presence of TNCs is usually restricted to the big cities for reasons of financial profitability.

4.2.3 Other accompanying mechanisms

Segmentation of the market

The segmentation of the market has different meanings and implications according to the geographical level where it occurs. At an international level, competition through private participation is limited to large middle-income cities, where profitability is secured. To that extent, there is a segmentation of the global market. At the local level, the market is segmented between domestic and industrial consumers. Increasingly specialised private firms contract with industrial firms that have a large consumption of water, that need special quality of water, or that need their own sewage treatment facility. The last step of segmentation would be among domestic users who require specialised services. This has already been observed in telecom and electricity sectors. One can observe price discrimination through step tariffs in most developing countries but this mechanism is different from segmentation, as everybody has the same contract with operator.

Growing importance of customer service

The customer-driven approach has already been implemented with interesting results in the water sector. The concern for better communication with users originates in England and Wales with the creation of customer charters that define standards of service. OFWAT has set up regional Customer Service Committees (CSCs) in order to investigate customer complaints regarding water and sewage companies. Moreover, the performance of customers' service is measured by different indicators. This approach is expanding in other countries, notably France and Scandinavian countries, with the development of performance indicators that include user satisfaction.

IV.3 Water sector and the European doctrine on network industries

The European doctrine on network industries has been elaborated with two pillars: the separation of operators and regulators with the creation of independent national regulators (see 3.3.1) to guarantee a fair competition, and the introduction of Public Service Obligations (see 3.3.2) to guarantee universal access to services or other political objectives.

4.3.1 Regulatory authorities for water

The water sector presents a great diversity of situations, ranging from the separation of operators and regulators with the creation of a national regulator (e.g. Office of water Services in England), through the complete integration of local operators and local regulators (e.g. municipal management in Germany), with some intermediate situations, where there is a separation between operator and regulator, but where the regulator remains at a local or regional level (delegated management of French model). However, as water supply is a natural monopoly, the missions of a regulatory authority for water (e.g. OFWAT) will differ from the missions of a regulator for telecom (e.g. OFTEL), see Littlechild (1988): whereas OFTEL has to organise a transition towards competition, determining the tariffs for different competitors for the access to network, OFWAT has to organise forms of comparative competition and competition for the market within a natural monopoly.

4.3.2 European doctrine in the water sector

As mentioned previously, the management of WSS services has been excluded until recently from the global trend for liberalisation. Thus, the concepts developed to limit the negative effects of competition were normally not necessary. However, most countries have developed a 'right to water' (see Smets, 2002) that guarantees the access to water for everybody (e.g. disconnection is forbidden in some States). This right to water is similar to a Universal Service Obligation that would include access and continuity of service. Furthermore, Public Service Obligations could include social aspects on participation of users – as prescribed in the Water Framework Directive.

For a long time, the European Union has not taken a decision regarding the nature of water and sanitation services. According to WFD (2000), "the supply of water is a service of

general interest." However, the recent Green Paper on Services of General Interest (2003) considers water supply as a Service of General Economic Interest and "the provision and organisation of theses services are subject to internal market, competition and State aid rules provided that these services can affect trade between Member States". To date the UK alone – with publication of *the Competition Act 1998, application in the water and sewerage sectors* (31 January 2000) – has effectively identified water supply and sanitation services as Service of General Economic Interest.

IV.4 Common trends in water and sanitation management and regulation in Europe

Despite the great diversity among European management of WSS services, one can observe three common trends in the evolution of water and sanitation services. These are: a **shift towards market logic** (with a larger private participation), a process of **regionalisation** (grouping of municipalities and increasing scale of WSS services), and the creation of new **regulatory systems**. There is a strong correlation between these three trends, as we illustrate further.

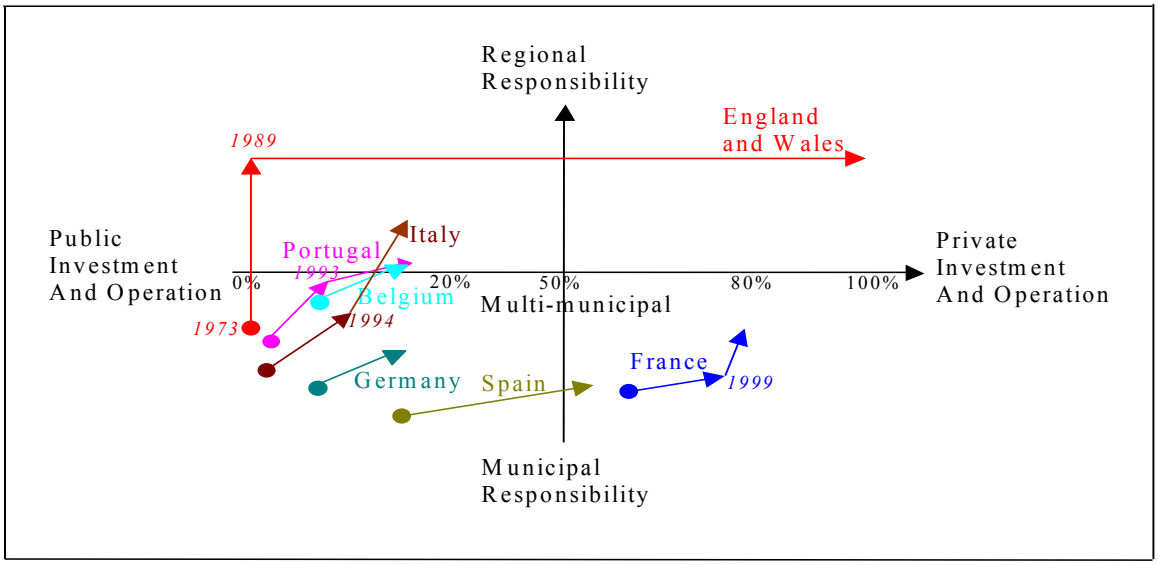
4.4.1 Regionalisation of WSS services management and a shift towards market logic

Regionalisation of WSS services management refers to an increase in the territorial scale of WSS services, often due to a grouping of municipalities. **In Italy,** as a result of the Galli law in 1994, responsibility has moved from municipalities to the ATOs (*Ambiti Territoriali Ottimali*), regional bodies of a larger geographical scale. This law also states that the delegation and competition for WSS services must become easier. However, private sector participation still remains relatively low. **In Portugal**, a 1993 decree-law reformed water policy by setting up a "multi-municipal" management arrangement and a framework for the system of delegation to public or private operators. **In England and Wales**, regionalisation dates back to 1973. The complete privatisation of these regional water and sanitation services was carried out in 1989. **France and Spain** are the EU countries where private operators are the most active through concession or lease contracts, while a trend of 'cross-municipal collaboration' has been strong in France since 1999. In other countries, where water supply is provided by public companies, they come under private law (e.g. *Eigengeselschaft* in Germany), even though the capital remains in the hand of local authorities. This type of

governance is more and more common in countries that have chosen the public management arrangement (e.g. the Netherlands and Scandinavia). Furthermore, all countries are taking into account the fact that water is a commercial product and should follow the **cost recovery principle**[120] adopted as a general rule in the WFD.

Increasing the geographical scale of WSS services and introducing private sector participation could be two ways to address the same issue: the move towards professional and performance-orientated services. This look for performance implies increasing technical skills, access to information and access to financial resources. Regionalisation and professionalisation are thus often combined in several European countries. Figure 4.1 shows the trends of water management for some European countries during the last thirty years by correlating the geographical level of management (local, local consortium or regional) with the degree of private sector participation: one can observe that most countries are following the same path, although their initial point greatly varies.

Fig. 4.1: Trend for privatisation and regionalisation in some European countries since 1973



Source: adapted from Guérin-Schneider (2001).
Notes: an arrow indicates a trend, the point at the beginning of the arrow is the initial date of observation (1973), a date mentions an important reform. The percentages on the horizontal axis refer to private investment and operation. Finally, the vertical axis refers to a range of situations: municipal responsibility at the bottom, grouping of municipalities within a "consortium" (France, Portugal, Italy for example) in the middle, and complete absence of municipalities for water management at the top (England only), replaced by regional authorities.

[120]The cost recovery principle consists in setting a water price that covers not only operation and investment costs of water supply and sanitation but also the resource and environmental costs.

4.4.2 Regulation authorities

With the development of private sector participation, there has been a focus on regulation. Many European countries have tried to control operators, whether public or private, by way of **regulation authorities**. The most complete system is the Office of Water Services (OFWAT) in England and Wales. OFWAT monitors prices in setting a "price cap" formula. A system of quasi-competition ("yardstick competition") has been set up in order to compare the costs and performance of water companies. After a considerable increase during the first five years, water prices have fallen in real terms since 1995 and it is expected that they will soon reach their pre-privatisation level (see Byatt 2001). Moreover, it is now acknowledged that the water companies are much more efficient, both in terms of operation and maintenance, water quality and service quality.

In other European countries, regulatory authorities have been created, while the delegation of water and sanitation services has been developed and private participation facilitated. **In Italy**, the *Comitato per la vigilanza sull'uso delle risorse idriche* is an independent institution established by the Galli law, that is in charge of driving the reform on the WSS services and the regulation of water prices. The regulator has also to represent the interests of users. A central objective in the reform was to decentralise the activities of the regulator to the level of ATOs with the setting up of regional authorities in charge of collecting and processing statistics. But until now, there has not been sufficient willingness to coordinate between all stakeholders. **In Portugal**, the *Instituto Regulador de Aguas e Residuos* (IRAR) began operations in 2000. IRAR is an authority under the supervision of the Ministry of the Environment. Its competencies focus on tariffs, quality, market access and investment. However, IRAR is only allowed to make recommendations and on the economic aspects of regulation. It is generally recognised that IRAR does not yet have sufficient powers to implement a genuine system of regulation. **In France**, a report by the *Haut Conseil du Secteur Public* (1999) recommended the creation of a regulation authority for water and urban services in charge of establishing technical standards, investment financing, price index rules, etc… In June 2001, the government proposed a law to the Parliament that included the setting-up of such a regulation authority (*Haut Conseil du Service Public de l'Eau et de l'Assainissement*). The negotiations have been very hard, and the prerogatives of this authority

have been progressively cut down. Since the 2002 general elections, the project has been shelved.

V CONCLUSION

Contrary to other network industries considered as services of general interest (e.g. electricity, telecom, postal services) that have been liberalised in Europe since the mid-1980's, **the management of WSS services has been excluded from any European liberalisation policy** aiming at introducing competition and private sector participation. This is mainly due to the specificities of water sector, in particular its structure **of natural and local monopoly**, and its strong positive and negative externalities on health and environment, leading most Member States to public and local management.

However, more recently the European Commission has broached the topic of water liberalisation in different texts. However, their position remains to be clarified. Firstly, the WFD states in its preamble that the supply of water is a service of general interest as defined in the Commission communication on services of general interest in Europe[121]. This means it is not compulsory to apply the competition law. Secondly, the recently published Green Paper on Services of General Interest[122] considers water supply as a Service of General Economic Interest, which according to the article 86 (2) of the EU Treaty means that such undertakings "shall be subject to the rules contained in this Treaty, in particular to the rules on competition, insofar as the application of such rules does not obstruct the performance, in law or in fact, of the particular tasks assigned to them." Moreover, in its Communication on internal market strategy (COM(2003) 238), the Commission states "One area where new action may be required is the water sector… European policy on the question of ownership of water and water services will continue to be neutral." And finally, at the international level, the European Commission sent out requests to 72 countries for liberalising their water markets in

[121] COM (2000) 580.
[122] COM (2003) 270 final.

the context of the new negotiations of the General Agreement on Trade in Services[123] (GATS). All things considered, there is a need to have a common approach to WSS services. Should it, or should it not, be included in the general liberalisation process.

To all intents and purposes, there is a **growing pressure to introduce competition and private sector participation**. A consensus for reform of water supply has emerged in recent years among international financial institutions. This derived from two major international conferences held in 1992: the International Conference on Water and the Environment (Dublin) and the United Nations Conference on Environment and Development (the 'Rio Conference'). At the core of this reform consensus are two fundamental principles:

- *the instrument principle* - that water has an economic value in all its competing uses and should be recognised as an economic good. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources. An important corollary is that water companies should be treated as commercial enterprises.
- *the institutional principle* - that water management should be based on a participatory approach involving users, planners and policy-makers at all levels, with decision-making taken at the lowest appropriate level according to the concept of subsidiarity.

The objective of this chapter was to analyse **to what extent the current European liberalisation policy for national network industries (energy, postal services, telecom) could be widened to the water sector**, and analyse its influence on a possible liberalisation of WSS services.

One first answer to that question relies on **empirical evidence**: we have observed that all the processes that characterise liberalisation of network industries in general (private sector participation, competition, unbundling, segmentation of the market, break-down of national boundaries) are already implemented in WSS services in several countries. Thus, even if it does not result from a European Directive, liberalisation of WSS services has already begun

[123] The European Commission is representing Member States in the new negotiations of GATS, which aims at extending the scope of the original agreement and explore ways of liberalising trade in services around the world.

in several countries, and is following the same processes than other network industries. This similarity with other network industries is strengthened by a trend towards regionalisation of the management of WSS services observed in most European countries. However, this first conclusion must be clearly completed with the affirmation of water specificity as a natural local monopoly: consequently, **the regulation of water is clearly different from the regulation of other network industries**. The main missions of a regulator of WSS services are to control the quality of the service, and organise a comparative competition between operators that operate on different geographical territories. Concerning regulation, water is not going to import the recipes from other network industries, but is likely to follow its own development path.

Thus, what can we expect from the EU in the near future regarding the liberalisation process in the water and sanitation sectors? Will water follow the same path as other network industries, or will the specificities of water involve an original path towards liberalisation? Our analysis of the current trends identify some drivers for liberalisation (an increasing scale of WSS services, an increasing private sector participation), but also some constraints, with a need to guarantee independent regulatory authorities.

CHAPTER 5 SYNTHESIS

This final chapter intends to analyse whether the current European policies could constitute a possible framework for analysing liberalisation scenarios of WSS services. It will firstly summarise the main issues that have been dealt in each of the previous chapters. Secondly, a cross-analysis of these results will be made in order to build a schematic representation of the main drivers and constraints for a possible liberalisation of WSS services. Finally, it will highlight the safeguards that would probably be needed, if the liberalisation process is further developed in the WSS sector.

I ANALYSIS OF THE FRAMEWORK CREATED BY EXISTING EUROPEAN POLICIES: DRIVING FORCES AND CONSTRAINTS FOR A POSSIBLE LIBERALISATION OF WSS SERVICES

In order to achieve the objectives enounced at the beginning of the document (to analyse the role of the EU in the current liberalisation process, and to point out drivers and constraints for a possible liberalisation of WSS services), three thematic approaches have been investigated: 1) standards in drinking water and sanitation systems, 2) management of the natural resource, and 3) liberalisation and services of general interest.

I.1 European directives on standards: various influences among countries

As shown in the analysis of standards and WSS services of chapter 2, the relationship between the development of drinking water standards and urban wastewater treatment and their impact on private sector involvement in the EU is not straightforward. One cannot point out a unique trend towards liberalisation, considering each country's particularities. On the contrary, it is possible to pinpoint several channels through which private sector involvement has developed or not: technical complexity, financial pressure, regionalisation and the emergence of new stakeholders.

1) The increase of technical complexity of water management forces local water management systems to delegate decisions to professionals having the necessary expertise. This leads to the creation of specialised water management organisations, who may belong to private or public sector depending on national paths and traditions. This does not necessarily mean that water operators will themselves be privatised: Italian and German municipally-owned water companies are well-known examples of water industry developed within the public sector, though with some sort of entrepreneurial autonomy. In other countries, the need for professional skills has led quite early to delegation of operation to private companies, instead of developing the same skills in-house (French case).
2) The second channel is the financial one. The increasing cost of water and sanitation services in the present phase is paralleled by the crisis of public finance, therefore ending the traditional way of financing through the public budget. Self-finance through full-cost recovery starts to become necessary. Tariffs and prices paid by consumers will serve as a cash flow for sustaining market-based finance, for which the water operator becomes the intermediator. Once again, this does not necessarily lead to private operation of services, since public companies might also have the capacity to access financial markets (the Netherlands). Given the high capital intensity of the water industry and the very long depreciation schedule of water assets, the financial reputation of operators (private or public) is a crucial aspect in order to reduce the cost of capital and finally the cost of water to final consumers. Even if remaining under public control, many water companies have engaged in enlargement of capital to new investors, buyouts and other financial operations opening their property to external investors.
3) The third channel regards the "regionalisation" concerning water operators and water regulators. Local water management cannot be considered anymore as a "simple" task within the frame of a publicly-controlled water plan; the water operator itself has to become "a planner", and therefore acquire both suitable geographical scale and vertical integration.
4) Finally, the fourth channel regards the need of water service management to interact with a larger number of conflicting stakeholders, with stronger emphasis to be put on the demand side rather than on the supply of new assets and technology.

Table 1.1. illustrates these four channels.

Table 1.1. Summary of issues related to the standards and their impacts on a possible liberalisation process

	Issues related to liberalisation of WSS services
Technical complexity	Driving force: • Growing complexity of water management leads local systems to delegate decisions to expert (often private) professionals in countries like Italy or France (although public management is still quantitatively important), However: • The local communities have demonstrated high performances in acquiring the technology (first wave of directives) with technical support from State administration. • It had no impact on private sector involvement in some other Member States (e.g. professionalism of municipal authorities in Germany, hiring of consultancy in The Netherlands).
Financial pressure	Driving force: • Increasing cost of water and in particular wastewater treatment, and lack of public financing lead municipalities to get capital from new investors, enabling different forms of public-private partnership: public utilities with good rating are able to get capital from stock exchange (e.g. ACEA in Roma, Italy) or water boards are more dependent on external financing (e.g. The Netherlands). However: • Subsidies from water Agencies in France allowed mutual funding of sewerage without necessary private financial involvement. • In Germany, costs are managed and borne by municipalities by way of levies and increased water price.
Regionalisation	Driving force: • In the Netherlands , EU directives may have enhanced the move towards the concentration of drinking water companies. However the government prohibits privatisation of the water supply. However: • In Italy, it was the national regulation and not EU legislation that pushed towards a more concentrated structure of water management.
Emergence of new stakeholders	Constraints: • Growing awareness of users regarding increased water price and problems of quality linked with new standards could put pressure against any liberalisation process. However: • Necessity of transparency and claims for decreased water prices can lead to the introduction of more competition.

I.2 WFD implications: structuring principles that apply in particular to WSS services

As seen in Chapter 3, it seems that the WFD, in its principles, does **neither reinforce nor hamper the liberalisation process** ***per se***. The main issues linked with liberalisation (e.g. unbundling, market regulation, definition of the services of general interest) are neither treated nor mentioned in the directive. Table 1.2. presents a summary of issues derived from the linkage of the WFD principles (and their potential implementation) with a possible liberalisation process, divided into:

- possible consequences of WFD principle implementation (consequence);
- needed activities and safeguards in order to ensure the implementation of the WFD principles even in a more liberalised environment (needed action);
- possible results of WFD principle implementation of direct interest for a possible liberalisation process (neutral);
- possible results of WFD principle implementation that would support a liberalisation process (driving force);
- possible results of WFD principle implementation that would hamper a liberalisation process (constraint).

Table 1.2. Summary of issues derived from the linkage of the WFD principles (and their potential) implementation with a possible liberalisation process

Implementation of the WFD principles as...		**Issues related to liberalisation of WSS services**
ECOLOGIC	Integrated basin management	Constraints: • Integrated management requires coordination of different geographical scales and different uses (energy, transport, agriculture, fishing), as they are all interdependent: it is more difficult to reach with private actors.
	Good status Environmental protection, conservation	Constraints: • The preservation of the ecosystems is an objective having priority, whereas any utility in a competition context looks for economic profit. • Reaching the good status requires a long-term planning and changes of the current practices. It is sometimes incompatible with market transactions that are mainly short-term decisions.
	Prevention and Precautionary	Constraints: • These principles are based on intergenerational responsibility (ethic issues) that are difficult to take on by markets. • These principles include additional risks that are not always taken into account in a competitive market, and that should be imposed with precise common calculation rules. Risk: • The unknown risks accounted for by these principles should be included in the calculations, but that implies an increase of costs.
ECONOMIC	Polluter pays principle, cost recovery principle (for water services as defined by WATECO)	Driving force: • The WFD induces a monetary vision of water values (including social and environmental aspects) that may open to a market vision. • The reporting requirements of the WFD will induce increased transparency on financial information (costs, prices etc.) thus enabling comparative competition. • The recognition that the price of water should cover the costs (investment and operation costs) is a pre-condition for private sector involvement because it legitimates increases of price. …But safeguards needed: • If cost recovery has to include also environmental damages, there is a need of a precise and common methodology to assess those costs, so that all actors make the same hypothesis in a competition context. Indeed, difficulties to assign costs in complex and synergetic impacts, difficulties to value eco-social assets and uncertainties of forecasting make the cost-recovery principle difficult to implement in a market structure. • There is also a need of a strong regulatory framework to avoid short-term planning by private actors in order to ensure long-term cost recovery; to avoid 'cherry-picking' by private operators in a liberalised market; to avoid restricted access to information for calculating actual costs and degrees of cost recovery.

Implementation of the WFD principles as...		**Issues related to liberalisation of WSS services**
	Cost-effectiveness of measures	Consequence: • Increased difficulty of reaching actor consensus on cost-effective set of measures. Needed action: • Safeguards needed to avoid sub-optimal outcomes due to an unequal distribution of bargaining power.
	Derogation if disproportionate costs	Risk induced by a liberalisation process: • Increased information asymmetries hinder the assessment of alternative options. • One can anticipate a surge in derogation due to private actors interests.
INSTITUTIONAL	Public participation	Constraint: • As public opinion usually fears for new private sector participation in the water sector, new avenues for large public participation could probably be a constraint for a liberalisation process.
	Management basin authority	Driving force: • The concept of WFD is by itself crossing countries borders by putting emphasis on the river basin. This multinational character breaks down national frontiers and as such might be a driving force for addressing also the drinking water and sanitation sector over geographical and administrative country borders. Currently within the EU the drinking water and sanitation sector is still very much bounded by the country borders. Risk induced by a liberalisation process: • Problem of co-ordination between basin authority, water service regulator and market competition regulator can appear.

Some open questions result from the analysis above, mainly because there are still some different interpretations of WFD. Several issues are particularly linked to the WFD and have an impact on liberalisation issues. Other more general issues (information, coordination, regulation) will be dealt with in the section III.

Water services/resource

First, it is important to consider the relationship that the WFD establishes between the water resource and water services. The WFD focuses on the protection of the natural resource. It sets a broad environmental objective, i.e. the good ecological status, and a series of instruments to reach it. However, the WFD does not ignore the provision of water services from the resource. The question arises of how the two perspectives fit together.

Considering initially the resource as a whole, Humans "produce"/derive goods and services from the resource (e.g. hydro-power production, support for fishing, irrigation, landscape, etc). This production process entails externalities and puts pressure on the renewability of the resource. Water services are only a fraction of the goods and services produced from the resource. The WFD principles should be enforced at different levels (i.e. the whole resource, the water services sector or a single water service so as water distribution). Public participation should be established for the entire field of water resource management. (as both the general public and stakeholders are consulted about the river basin management plans). Cost recovery has to be considered for all the water services. Liberalisation (and price setting) that does not enter the scope of the WFD could eventually apply to the production, distribution and treatment of drinking water (i.e. tap water, sewerage collection and treatment). How would the application of these different approaches fit together? Will public participation at resource scale have an impact on the liberalisation of water services? To which degree will redistribution take place between the billing of tap water (and other water withdrawals) and the financing of other water services? Moreover, the calculation of cost recovery depends on the extent of the definition of water services. Will the cost recovery be strictly limited to the cost of water services or will it include corrections of externalities from other goods and services (e.g. cost of prior treatment due to manure spreading above the aquifer)? To determine the perimeter of the elements included in the calculation of cost is far from being an easy task.

Divergences on the implementation of WFD

In its conception, the WFD sets objectives but not the precise roadmap to meet them. Much is left at the discretion of the Member States. This is particularly the case with institutional design concerning water management, as the latter varies tremendously from one place to another. The national transcription of directives is unpredictable. Transposition of the WFD will not be linear as it sets broad objectives but not the precise means to achieve them. A strong variation in national interpretation and operation is widely expected, in spite of the Common Implementation Strategy. The results of different national policy development and implementation processes are not currently foreseeable.

Cross-subsidies between different water uses

The WFD introduces principles that have different scopes: for instance, the principle of cost recovery applies to water services in general (including irrigation), while the principle of public participation applies to the system on the whole, i.e. the decision mechanisms for water resources management. A possible liberalisation would focus only on WSS services, and the questions arises of how these different perspectives fit together: in particular, the redistribution between the billing of tap water and the financing of other services is a central issue.

Public participation

In many EU countries, public participation is not well developed in water management. The adoption of the WFD creates the opportunity to open the water sector to the principles of good governance[124]. However, without a strong political will, there is no reason for the situation to evolve. Concerning liberalisation, we observe in other sectors that it developed without much public participation. There is no reason that the situation differs in the water sector. In this sense, the implementation of this WFD principle would not have a true influence on a potential liberalisation process. On the other hand, mechanisms of public participation could constitute a new opportunity for the public to manifest its opposition to the liberalisation process, considering that their role as a driving force or constraint is not negligible. But, since the decision of liberalisation is a highly political one, it does not seem probable that the decision process will be influenced by the WFD and "opened up" to public participation. Concerning the cost recovery principle and the introduction of incentive pricing, the situation regarding public participation is different: the programme of measures as part of the River Basin Management Plan (due 2009) explicitly has to mention measures to be taken for these requirements on Article 9. In combination with the fact that these RBMP are one of the main elements for public participation in the WFD, it can be expected that these measures will be discussed in public. The service of general interest or the cost recovery could be defined with stakeholders in a participatory way. Such an implication could have repercussions on the determination of the water price.

[124] According to the EU White Paper on the European Governance (COM (2001) 428 final).

Social issues

Usually, sustainable development is built on three pillars: environment, economics and social issues. In the WFD, social aspects remain vague, even if explicitly mentioned[125]. However, social principles could be more detailed at a later stage, when incentive water pricing and its consequences are considered. In particular, price determination includes social aspects. The question of who should pay for the restoration of the water bodies is a social issue when it is expected to pass through the water bill. Social issues could come up in discussions about liberalisation, particularly about the definition and financing (e.g. through general tax or sectorial funds) of the services of general interest and the determination of the retail price of water (for the final consumer).

Safeguards

The analysis of issues for liberalisation within the chapter on resource managment has shown that in many cases safeguards will have to be established in order to ensure reaching the WFD objectives within a liberalised market (see Table 1.2.). Increased liberalisation may impede the successful implementation of WFD principles, leading to the need for balancing interventions by i.e. a strong regulator.

I.3 Liberalisation policies in other network industries and specificities of the water sector

As seen in Chapter 4, in several European countries, there is some empirical evidence in favour of a relative liberalisation of water services, that includes a greater autonomy of operators – even when they remain public – and a growing private sector participation (PSP) in the management of water services. The introduction of these market principles in the management of water services is mainly due to national policies, and the European Union has had only a minor role. In Table 1.3., we have identified the different elements that can be constraints or driving forces to a possible liberalisation process at the European level. The

[125] Examples of reference to social issues include:
- Art. 4.5(a) ("less stringent environmental objectives")a which refers to the "socio-economic needs served by human activities" as an element that has to be considered while assessing possible derogations from the good ecological status;
- Art. 9.1 which states that "Member States may...have regard to the social effects of the recovery.." of the costs of water service;
- Preamble (1) refers to water as a heritage thus stressing its cultural and social values.

historical or recent experiences of liberalising networks industries also constitutes drivers or countervailing forces depending on the success of the experience. For instance, water privatisation and regulation in the UK is now rather seen as a success story, whereas privatisation of the railways, again in the UK, is now seen as a failure. These real life examples help to form the public and political opinion for future actions.

Table 1.3. Summary of issues concerning WSS services, their management and their regulation, and a possible liberalisation process

		Issues related to liberalisation of WSS services
Specificities of water services	International discussions of the nature of the good 'drinking water'	Constraint: • 'Water' has been recently adopted as a human right during international forum discussions. This leads to a questioning of the legitimacy of the private operators that make a profit on water business. • The feasibility of PSP depends on which costs are really internalised: there exist public fears on increased prices by a private operator. Driving force: • On the other hand, there is a growing international consensus on the economic value of 'water' (principle 4 of Dublin Conference)
	Water services as SGI or SGEI	Constraint: • If water services are considered as SGI, fundamental objectives assigned to water services (e.g. PSO, conservation of environment, social cohesion…) need to be imposed on private operators, which may constrain their participation. Driving force: • If water services are considered as SGEI, European competition laws apply, and liberalisation process is feasible.
	A natural monopoly	Constraint: • There are technical difficulties for competition in the market, although competition for the market and comparative competition are feasible.
	A local service, physical supply and sanitation infrastructure	Constraints: • The great diversity of organisation of services in Europe, with a central role to local public authorities, makes any liberalisation policy more difficult to implement. • Until now, the principle of subsidiarity gives to each Member State the responsibility for the organisation of WSS sector.
Current evolution in the management of WSS services	Evolution of the legal status of operators	Driving force: • Most public operators have a greater autonomy and come under private law.
	Evolution of the juridical framework	Driving force: • New laws in favour of concession of water services to specialised (private or public) operators are now enacted in several countries.
	Development of an industrial pool of public and private big companies	Driving force: • The emergence of big European companies (TNCs) creates potential competitors in Europe for the delegated management of water services, thus enabling future competition for the market. • These companies are breaking down national frontiers, however: It creates new oligopolistic situations.

		Issues related to liberalisation of WSS services
	Public and private multi-utilities	Constraints: • In case of a public municipal multi-utility, it would be necessary to unbundle it before introducing competition. Risk: • In case of capitalistic multi-utilities, there is a risk of an oligopolistic situation, with a limited number of competitors after mergers. Driving force: • The development of an industrial structure increases the potential competition between TNCs.
	Larger scale of services (administration, organisation)	Driving force: • The regional concentration makes services more attractive for a private operator, as they reach a critical size that enable profitability.
Evolution of the framework for regulation	Creation of regulatory authorities	Constraints: • Regulatory authorities ensure the enforcement of PSO that are not a priority of the competitive market. • Regulatory authorities also ensure that the internalisation of externalities is done with the same methodology. Driving force: • A regulatory body enables comparative competition between public and private operators. • A regulatory body could supervise concession procedures.

II MAIN RESULTS AND CHANNELS LEADING TO A POSSIBLE LIBERALISATION OF WSS SERVICES

The objective of the first work package was to finalise a framework based on the analysis of EU policy on standards, resource management and liberalisation of network industries, in order to analyse water liberalisation scenarios. The EU has yet no clear role on the liberalisation of WSS services. There is no explicit liberalisation policy but there are some contradictory signs. On the one hand, the water sector is excluded from the general competition laws and still remains under the national and local responsibilities. On the other hand, some discussions within EU leads us to think that a future action in the WSS sector is on the agenda. The following analysis presents the drivers and the constraints underlined in the previous section in a schematic way.

A cross-analysis of the explicit and implicit European policies influencing the WSS services allow us to point out three topics that could relate to a possible liberalisation of WSS services:

- the emergence of new stakeholders, with on the one hand the development of (public and private) industrial companies in the water sector, (whose objectives are to widen their area of activity), and on the other hand, the suspicion of public opinion about the business of those companies in the water sector;
- national, European and international discussions on the nature of WSS services;
- an evolution of political and juridical framework that allow to build innovative forms of public-private partnerships.

II.1 New stakeholders: large water companies (public and private) and users representatives

The stringency of drinking water standards increase the technical complexity of water and waste water treatments, and forces local management systems to be professional, because technologies required imply a high degree of specialisation. Combined with the principle of cost recovery (from WFD), it leads to an increase of costs covered by WSS users. This increase in costs has two main consequences: on the one hand, it creates financing needs that appeal to external private financing; on the other hand, it increases prices, with suspicious reactions of users who do not want to pay high prices for water. Driven by the need of professionalism and the financial pressure, local management authorities have different options that can eventually be combined:

- they can delegate their services to a private operator who has the expertise and the capital;
- they can group with other local authorities in order to reach a critical size that allow the development of skills, the mutualisation of financial resources, and the access to financial markets;
- in the case of public sector, local authorities have to adopt an autonomous status that enables them to borrow and act as a enterprise.

Whatever the solutions chosen by countries are, according to their culture and their existing industrial structure, the result of these trends is that big companies, public and private, are developing a financial autonomy - often under private law status - and professional skills. They may be potential competitors if liberalisation is introduced in the WSS sector.

II.2 Open discussions on the nature of WSS services

The second causal chain is rather well separated from the first one, and it deals with the nature of WSS services. It includes the monopolistic structure of WSS services and their inclusion within ecosystems that impose ecological objectives. Thus, more regulation and safeguards are needed in order to avoid excessive rent from the monopoly and non-respect of ecological constraints. The nature of WSS services also includes on-going discussions on the qualification of WSS services as a Service of General Interest (SGI) or as a Service of General Economic Interest (SGEI). This qualification has strong consequences on the competition rules that must be applied to the water sector, and the latest green paper of the commission on SGI (COM(2003)270) tends to indicate that water is acknowledged as a SGEI, thus calling for more competition.

II.3 The evolution of the regulation on Public-Private Partnerships and Competition

The third causal chain is closely linked with discussions on the qualification of WSS services. Although EU has until now not submitted water to its general competition laws, the debate is now open[126] at a European level. At a national level, several countries have introduced laws enabling concessions with competition for the market in the water sector. Moreover, the commission intends to publish a green paper on Public-Private Partnerships at the end of 2003[127], which proves a strong interest in those subjects.

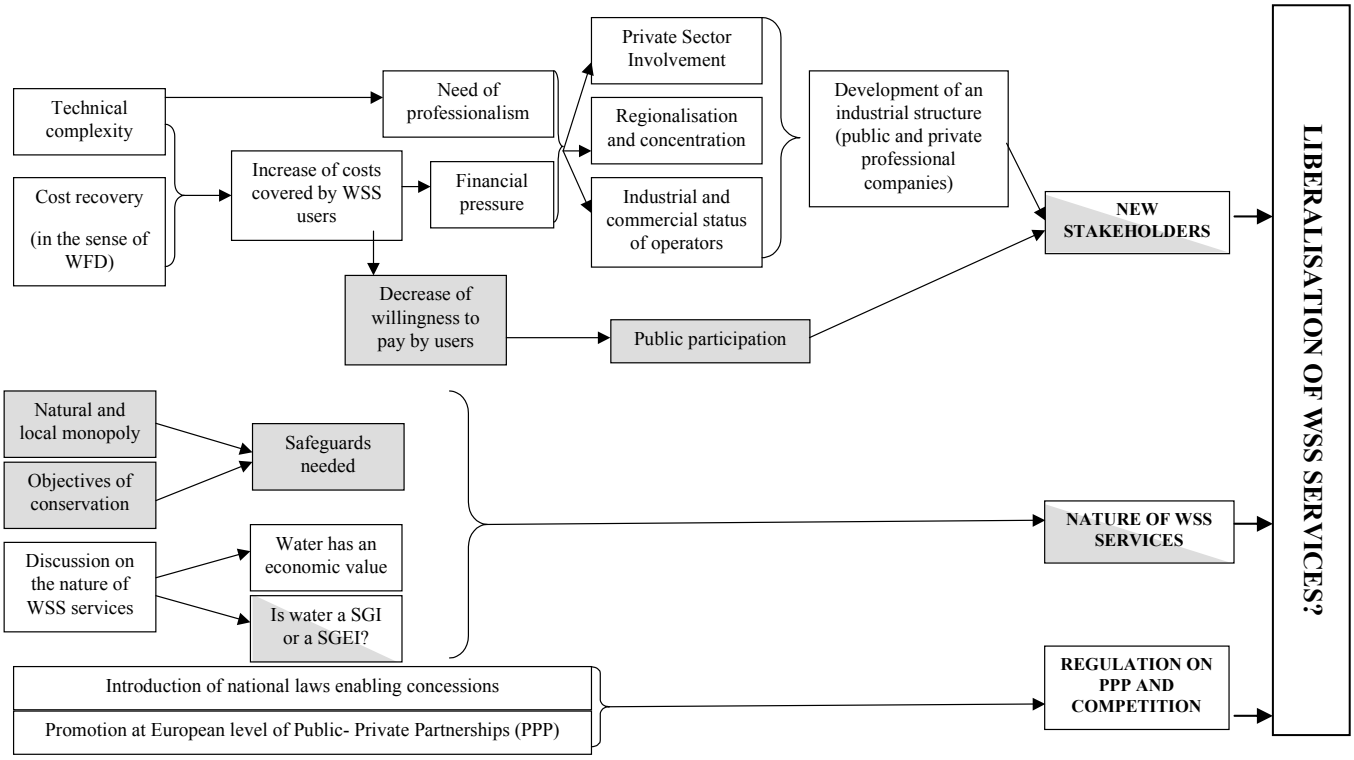
Figure 2.1. summarises the three causal chains that result from existing European policies:

- The emergence of new stakeholders (public opinion and water industries) has contradictory effects on liberalisation issues, with two diverging lobbying groups;
- The discussions on the nature of the good are still unsolved and their impact on liberalisation issues is still uncertain;
- The regulation on competition and Public-Private-Partnerships - which is one important levy of EU - is currently evolving towards an increased liberalisation of WSS sector.

[126] See the recent communication of the commission on Internal Market Strategy (COM(2003)238), where water is mentioned as "one area where new action may be required".
[127] The European Commission has already published some guidelines on this matter. See:

Hence, theses channels do not exhibit obvious conclusions on the future liberalisation of WSS services.

Figure 2.1. Framework figuring drivers and constraints for WSS services liberalisation[128].



III VARIOUS ISSUES AND NEEDED SAFEGUARDS

Many issues cannot be solved at this stage of our research and will be further developed in next phase of our project. Nonetheless, some of the safeguards needed in any liberalisation processes can be highlighted. In the perspective of an action or a policy of the European Union, different (non-exhaustive) questions are related to the channels leading to a liberalisation of WSS services:

- Is it necessary or desirable to precise the nature of the good 'water' and at the same time to introduce a new definition for a concept more specific to the WSS services on the pattern of concepts already existing such as SGEI or Universal service?

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http://europa.eu.int/comm/regional_policy/sources/docgener/guides/PPP/ppp_en.pdf

[128] In grey appear factors that are considered as constraints for a liberalisation of WSS services.

- Is it possible and/or desirable to introduce competition rules and/or derogation to strict competition (direct negotiation, best deal rather than cheapest deal, etc.)?
- In the case of a liberalisation process with the introduction of competition, which type of additional regulation process has to be set up? How have the problems of information and coordination to be treated?

This last question on the regulatory arrangements and the specific problems relating to the regulation of WSS services is crucial.

Planning a liberalisation process is not simply a matter of choosing the type of status of operators or the level of private involvement or the degree of competition. The reality and the consequences of a liberalisation process will depend on the regulatory authorities and mechanisms implemented to reach the best efficiency (i.e. to reduce costs, to invest and to improve the quality of service), optimal environmental objectives and a good social acceptance. Moreover, regulation objectives are not only there to protect the customers from the abuse of the power of monopoly suppliers and to avoid damaging interruptions to the service, but also to protect the new entrant competitors from the dominant position of incumbents.

In a regulation system, a very important factor is the availability of good information on operating practices and investments, but also on the environmental context (resource and quality). For instance, following the application of the principle of evidence-based policy, the WFD proposes to shape policies based on detailed information about the resource status and its socio-economic uses in each river basin. Collection of information at river basin scale should be systematic and compulsory. The obtained data set, given its final format, could act as a facilitator in a context of liberalisation or be "neutral" due to the high level of aggregation of information. In the second case, it could not be detailed enough to be useful to operators or potential investors interested in market entry. On the other hand, data collection may help to reduce information asymmetries between the regulator and the private or public operator responsible for the management of WSS services. Indeed, operators can use hidden information in a strategic way in order to increase their rents.

The WFD requires the designation of competent authorities at river basin scale[129]. In most States today, water management is driven by territorial authorities with administrative boundaries. In a liberalisation context, the increase in the number of regulators (basin authority, water sector regulator) poses the question of compatibility between these different regulatory authorities and also with the local authority responsible for WSS services and even operators. Problems of coordination could act as a constraint in increasing transaction costs so that it reduces their efficiency. In another way, the enforcement process of integrated river basin management may stimulate the coordination between the different public administrations of water policy (e.g. administration of the Environment for the management of surface water, administration of Public Works for navigation and quantitative issues, administration of Agriculture for irrigation and manure spreading, etc.).

The competition rules but also the resource management (by way of WFD), and the setting up and the monitoring of environmental standards require the designation of competent regulatory authorities. In most countries, territorial authorities with administrative boundaries drive water management. Moreover, other authorities regulate the water services and operators (e.g. competition authority, public health agency, etc.). A crucial question is to know whether these regulation authorities falls within the competence of the European Union or whether these aspects remain in the context of national or local actions. Is the European Union the best level to enforce different rules of regulation or does the WSS sector come under the exclusive competence of Member States? The answers to these questions depend on different problems stressed above. On the one hand, there are important interactions and cross-border externalities that require coordination and justify the establishment of centralised rules at the European level. On the other hand, the need to have a better information and to bring a rapid answer or action to any problem argues in favour of strong decentralisation and local decision-making. The solution is not black or white, and certainly some aspects will be managed at the Community level to achieve the objectives of the internal market, whilst other ones will be dealt with at national or local levels in accordance with subsidiarity principle.

[129] The basin authority, as defined in art. 3.2 WFD, is an administration that prepares and executes the management plans, included the programme of measures, for the account of the governments.

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ANNEX I: EUROPEAN DIRECTIVES ON DRINKING WATER AND URBAN WASTEWATER TREATMENT

Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in Member States

This is the first European directive that imposes restrictions for drinking water. This directive concerns only surface water (lakes, rivers and waterways). It fixes limit values or guidelines for 46 parameters, including aesthetic parameters (colour, odour), limits for chemicals (arsenic, cadmium, selenium, mercury, cobalt, cyanide, boron, phosphates, nitrates, pesticides, polycyclic aromatic hydrocarbons…) and microbiological parameters (coliform bacteria, streptococci, salmonella). Surface water is divided into three groups of limit values A1, A2, and A3, that correspond to appropriate treatment methods according to water quality: the more the quality of water is good, the less it will need treatment (the best water quality A1 will need less treatment, i.e. simple physical treatment and disinfection). This directive was completed by Council directive 79/869/EEC of 9 October 1979. It specifies measuring methods, sampling frequency and analysis of the 46 parameters.

Council Directive 80/778/EEC of 15 July 1980 relating to the quality of water intended for human consumption

This directive concerns all drinking water, except mineral waters and medicinal waters. It imposes 66 parameters. Members State were given five years to comply with these standards. Water is no longer defined in three classes (A1, A2, A3). Instead, all water must conform with the same values. The most stringent values existing in the 1975 directive (for A1 water) are selected. The following parameters are added: turpidity, taste, silica, calcium, magnesium, sodium, potassium, aluminium, nitrites and silver. Concerning microbiological parameters, drinking water must not contain any pathogen organisms (80/778/EEC, annexe I, p. 12). Analyses and sampling are more stringent than the former directive (the maximum number of analyses was 12/year in the 1975 directive).

Table A.1. Minimal frequency of sampling and analysis in council directive 80/778/EEC

Volume of water distributed or produced (m^3/day)	**Population concerned** (200 l/day/inhabitant)	**C_1 Minimum control** *For odour, taste, conductivity, coliform bacteria*	**C_2 Current control** *For odour, taste, turpidity, pH, residual chlorine, nitrates, nitrites, ammonium*	**C_3 Periodic control** *Substance of current control plus other parameters according to country*
100	500	*	*	*
1000	5000	*	*	*
2 000	10 000	12	3	*
10 000	50 000	60	6	1
20 000	100 000	120	12	2
30 000	150 000	180	18	3
60 000	300 000	360	36	6
100 000	500 000	360	60	10
200 000	1 000 000	360	120	20
1 000 000	5 000 000	360	120	20

Notes: * means left to each country's decision.

Council directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption

From December 2003, Directive 80/778/EEC will be replaced by Directive 98/83/EC. This directive will then have to be applied by all countries, apart from bromate standards (that must be applied in 2008), lead standards (in 2013), and trihalomethanes standards (in 2008). Standards have been considered in the light of new scientific knowledge (WHO standards and the Scientific Advisory Committee on Toxicity and Ecotoxicity of Chemicals). This directive applies to all water, including bottled water (except for natural mineral water and medicinal water). There are now 48 parameters, and 50 for bottled water (see Table A.2.).

Table A.2. Parameters in Drinking Water Directive 98/83/EC

Microbiological	*Chemical*	*Indicator*
E. coli	Acrylamide	Aluminium
Enterococci	Antimony	Ammonium
	Arsenic	Chloride
Where water is offered for sale in	Benzene	Clostridium perfringens
bottles or containers	Benzo(a)pyrene	Colour
E. coli	Boron	Conductivity
Enterococci	Bromate	Hydrogen ion concentration
Pseudomonas aeruginosa	Cadmium	Iron
Colony count 22° c	Chromium	Manganese
Colony count 37° c	Copper	Odour
	Cyanide	Oxidisability
	1,2-dichloroethane	Sulphate
	Epichlorohydrin	Sodium
	Fluoride	Taste
	Lead	Colony count 22°c
	Mercury	Coliform bacteria
	Nickel	Total organic carbon
	Nitrates	Turpidity
	Nitrites	Radioactivity: tritium, and total
	Pesticides	indicative dose
	Polycyclic aromatic hydrocarbons	
	Selenium	
	Tetrachloroethene	
	Trichloroethene	
	Trihalomethanes	
	Vinyl chloride	

Source: Council Directive 98/83/EC, and Productivity Commission (2000).

Some parameters have disappeared (e.g. magnesium, potassium, phenols, zinc, phosphorus) as they were considered not to represent essential health-related parameters. Moreover, stricter standards are imposed for certain pesticides (0.03 μg/l for aldrin, dieldrin, heptachlor, and heptachlor epoxide), but these limits have little significance as the compounds are scarcely used. More stringent standards are imposed for arsenic (from 50 to 10 μg/l), lead (from 50 to 10 μg/l), antimony- a toxic heavy metal- (from 10 to 5 μg/l) and nickel (50 to 20 μg/l). Further investments will be necessary to treat water for arsenic and antimony. Treatment costs are evaluated at 0.03 euros/m^3 of water for large units, and 0.45 euros for units of a capacity of 100 m^3/day, although less than 1% of waters are affected by this type of pollution. Certain parameters are added such as trichloroethene, tetrachloroethene, trihalomethanes, bromate and acrylamide. The most important impact on technical impacts is the addition of bromate, chloroform and bromodichloromethan which will slightly modify

treatment systems and their functioning. Costs are estimated at about 100 to 150 million euros (CEC, 1995).

Enterrococci are added in the microbiological parameters. Some standards are less strict such as chloride (200 to 250 mg/l), sodium (150 to 200 mg/l), nitrites (0.1 to 0.5 mg/l) and copper (1 to 2 mg/l). The directive aims to strike a balance between the need for chlorine as a disinfectant and the chemical risks associated with chlorine by-products. These substances (tetrachloroethene, trichloroethene, 1,2-dichloroethane, epichlorohydrin) are carcinogens. The EU requires that Member States strive for a lower value without compromising disinfection.

Monitoring requirements are less stringent than under the former directive (see Table A.3.):

Table A.3. Minimum frequency of sampling and analysis of drinking water supplied by a distribution network under Directive 98/83/EC

Volume (x) of water distributed or produced each day within a supply zone (in m^3)	**Check monitoring number of samples per year**	**Audit monitoring samples per year**
$x \leq 100$	*	*
$100 \leq x < 1000$	4	1
$1\,000 \leq x < 10\,000$	4 + 3 for each 1000 m3/d and part thereof of the total volume	1 + 1 for each 3 3000 m^3/d and part thereof of the total volume
$10\,000 \leq x < 100\,000$		3 + 1 for each 10 000 m^3/d and part thereof of the total volume
$x > 100\,000$		10 + 1 for each 25 000 m^3/d and part thereof of the total volume

Notes: * means to be decided by the Member State.

Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment.

This directive states that Member States shall ensure that all agglomerations are provided with collecting systems for urban waste water at the latest by 31 December 2000 or 31 December 2005, depending on the population equivalent (p.e.) (>15,000 p.e. and 2,000-15,000 p.e. respectively). For agglomerations of more than 10,000 p.e., a stricter deadline (31 December 1998) has been defined for urban waste water discharging into receiving waters that are considered 'sensitive areas'. Collecting systems shall take into account waste water treatment

requirements. The design, construction and maintenance of collecting systems shall be undertaken in accordance with the best technical knowledge but without entailing excessive costs. Where the establishment of a collecting system is not justified either because it would produce no environmental benefit or because it would involve excessive cost, individual systems or other appropriate systems that achieve the same level of environmental protection shall be used.

Secondary treatment or an equivalent treatment is required before urban waste water entering collecting systems is discharged (deadlines depend on p.e and type of receiving water). The discharges have to meet the requirements shown in Table A.4.

Table A.4. Requirements for discharges from urban waste water treatment plants. The values for concentration or for the percentage of reduction shall apply

Parameters	***Concentration***	***Minimum percentage of reduction (1)***	***Reference method of measurement***
Biochemical oxygen demand (BOD5 at 20°C) without nitrification (2)	*25 mg/l O_2*	*70-90* *40 under Article 4 (2)*	*Homogenized, unfiltered, undecanted sample. Determination of dissolved oxygen before and after five-day incubation at 20°C ± 1°C, in complete darkness. Addition of a nitrification inhibitor.*
Chemical oxygen demand (COD)	*125 mg/l O_2*	*75*	*Homogenized, unfiltered, undecanted sample Potassium dichromate*
Total Suspended Solids	*35 mg/l (3)* *35 under Article 4 (2) (more than 10,000 p.e.)* *60 under Article 4 (2) (2,000-10,000 p.e.)*	*90 (3)* *90 under Article 4 (2) (more than 10,000 p.e.)* *70 under Article 4 (2) (2,000 – 10,000 p.e.)*	*Filtering of a representative sample through a 0.45 μm filter membrane. Drying at 105°C and weighing* *Centrifuging of a representative sample (for at least five mins with mean acceleration of 2800 to 3200g), drying at 105°C and weighing*

Notes: (1) Reduction in relation to the load of the influent.
(2) The parameter can be replaced by another parameter: total organic carbon (TOC) or total oxygen demand (TOD) if a relationship can be established between BOD5 and the substitute parameter.
(3) This requirement is optional.

Annex II of the same directive lays down the criteria by which Member States have to identify sensitive areas. The identification of sensitive areas has to be reviewed at intervals of no more than four years. All discharges into those areas of urban waste water entering

collecting systems are subject to more stringent treatment. This requirement should be met at the latest by 31 December 1998 for all discharges from agglomerations of more than 10,000 p.e. For the discharges to sensitive areas that are subject to eutrophication, the additional requirements shown in Table A.5. have to be met. These requirements for individual plants need not apply in sensitive areas where it can be shown that the minimum percentage of reduction of the overall load entering all urban waste water treatment plants in that area is at least 75% for total phosphorus and at least 75% for total nitrogen.

Table A.5. Requirements for discharges from urban waste water treatment plants to sensitive areas which are subject to eutrophication[130]

Parameters	***Concentration***	***Minimum percentage of reduction (1)***	***Reference method of measurement***
Total phosphorus	*2 mg/l (10,000-100,000 p.e.)* *1 mg/l (more than 100,000 p.e.)*	*80*	*Molecular absorption spectrophotometry*
Total nitrogen (2)	*15 mg/l (10,000-100, 000 p.e.) (3)* *10 mg/l (more than 100,000 p.e.) (3)*	*70-80*	*Molecular absorption spectrophotometry*

Notes: (1) Reduction in relation to the load of the influent.

(2) Total nitrogen means the sum of total Kjeldahl nitrogen (organic and ammoniacal nitrogen) nitrate-nitrogen and nitrite-nitrogen.

(3) These values for concentration are annual means as referred to in Annex I, paragraph D.4(c). However, the requirements for nitrogen may be checked using daily averages when it is proved, in accordance with Annex I, paragraph D.1, that the same level of protection is obtained. In this case, the daily average must not exceed 20 mg/l of total nitrogen for all the samples when the temperature from the effluent in the biological reactor is superior or equal to 12°C. The conditions concerning temperature could be replaced by a limitation on the time of operation to take account of regional climatic conditions.

Annex II of the same directive also sets criteria for less sensitive areas. Depending on the p.e. and the type of receiving water, less stringent treatment is needed, provided that discharges receive at least primary treatment and comprehensive studies indicate that there is no adverse effect on the environment. Once again, the identification of less sensitive areas is subject to review, every four years at least.

Appropriate treatment has to be provided by 31 December 2005 for discharges of urban waste water entering collecting systems to fresh-water and estuaries from agglomerations of less

[130] One or both parameters may be applied depending on the local situation. The values for concentration or for the percentage of reduction shall apply.

than 2,000 p.e. and discharges to coastal waters from agglomerations of less than 10,000 p.e. Appropriate treatment means treatment of urban waste water by any process and/or disposal system which after discharge allows the receiving waters to meet the relevant quality objectives and the relevant provisions of the Urban Waste Water Treatment Directives and other Community Directives.

Treated waste water shall be reused whenever appropriate. Disposal routes shall minimise adverse effects on the environment. The same applies to sludge arising from waste water treatment. The disposal of sludge to surface waters by dumping from ships, by discharge from pipelines or by other means should be phased out by 31 December 1998.