



# **Precaution and Financial Risks in Implementing the Urban Waste Water Treatment Directive: Cities Investing in Water Infrastructures**

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## Abstract

This study aims to understand the complexities and controversies around the application of the precautionary principle in the context of urban waste water infrastructure provision. It examines these dynamics by example of case studies in London and Milan. It begins by outlining the risks and threats associated with the cases and relates them to the conceptual core of the precautionary principle, the risk governance process, and the regulatory and legal history. It argues that the application of the precautionary principle through the WFD has significant impacts on urban development and that its application shifts risks from environmental impacts towards long-term planning risks and economic vulnerability of cities. The examination of the risk governance process further shows how the complexity of the water sector challenges good governance practices and how external pressures such as those instigated by the precautionary principle can lead to undesirable reconfigurations. This study further examines the innovation dynamics in the cases. The London case focusses on an individual infrastructure project and shows how financial innovation has shaped the case. The Milan case presents a longer-view perspective that shows how structural changes in the infrastructure sector have enabled an environment for sustainable financial innovation. The innovation section concludes with a perspective on the innovation dimension inherent in the precautionary principle and how it has affected the two case studies. The study closes with a synthesis of the findings and concludes that the role of transparency and good local governance practices are essential for a successful implementation of precautionary principle requirements in a city's water sector. A common dynamic in compromised planning processes is the creation of 'white elephants', which can be avoided by harnessing the innovation dimension of the precautionary principle in a conscientious manner.

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## List of abbreviations

<b>AEEGSI</b>	Autorità per l'energia elettrica il gas ed il sistema idrico
<b>ARERA</b>	L'Autorità di Regolazione per Energia Reti e Ambiente
<b>BWD</b>	Bathing Water Directive
<b>BTL</b>	Bazalgette Tunnel Limited
<b>BOT</b>	Build - Operate - Transfer
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs
<b>DWD</b>	Drinking Water Directive
<b>EE2</b>	Ethinyl Estradiol
<b>EIB</b>	European Investment Bank
<b>FD</b>	Floods Directive
<b>IP</b>	Innovation Principle
<b>JRC</b>	Joint Research Centre
<b>MSFD</b>	Marine Strategy Framework Directive
<b>MM Spa</b>	Metropolitana Milanese S.p.A.
<b>ND</b>	Nitrates Directive
<b>PP</b>	Precautionary Principle
<b>TTT</b>	Thames Tideway Tunnel
<b>TW</b>	Thames Water
<b>UWWTD</b>	Urban Waste Water Treatment Directive
<b>WAREG</b>	European Water Regulators
<b>WFD</b>	Water Framework Directive
<b>Ofwat</b>	Water Services Regulation Authority

# 1 Introduction

## 1.1 Introduction

Many European **cities are facing the challenges** of having to massively overhaul their urban water infrastructures. Ageing and overburdened systems first installed in the 19<sup>th</sup> century are challenged by **increasing environmental standards** imposed by European law. These standards are set within the Water Framework Directive (WFD) and its daughter directives, with direct reference to the precautionary principle, the Control at Source Principle and the Polluter Pays Principle (Art. 191(2) of the Treaty on the Functioning of the European Union). In order to meet these infrastructural challenges, **immense investments** are needed, posing their own risks and problems for cities. This dynamic is a major point of **difference towards the other case studies** in the RECIPES project: it provides a **reverse perspective on the precautionary principle**, it does not follow the introduction of a new product or technology in tension with the precautionary principle, but it examines the **long-term impacts of a precautionary principle regime**.

The relationship between cities and their infrastructure defines how society interacts with the environment, thus emphasizing the importance of the way we govern, maintain and construct urban water infrastructure. The precautionary principle by means of the WFD thus enacts immense influence over the way we organize our cities. A particular key issue is the **Urban Waste Water Treatment Directive**, which is one of the 'industry directives' born from the WFD. It has been **utilized to sue cities within the European Union** that do not conform with the imposed waste water standards. Two of these cities are London in the United Kingdom and Milan in Italy. By example of these two cases, this report will detail how the precautionary principle affects urban water infrastructure provision, and how the regulation of the primary risk of pollution entails secondary risks that result from the highly integrated nature of a city's water infrastructure. This **balancing of risks in a multi-risk environment** is one of the key challenges to the precautionary principle in the infrastructure sector, where the regulation of one aspect can lead to the introduction of regrettable substitutions elsewhere. The challenges of integrating water services more closely with long-term urban planning objectives has been recognised as one of the key issues for improving European water policy (EurEau 2017).

*This report's main goal is to understand the complexities and controversies around the application of the precautionary principle in the context of urban waste water infrastructure provision. It examines these dynamics by example of case studies in London and Milan. Furthermore, it will examine the role of financial and organizational innovation and how it relates to the innovation principle and the precautionary principle.*

The 2010 legal case against the United Kingdom centred on the **overflow of the sewage system into the river Thames** in case of minimal rainfall. The case argues that under the UWWTD London does not provide adequate infrastructure for the prevention of pollution. As a consequence, the city was presented with the challenge to fix the problem and present a solution that was both capable to cope with the difficult post-financial crisis funding situation as well as the long-term infrastructural challenges present in London. A **strategic study** was implemented by the Environmental Agency, Thames Water (TW), Department for Environment, Food and Rural Affairs (DEFRA, the responsible ministry) and the Greater London Authority to determine appropriate solutions. Funding allocation for the different involved disciplines was questioned later, as the results were biased towards large-scale engineering solutions. The selected solution was the adaptation of the water

system to and the construction of a **25km tunnel under the River Thames** that effectively acts as a secondary sewer system that catches the overflow of the first when it becomes overburdened. Construction is ongoing and the cost is estimated at **£4.2 billion** total. Controversies around the project relate to a lack of transparency in selection process following the strategic study, a weak tender-process, a questionable financial model as well as challenges to the entire raison d'être of the project, since it's services are projected to be no longer necessary.

The legal case brought against Italy in 2000 for **Milan's ongoing dumping of untreated waste water into the river system**, handles a similar issue, however it is larger in scale. The legal case results from previous cases against Italy for the failure to implement the UWWTD into national law and puts the finger on immense structural changes that had to be implemented in cities across Italy. Milan was at the time the last major European city still dumping untreated waste water. Due to these proceedings, Milan has been the subject to an infringement procedure by the EU Commission. A reason for the EU Commission's hesitance to impose a pecuniary sanction was most likely due to the belated awarding of construction contracts to private consortia. **Milan had to construct two completely new purification plants** and implement major upgrades in a third between 1999 and 2006. The awarded BOT (Build-Operate-Transfer) **contracts were surrounded by controversy** over bribery, lack of transparency and restricted competition. These events were still very much in line with ongoing fallout from the 1990s Tangentopoli phenomena ("Bribesville", referring to corruption in public works contracts). These scandals facilitated structural changes in the operation of Milan's water sector, particularly with the **transfer of the management responsibility** for the integrated water system from the Municipality to MM Spa, a multiservice company fully owned by the Municipality of Milan. Even though the way these structural changes were implemented are still not free of criticism and path dependencies resulting from the BOT contracts are still strong, today, Milan's water system has emerged from this transformation process with several **technological and financial innovations**. It has become a point of reference for a successful water system in a European city.

The following section will provide a brief overview over the timeline of the two case studies. The sections thereafter will outline the risks and threats associated with the cases and will relate these to the conceptual core of the precautionary principle, the risk governance process, and the legal and regulatory history. It is argued that the application of the precautionary principle through the WFD has significant impact on urban development and that its application shifts risks from environmental impacts towards long-term planning risks and economic vulnerability of cities. The examination of the risk governance process further shows how the complexity of the water sector challenges good governance practices and how external pressures such as those instigated by the precautionary principle can lead to undesirable reconfigurations. The legal and regulatory history section details the long-winded nature of water regulation and implementation of changes. Section five outlines the innovation dynamics in the cases. The London case focusses on an individual infrastructure project and shows how financial innovation has shaped the case. The Milan case presents a longer-view perspective that shows how structural changes in the infrastructure sector have enabled an environment for sustainable financial innovation. The innovation section concludes with a perspective on the innovation dimension inherent in the precautionary principle and how it has affected the two case studies. Two related instances in which the precautionary principle has been invoked are briefly portrayed. The report closes with a synthesis of the findings and concludes that the role of **transparency and good local governance** practices are essential for a successful implementation of



precautionary principle requirements in a city’s water sector. A common dynamic in compromised planning processes is the creation of **‘white elephants’**<sup>1</sup>, which can be avoided by **harnessing the innovation dimension of the precautionary principle** in a conscientious manner.

## 1.2 Key timeline

### The London Case

	<i>Political</i>	<i>Legal</i>	<i>Economic</i>	<i>Public debate</i>	<i>Other</i>
<b>Year</b>	<b>Event</b>		<b>Relevance to case study</b>		
1989	Privatization of Thames Water		Deep structural changes to London’s water system		
1991	Water Industries Act		Reforming the British Water Sector		
1991	Creation of Ofwat		Establishing the Regulatory Agency		
2001	RWE acquires Thames Water		Begin of overleveraging of assets		
2005	Case C-252/05 for definition of waste water		Begin of legal proceedings		
2006	Kemble Water Holdings acquires Thames Water		More financial engineering in the operation of Thames Water		
2010	Case C-301/10 for failure to comply with the UWWTD in London		Begin of specific UWWTD case		
2012	Founding of Clean Thames Now and Always Initiative		Begin of public advocacy		
2015	Creation of BTL and receiving operating Licence from Ofwat		Project realization begins		
2016	Construction of Thames Tideway Tunnel begins		Construction phase begins, projected to last until 2024		
2017	Kemble Water Holdings sells all stakes in Thames water		Reshuffling of ownership and final responsibility		

<sup>1</sup> From Merriam-Webster Dictionary: “a property requiring much care and expense and yielding little profit. [...] the kings of Siam [...] gave white elephants as gifts to those they wished to ruin, hoping that the cost of maintaining the voracious but sacred mammal would drive its new owner to the poorhouse.”

## The Milan Case

	<i>Political</i>	<i>Legal</i>	<i>Economic</i>	<i>Public debate</i>	<i>Other</i>
Year	Event				Relevance to case study
1992	Begin of first Tangentopoli trial				Deep structural changes to Italy's urban infrastructure sector
1994	Galli Law reforming Italian Water Sector				Redefinition of Italian Water Regulation
1995	Case C-302/95 for failure to implement the UWWTD				Case against Italy for failing to comply with EU law
1997	Case C-195/97 for failure to implement the UWWTD				Case against Italy for failing to comply with EU law
2000	Case C-396/00 for failure to comply with the UWWTD in Milan				Begin of legal proceedings related to Milan
2000	BOT Contracts: construction start for first new purification plants				Begin of financial complications
2003	Transfer of Water System from Municipality of Milan to MM Spa				Restructuring of Milan's water system operation
2006	All purification plants completed				Original plans completed
2007	MM Spa assumes responsibility for the Water System until 2037				Solidifying current practices
2014	ATO Plan update and revised investment plan				Establishing long-term commitments

## 2 Urban Water

As mentioned before, this case study bears a major point of difference towards the other case studies: it does not focus on a particular product or technology that stands in tension with the precautionary principle, but it **examines the impacts of a long-term precautionary principle regime over urban water infrastructure development**. Therefore this section will not portray a specific technology, but it will briefly outline some significant aspects of urban water.

Access to **clean water and sanitation has been recognised as human right** by the United Nations General Assembly in 2010. This emphasizes the significance of the close entwinement of the human metabolism with water, and thus it could be argued that **water infrastructure is a key prerequisite for the development of cities** in history per se. From river settlements, to aqueducts, to the development of sewers, purification and

desalination plants, the history of urban water infrastructure mirrors the increasing complexity of our increasingly urbanized societies. Erik Swyngedouw characterizes this relationship as follows: "Water is indispensable 'stuff' for maintaining the metabolism, not only of our human bodies, but also of the wider social fabric. The very sustainability of cities and the practices of everyday life that constitute 'the urban' are predicated upon and conditioned by the supply, circulation, and elimination of water" (Swyngedouw 2004, p.1).

This relationship sets the stage for many current issues in urban development: from climate change impacting fresh water reservoirs to sewage system development lagging behind urban growth in newly industrializing economies and aging water infrastructures in the Global North, these issues pose many a **challenge to human health and local ecosystems**. The complexity of these issues is immense, as they cut across several scales and intersect with every aspect of human life. Keeping the scale of these challenges and structures in mind, urban water infrastructure issues pose **major financial challenges to cities**. The question of what is to be built, where and why is closely tied to the question of what funds are available and under which conditions these are provided. Financial commitments set path dependencies that can impact urban development for multiple decades, as many of these infrastructures are set up to operate for well over a hundred years. This introduces a great amount of uncertainty, as the future remains unknown. The plurality of interests and opinions tied to the interpretation of this future characterize the key role of ambiguity for urban water issues.

Between the significance for the human metabolism and society, the long timescales at play and the immense financial costs of constructing and maintaining urban water systems, the **role of regulation and its legal framing** come to the fore. Here, the precautionary principle sets the stage in the European context, as its inclusion in the WFD frames the way in which urban water systems are realized within the Union.

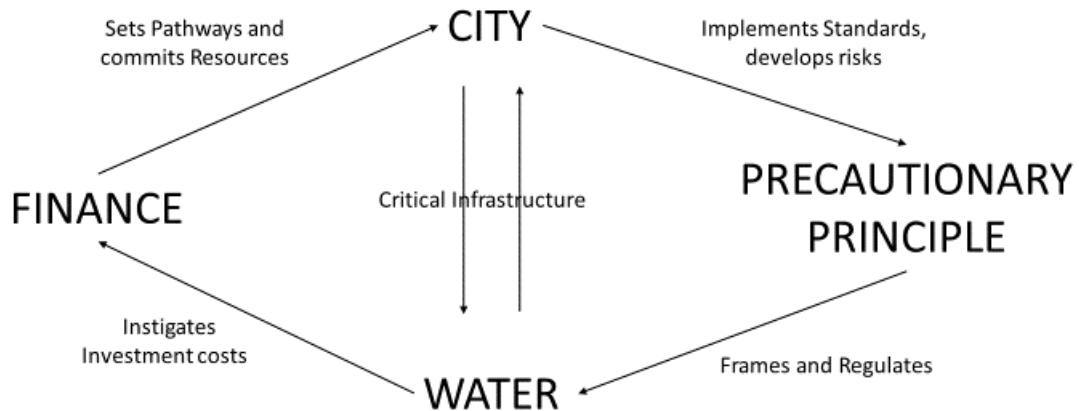
## 3 Risks and scientific uncertainties

### 3.1 Risk/threat

The precautionary principle plays a central role in regulating the relationship of cities with their water infrastructure. The **precautionary principle frames and regulates how cities are supplied with fresh water and how they deal with their waste water** through the Water Framework Directive and the associated Industry Directives (UWWTD, DWD, BWD). This legislative framework sets certain standards that must be met and can result in legal action in case cities fail comply. This has been the case in the cities of London and Milan. The ensuing situation presents cities with an enormous challenge: **the costs associated with the infrastructure investments needed to comply with the increasing standards are so high, that they present a challenge in themselves to cities**. This situation gives rise to different financial solutions that set out pathways for future urban development. These pathways bring their own risks and threats that often go beyond the original risk that was to be regulated by the precautionary principle-based legislation.

Risks and threats thus emerge at different points within this dynamic, accompanied by uncertainties that are mostly tied to unpredictable future developments:

**Figure 1 The precautionary principle, Finance and urban water**



These risks and threats can be roughly allocated to the following categories, though as the graphic shows, the risks and threats in the water sector are highly integrated and often cause ripple effects in related areas.

#### ENVIRONMENTAL AND HEALTH RISKS

- Underfinanced infrastructure leads to lack or degradation of water supply systems which affects water quality

#### FINANCIAL RISKS

- Exposure of local administrations to market risk, financial health at risk
- Increased complexity in local administration operation with often scarce expertise
- Asymmetric expertise between cities and lenders creates incentives for obfuscation (socialized costs vs individualized profits)
- Current incentives discourage developers to achieve project completion to time and cost
- Water sector is characterized by quasi monopolies, who are often “too big to fail” creating further misguided incentives for effective market operation
- Conflicts of interest and corruption undermining market mechanics

#### PLANNING RISKS

- Pressure on cities to meet standards creates a financial burden and planning risks which restricts decision space towards other urban issues. Path dependencies are created

- Compromised decision-making process leads to sub-optimal infrastructure solutions
- Overall reduction in resilience due to increased complexity, interdependency and exposure to new vulnerabilities: systemic risk increases

### 3.2 Scientific analysis

Gawlik et al. provide an excellent first overview over current water issues in European cities in their “Urban Water Atlas for Europe” (2017). Within the wider literature the above risk groups can be allocated to different debates, with **environmental and health risks** as the longest established field. Here, key debates include pollution through the introduction of untreated wastewater into the landscape, securing drinking water, ecosystem management, climate change impacts and socio-economic issues (cf. Aboelnga et al. 2019, UN 2019). **Planning risks** are mostly discussed under the umbrella terms of urban resilience and vulnerability, and cover issues ranging from future challenges such as climate change to securing water resources and critical infrastructures (Revi et al 2014, O’Rourke 2007). **Financial risks** and their repercussions with regard to urban water infrastructure only entered the discourse more recently. Debates centre around changing governance practices, exposure of cities to market volatility and externalisation of costs into the future (Pike et al 2019, Grafe & Mieg 2019, Loftus & March 2016, Pryke & Allen 2019), while some authors point out the risk of corruption in water infrastructure projects (Butterworth & de la Harpe 2009). A key aspect of urban water is the **highly integrated nature of all these risks and dynamics**, which all need to be taken into consideration to achieve urban socio-environmental sustainability (Swyngedouw, Kaika & Castro 2002).

In the context of our two example cases specifically, local research reflects these larger debates as well:

The wastewater overflow pollution occurring in London due to ground sealing and the resulting legal case, triggered research into ways to overcome the issue (Tideway Strategic Study 2005). The implementation of the proposed solution, the Thames Tideway Tunnel, has been accompanied by critical research and commentary, pointing out planning and financial risks (Loftus & March 2019, Grafe & Hilbrandt 2019, Blaiklock 2017). Aside from research on the tunnel project specifically, research further investigated financial practices and resulting risks by key water infrastructure providers (Allen & Pryke 2013, O’Brien & Pike 2015), as well as central challenges in implementing the UWWTD in a precautionary manner (Smith 2010).

The European Commission’s legal case concerning Milan over ongoing lack of sufficient wastewater treatment, has caused a similar breadth of research in its wake. Early research on the case focusses on the 2000 corruption scandal and its negative effects, as well as the delayed implementation of institutional changes (Global Water Report 2001, Lobina & Paccagnan 2005). More recent publications highlight financial innovation and its effects (Cetti 2018), with the “Juncker Plan” playing a significant role in making the specific financial model work (Ref Ricerche 2017). Improving environmental impacts and implementation of the Water Framework Directive have been well documented (European Commission 2012). While planning risks are managed in close dialogue with the city administration (Cetti 2018).

## 3.3 Scientific uncertainty

### 3.3.1 Complexity

Of the three aforementioned risk groups, **environmental impacts and health risks provide the best understood area**. Target values are established and impacts of pollution are well monitored and understood. In terms of **planning risks, complexity increases** as decisions set pathways far into the future, increasing uncertainty and introducing new dependencies. Research in the context focuses foremost on questions of critical infrastructure, that is security of highly vulnerable infrastructure for the functioning of modern societies. The group of **financial risks introduces the greatest volatility**, as potential feedback loops and network effects are localized, and local administrations are potentially brought to financial collapse. Here, the **increasing complexity is even advantageous to some actors**, as they can then leverage superior knowledge vis-à-vis other less informed market actors. This dynamic adds potential conflicts of interest and provides an entry-point for corruption. The literature has not identified tipping points per se, but the network effects of systemic risk in the finance sector as well as the outcomes of lack of transparency and weak competition are well established.

### 3.3.2 Uncertainty

Even though differences in the implementation of the European Water Directives are practiced in the different member countries (cf. Smith 2000), **uncertainty as to the effects of environmental impacts is low**. In terms of the planning risks taken on by local administrations, complexity is largely due to **scientific uncertainty over future challenges** such as climate change, infrastructure vulnerability and economic issues. With respect to the financial risks, the 2008 financial crisis has exposed some of the localized effects of urban investment practices, while the scientific debate on the wider impacts of financialization on urban infrastructure has only recently been taken up (cf. Pryke & Allen 2019, Grafe & Mieg 2019, Pike et al 2019). The evidence points towards a number of risks developing in this sector and includes increasing obfuscation and complexity, the exposure of municipalities to market volatility and the socialization of costs while profits are individualized.

### 3.3.3 Ambiguity

**Ambiguity plays a key role in the water infrastructure sector**. Not only are solutions dependent on local specificities (existing infrastructure, investment practices, water availability, etc), but they are also dependent on a critical number of actors agreeing on which path to pursue. The Tideway Tunnel project shows how discrepant visions for the future can yield very different outcomes: environmental advocacy groups were supporting sustainable drainage systems as a solution for overcoming the sewage overflow issue, as opposed to the tunnel project which was favoured by investors and the water operator. One group was focussing on long-term sustainable solutions for the city, whereas the other was looking for those solutions that were financially lucrative and viable (cf. Grafe & Hilbrandt 2019).

Another key aspect of ambiguity is represented in the case of Milan: different interpretations of the facts can only exist if different actors are invited to participate in the process. The corruption scandal in the early phase of the project as well as the desire to avoid putting the water service concession out for tender shows how certain actors stand to gain from keeping processes behind closed doors (Butterworth & de la Harpe 2009). The

lack of legal requirements for public participation further emphasizes the structural deficiency towards making more viewpoints heard.

### 3.4 Relevance of the precautionary principle to the case

The key issues of the case relating to the precautionary principle are the **environmental and health risks** at the onset of the case studies, the **complexity related to the planning and financial risks**, the **uncertainty related to the long timescales** at play, as well as the **ambiguity resulting from the multitude of actors** involved in water issues. The precautionary principle touches upon all of these issues and acts as a driver in multi-risk environment, where it emphasizes certain aspects in lieu of others, thus shaping the overall trajectory of urban water systems in Europe.

## 4 Risk governance and the precautionary principle

### 4.1 Risk governance

The following section will examine the risk governance process, it follows the five steps of the IRGC framework, in order to find out whether these phases can be identified in the cases (see D2.1 Section 5).

#### 4.1.1 Pre-estimation

Access to **clean water and sanitation has been recognised as human right** by the United Nations General Assembly in 2010. Thus, defining water resources and sanitation as one of the most important aspects of human life. Consequentially, the position on risks by state actors and citizens regarding water and sanitation is an absolutist one. Standards are continually raised and improved, and the public tends to be aware of the quality of service they are provided. Industry actors tend to argue the other side of the coin, as to them water tends to be primarily and industrial resource. All these interactions are tightly regulated by the European Water Directives.

This high prioritization of water quality has led to the **overshadowing of other risks**: expensive measures introduce new dependencies and open the door to financial instability. This hints at the complexity inherent in the urban water sector. The OECD gives the following issues as the **key challenges of successful water governance** (OECD 2011): institutional fragmentation, ambiguous legislation, poor implementation, limited local scientific and technical capacity, unclear allocation of roles and responsibilities, unstable or insufficient revenue and funding, no long-term strategic plans and insufficient monitoring of performance. All of this leads to weak accountability and poor transparency. Many of these issues are found in the cases and give rise to different risks.

#### 4.1.2 Interdisciplinary risk estimation

Risk assessment was tied into long-winded legal proceedings, where after the reversal of burden of proof the cities were under pressure to present their solutions. The main aim was to provide adequate infrastructure for preventing overflows, **which infrastructures are to be built specifically was left to the cities.**



Here the stories diverge: in the case of London a strategic study was commissioned to achieve a consensus towards the most appropriate measure. The consensus process was commonly criticised, as the funding for the different sciences diverged significantly, and the resulting tunnel proposal was severely questioned by citizens favouring more sustainable long-term solutions rather than short-term technical fixes that disregard related issues such as future flood risks. As a result, the consultation process appeared to favour specific outcomes from the onset, silencing part of the discourse and discouraging input from social and environmental scientists.

Milan went about the construction of a complete waste water purification system for the city, which was overseen by a technical-scientific control committee put in place to check and verify the project for technological adequacy, reliability, costs and environmental impact. The committee itself was composed of a mix of experts and scientists from several fields from all over Italy. The entire operation of the water system was then handed over to MM Spa in 2003, an engineering company formerly in charge of the city's metro system and 100% owned by the municipality of Milan.

#### 4.1.3 Risk characterization

As stated before, environmental risks are characterized as intolerable, whereas secondary risks such as planning risks and financial risks are treated as much more tolerable. This **tolerance varies between the two cities**, London was willing to take much bigger risks both financially as well as in future flexibility. Milan followed a more conservative approach, keeping more options available for future challenges.

#### 4.1.4 Risk Evaluation

The risks occurring in the two cases have **not been subject to a collective risk evaluation**. Risks evaluations are spread out and differ across the early stages of the legal case, the pre-emptive studies, the tender-processes, the construction and finally the operation of the infrastructure asset. Taking these differences into account, the continued quality of service provided by the operator is still the most important risk, followed by hidden structural risks introduced by planning compromises and novel financial practices.

#### 4.1.5 Risk management

The precautionary principle acts as the trigger for the cases at hand. The European Commission invokes the precautionary principle through the EU Water Directives and applies it in the legal cases it brings against cities for failing to comply with the standards set out therein. Once the case is brought and the reversal of burden of proof occurs, the cities are in the position to come up with their own solutions. Here, the composition of actors and decision makers differs across contexts, as this is largely dependent on the configuration of that city's water sector. Here, the level of privatization and power of regulators plays a key role. The following process and configuration of key actors is then largely structured by the pre-emptive studies phase, the tender-process phase, construction phase and operation phase of the newly developed infrastructure. The power dynamics across this development vary widely dependent on the specific configuration of the city's water sector. In a more privatized context like London, investors hold more power at the costs of public oversight. An over-emphasis on profit maximization on their side can skew the entire development towards a more economically focussed logic, whereas the case of Milan holds strong oversight and long-term planning at the centre of the project, thus providing a more secure planning environment.



## 4.2 Political/juridical dynamics

This section examines those aspects of the precautionary principle that relate to regulatory measures, the section will be concluded with an overview over the cases legal history.

### 4.2.1 Threshold of damage

The primary risk of unmet water quality standards was put to the test in the two legal cases. Initial trigger was the continued missing of target values regarding the release of raw sewage into the environment. The legal cases thus centred on the lack of provision of adequate infrastructure according to paragraph 3,4 and 10 of the UWWTD. Both cities have since implemented different infrastructural solutions to overcome the challenge and as of 2020 meet the current standards. In the case of London questions are raised if the Tunnel project was necessary in the first place, as other regulatory changes have had an impact on improving the problem. Similarly, in Milan, the questionable BOT contracts established long-term path dependencies that heavily weighed on the flexibility and adaptability of the water system. **Secondary risks, resulting from the efforts to achieve solutions to the primary problem to cost and date, are not yet subject to the precautionary principle** in the water sector. Efforts have been made to integrate it with financial regulation after the last financial crisis, but the efforts have largely been eschewed by decision makers (Crotty & Epstein 2009, Ülgen 2016). Considering the immense costs tied to infrastructure investments, an argument could be made that a **mishandling of these funds meets a threshold of damage**, as the consequences often impact other essential services cities provide.

### 4.2.2 Cost effective/proportionality

The quality and sustainability of the infrastructural solutions themselves have not been part of the legal cases. This is largely due to the long construction and implementation periods. Neither proportionality nor cost-effectiveness were met in the case of London and investor interests prevailed. Here, the longer time frame of the Milan case provides some more accurate evidence towards the low political (delays, legal proceedings, protests), economic (transparency issues, restricted competition) and environmental (delayed implementation, binding of resources) sustainability of the awarded BOT contracts and resulting purification plants (cf. Lobina & Paccagnan 2005). **Cost effectiveness and proportionality were not met.**

### 4.2.3 Reversibility of the measure

As a consequence of the large investment costs, long construction periods, and far reaching financial schemes, commitments to overcome the legal challenge are not easily if at all reversed. Significant path dependencies have been committed, the longevity of these and the on-going struggles in overcoming their fallout have been documented in the Milan case and with its problematic BOT contracts. Systemic interdependence of infrastructure systems forecloses any short-term reversals and imply significant costs if a full reversal is intended. **Obduracy and path dependencies put in place by large-scale physical structures immensely restrict the reversibility** of implemented changes.

#### 4.2.4 Reversal of burden of proof

The European Commission has brought the first evidence underlying the legal case, the burden of proof has since been reversed, so that both cities were under the obligation to document their improved compliance to the UWWTD. Both cities did so successfully.

#### 4.2.5 Legal history

**EU water legislation is defined through the Water Framework Directive (WFD) and its daughter directives** (Groundwater Directive 2006/118/EC and the Priority Substances Directive 2013/39/EU). The precautionary principle is one of the core principles of the WFD and is established in article 11. These directives form the legal framework for European, national and regional policies for protecting water resources. These are further complemented by the Marine Strategy Framework Directive 2008/56/EC (MSFD), the Nitrates Directive 91/676/EEC (ND) and the Floods Directive 2007/60/EC (FD). Furthermore, the 'Water Industry Directives' (Urban Waste Water Treatment Directive 91/271/EEC (UWWTD), Drinking Water Directive 98/83/EC (DWD), and the Bathing Water Directive 2006/7/EC) provide complementary legislative tools for the safe management of sewage, the protection of drinking and bathing waters. These pieces of legislation form the backbone of water policy in the European Union and each address separate issues within the water sector. As these issues are still closely interrelated, these directives mutually impact compliance. The UWWTD fulfils an obligation of WFD to treat urban waste water (cf. EurEau 2017, p.5).

The precautionary principle was brought to bear in the two legal cases against both the United Kingdom and Italy for failing to comply with the UWWTD in the cities of London in Milan. The extensive nature of these problems and the long time necessary to overcome them characterizes the protracted legal cases. The following section summarizes these proceedings.

### LONDON

The London example is characterized by two court cases, the latter of which forms the core conflict.

CASE C-252/05 (Judgement ECLI:EU:C:2007:276)

The first case can be considered a pre-ambule to the latter legal case, as its subject is concerned with the definition of waste water and thus resulting obligations to improve the stormwater overflows for Thames Water.

CASE C-301/10 (Judgement ECLI:EU:C:2012:633)

The second case treats the non-compliance of the United Kingdom with the UWWTD (Urban Waste Water Treatment Directive, Council Directive 91/271/EEC) in London and Whitburn and threatens financial sanctions for ongoing breaches. The case is characterised by a long correspondence and meeting phase in which the UWWTD requirements are clarified and declared relevant for the case. The Thames Tideway strategic study is implemented, but the UK's response thereafter is still deemed lacking, thus advancing the legal procedures. The decision acknowledges the UK's failure to comply and orders it to bear the costs. Progress has been made to remedy the situation since, but problems persist. Details of the case taken from the final judgement are provided in the appendix.

## MILAN

The Milanese case consists of three legal proceedings, which represent the escalation of the failure of the Italian state to implement the UWWTD first nationally and then as consequence breaching regulations locally.

CASE C-302/95 (Judgement ECLI:EU:C:1996:502)

CASE C-195/97 (Judgement ECLI:EU:C:1999:100)

These cases form the pre-amble for the Milanese case, as they treat failure to implement the UWWTD on the national level.

CASE C-396/00 (Judgement ECLI:EU:C:2002:261)

This case treats the failure to comply with the UWWTD in Milan specifically. It mirror's the British legal case to a large extent: a long correspondence phase is characterised by inaction to solve the problem at hand. Three treatment plants were planned early on but construction had not yet begun, thus triggering the pursuit of the legal case. The decision finds Italy in breach of its obligations and orders it to bear the costs. The appendix contains a detailed summary of the case taken from the final judgement.

### 4.3 Other governance dynamics

As mentioned earlier, the water sector is highly integrated into complex urban systems and is **regulated at several levels**. EU Level guidelines set by WFD and its related directives are implemented locally by differing institutions. Foremost are the **local regulators** for the water sector. In the case of London this is Ofwat (Water Services Regulation Authority) and in case of Milan ARERA (L'Autorità di Regolazione per Energia Reti e Ambiente, before 2018 known as AEEGSI).

There exists also a dedicated **instrument for cooperation between economic regulators** to encourage innovation and transfer of knowledge on the European Level called WAREG (European Water Regulators). So far, this network includes 31 members with shared goals of sharing common practices, improving technical and institutional cooperation, promoting capacity building, providing/creating stable regulation, protecting consumers, as well as fostering open dialogue with EU institutions and stakeholders at international levels.

#### BOX 1: Gender Issues and Urban Water Infrastructure

As indicated earlier, the water sector is highly integrated and touches upon a multitude of societal dynamics. This includes several gender issues, ranging from the underrepresentation of women in the financial sector to the significance of bad water accessibility for women's everyday lives in many developing countries. This section will spotlight a key gender issue that is most relevant to the two cases and that illustrates some of these dynamics in the water sector.

##### **The Hidden cost of Birth Control**

Birth control has played a significant role for sexual self-determination of women and has become an integral part of modern societies. However, this sexual revolution comes with an infrastructural cost. The active ingredient in the majority of birth

control pills is **ethinyl estradiol (EE2)**, a pollutant that is very **difficult to remove from waste water** with ordinary purifying infrastructures currently in place within most cities in the EU. If it enters waterways it can have adverse effects on the **reproductive systems of fish** by causing a condition known as intersex (Owen & Jobling 2012).

In 2012 the European Commission announced that it intends to regulate EE2 under the WFD, then requiring countries to limit EE2 levels in their water bodies, establishing a global precedent for regulating pharmaceuticals in the environment (Owen & Jobling 2012). In order to successfully filter EE2 out during the purification process, Owen & Jobling calculate **significant upgrade costs** for existing purification plants to be about £8 million with operational costs of about £800.000 per year for a town of 250.000 inhabitants (id.). Across England and Wales this would add up to £30 billion for the 1400 existing waste water plants (id.).

The debate around this subject is mostly held outside the public sphere and without contribution of women's voices. The UK Royal Commission on Environmental Pollution has criticised this approach advocating for an inclusion of people's values and that "it is no longer acceptable for decisions to be negotiated privately between the regulator and polluter" (RCEP 1998).

The **immense costs associated with upgrading purification plants** across the EU emphasize again the significance the precautionary principle holds for urban infrastructure development by commandeering a potential second wave of costly upgrade requirements. It further stresses the significance of transparent consensus processes in which the public can make an informed decision as to how it **balances environmental impacts, sexual self-determination and allocation of scarce resources**.

EE2 is currently on the 1<sup>st</sup> WFD watchlist, a recent JRC report concludes that it will remain there for the 2<sup>nd</sup> iteration (European Commission 2018). No legal obligation to upgrade plants has been imposed yet.

## 5 The precautionary principle and its future

### 5.1 Reflection on the PP in the literature

Even though the precautionary principle lies at the very foundation of regulating urban water, it is rarely reflected upon. This has two reasons, first, as discussed in the risk governance section, it is **generally accepted that the precautionary principle applies** to the regulation of water and that the upholding of the highest standards is desirable. The significance for the human metabolism and its enshrinement as human right by the UN further solidify this rarely contested position. Second, repercussions of the application of the precautionary principle in terms of **risks generated elsewhere are rarely perceived as being directly related to the precautionary principle**. Thus, discussions often centre around issues of urban and financial sustainability in general, and less so as complex interactions of regulatory measures. Independently of water regulation, the precautionary principle is occasionally called upon as a principle for financial regulation or in the context

of critical infrastructure debates (Belluck et al. 2006, Crotty & Epstein 2009, Ülgen 2016). This uncontested position has led to the **firm establishment of a precautionary principle based regulatory regime** over urban water issues.

## 5.2 Innovation in the water sector

Innovation in the water sector is coordinated on the EU level through the **European Innovation Partnership on Water**. It is a forum established under the Water Framework Directive (WFD) with the aim to remove barriers to innovation in the water sector. Its activities are mostly related to technological innovations in the field. This report will **focus on financial innovations**, as their impacts are underrepresented, and their repercussions can be more far reaching than technological fixes.

This case differs from the other case studies in the regard that it is not a new product or technology that challenges the precautionary principle, but that it is the **ongoing raising of standards under the precautionary principle that fosters innovation**. The basic premise is this: cities are obliged to heavily invest in water infrastructure to meet the imposed requirements, they however lack the means to fulfil this duty. In the literature this is often referred to as the **'infrastructure gap'**, and actors on all sides and levels develop strategies to overcome it. This is the main source of innovation in the case, which is why this section will focus on financial R&I of the urban water infrastructure sector.

The cases provide two different perspectives on financial innovation in the field. The **London case focusses on a specific project** that employs a highly individualized financial strategy to the benefit of investors, whereas the **Milan case presents a perspective that is more focussed on the city's long-term needs**. Both of these had to employ financial innovation to develop a viable model for the cities' infrastructure development. However, how we pay for infrastructure influences what is to be built, how it is going to be done and the location where it will happen. Thus, a novel financial model introduces new variables into a city's water system, potentially introducing new risks and vulnerabilities.

## 5.3 Effect of the PP on innovation pathways

As stated before, the two cities utilized different strategies for overcoming their specific infrastructure gaps. Both of these strategies resulted in specific innovation pathways, which will be characterized separately below.

### London

The section on risk governance highlighted the decision-making process arriving at the Thames Tideway Tunnel (TTT) as the solution to London's water infrastructure problem. This section will move on from the pre-construction phase and will detail the specific project setup and implementation with a focus on the financial innovation occurring in this case of project finance.

Thames Water (TW) is the key actor for this project, they supply about 9 million customers with water and are responsible for the wastewater of about 15 million customers within South-East England (Thames Water 2019). TW was first privatized in 1989 and has since been subject to several takeovers and restructurings. This has resulted in lower credit ratings which mostly result from overleveraging of the underlying assets to finance these takeovers (Blaiklock, 2017). TW was first listed on the London Stock Exchange, but has

since been unlisted and employed an increasingly byzantine off-shore structure, which in 2012 consisted of 10 corporate layers between shareholders and the licensed water company, further increasing complexity. For example, the off-shore subsidiary Thames Water Cayman Island Finance Ltd. holds over half of Thames Water's £10 bn long-term debt. Ultimate owner of TW is the consortium of international investment funds Kemble Holdings Limited, who mostly refinance their investment debts by securitizing household revenue streams (cf. Allen and Pryke 2013).

TW financially weak position has resulted in the fact that project delivery is being implemented by a separate entity, Bazalgette Tunnel Limited (BTL), a new special-purpose company with an off-shore holding structure similar to that of TW. The financing scheme passes a proportion of the project costs on to Thames Water's customer bills, with an estimated £25 added per annum in the mid-2020s. Martin Blaiklock, an independent infrastructure finance expert states that this scheme where customers pay both during the construction phase as well as during service delivery is contrary to common investment principles, as it **transfers the project completion risk from utility company to the customer** (Blaiklock 2017). He concludes that "the incentive for contractors to achieve project completion to time and cost is now much diminished, if not eliminated. Furthermore, customers cannot manage, control or mitigate such risks" (id., p. 4).

Both TW as well as BTL are regulated by Ofwat (Office of Water Services), whose main responsibility lies in the negotiation of tariffs every 5 years based on Thames Water's business plans and Ofwat's internal Regulatory Assets Base Model (RAB). The relatively **weak negotiating position of the regulator** has been well acknowledged and has been much subject of recent politics within the United Kingdom's political process.

The documented increasing withdrawal from oversight mechanisms as well as the relatively weak position of oversight authorities has provided an environment in which **financial innovation occurs 'in the dark'**, and at the cost of future risks (cf. Grafe in review). The mechanism succeeds in providing the necessary financial capital but obfuscates key categories that are necessary for cities to manage their planning risks.

## **Milan**

As the previous sections have shown, the case of Milan was characterised by a rocky start. Corruption, lack of transparency, legal proceedings as well as costly BOT contracts have provided for a burdensome heritage for MM Spa to sort through. This section will focus on the activities that are trying to overcome these challenges in more recent years.

MM Spa itself is a joint-stock company 100% owned by the Municipality of Milan. Originally primarily an engineering company and formed in 1955 for the construction of Milan's metro system, it today covers both mobility and infrastructure engineering as well as management duties for municipal housing and other public assets (cf. Cetti 2018). Outside these core activities MM Spa also engaged in international business with a joint venture in Moscow with Millenium Bank, part of the Russian Railways group, which shortly thereafter went bankrupt and lost its banking license (cf. Central Bank of the Russian Federation 2016).

The territory and duties for operations of MM Spa is defined by the restructuring of water supply and sanitation operations in Italy through the 1994 Galli Law. According to it, responsibility for water supply and sanitation is transferred to a public authority called ATO (Ambito Territoriale Ottimale). The ATO's governing body selects the water operator and determines the organizational form for water operations. It further carries the



responsibility for surveying infrastructure, developing the investment program, setting tariffs, and regulating the water operator. This is done via the technical secretariat within the administrative structure of the municipality of Milan.

This sets the framework within which actors aim to provide adequate solutions despite historical baggage and pressing future challenges. Here, innovation is key for optimizing services and achieving long-term goals of the city. This section will highlight the innovative process employed in Milan to overcome this challenge.

Following the 2014/2015 updates to the ATO plan, MM Spa was presented with the challenge of developing an investment strategy to match the plan's requirements to maintain the current level of service as well as adapt the system to future technical and environmental challenges (ATO 2015).

The key innovative moment is the **bilateral development of principles for the financial strategy design and execution between MM Spa and the municipality**. This is done to balance the system's long-term requirements with financial viability and current economic opportunities. Stefano Cetti, the director general of MM Spa, summarizes these as follows (Cetti 2018, p.279):

- total IWS financial needs coverage
- source diversification
- risk and collateral minimization
- increase in debt maturity

The first aspect refers to the principle that the total financial needs of the system up until 2037 (the end of the concession of the system to MM Spa) have to be covered, while guaranteeing coherence between old and newly employed tools, acknowledging current obligations and avoiding the resurgence of refinancing risks (Cetti 2018). Source diversification refers to the fact that MM Spa aims to take advantage of favorable market conditions and be able to employ different financial instruments outside of traditional bank loans that line up with tariff and investment projections. In order to be able to do this MM Spa acquired credit ratings at the corporate level from Moody's and Standard & Poor's. As a result of this diversification, risks are spread more widely (id.). Risk and collaterals minimization further refer to the fact that the overarching aim is self-sufficiency, thus it aims to minimize risks both to MM Spa as well as the municipality of Milan resulting from instruments that require specific collaterals. The final aspect focusses on the use of financial instruments that have the same duration as the lifetime of the underlying assets. This greatly extends the debt duration, thus heavily emphasizing long-term instruments with a duration of up to 20 years (id.).

These principles were successfully put to practice with the employ of two financial instruments: first by issuing institutional amortizing notes for an amount €100 mln , to be listed on the regulated Main Securities Market of the Irish Stock Exchange; and second the negotiation with the European Investment Bank (EIB) for a credit facility of €70 million. Both instruments are innovative on several levels in reference to Italian water sector practices (cf. Cetti 2018).

## 5.4 Innovation principle

The innovation principle has not been invoked in either of the two cases. The cases however make an interesting argument for the **innovation dimension already being contained within the precautionary principle**. As stated before, this case study differs in the regard that it does not have the introduction of a new technology or product as its subject, but that it inspects the consequences of the ongoing employ of the precautionary principle as a guiding principle in the water sector.

The first occurrence of innovation is within the financial sector, where the precautionary principle creates a need that could not be met by existing strategies and tools, which thus encourages the development of new solutions. This stimulating effect triggered a plethora of financial innovation across Europe. A critique could be made of the fact that this **innovation is unintended and thus unguided**, often resulting in the shifting of risks from one area to the next. The resulting vacuum from the precautionary principle implementation through the UWWTD has provided an arena in which, as illustrated in the London case, financial innovation can take advantage of obfuscation strategies and profit of off an imbalance of knowledge between actors. However, the Milan case shows how even despite a difficult starting proposition, financial innovation can occur in a sustainable and impactful manner.

The **second area of innovation is within the development of the infrastructural solutions themselves**. The Tideway Tunnel project is filled with technological innovations that make the construction of a tunnel under a river across the breadth of city possible. The project itself greatly stimulated the logistics, construction and engineering across the city. Similar patterns occurred in Milan, where individual solutions won awards for their innovative approaches (cf. Gruppo CAP 2019).

**Outside of the two case studies, the innovation principle has been raised in two occasions:** Firstly, an innovation principle workshop on water reuse for agricultural irrigation and aquifer recharge took place in 2017, the discussion resulted in several policy recommendations enabling effective implementation of water reuse policies in the EU (cf. European Commission 2017a). Furthermore, the interim report on the evaluation of the precautionary principle makes an argument for a recently initiated voluntary 'Innovation Deal' pilot on sustainable waste water treatment through anaerobic membrane technology as an implementation of the precautionary principle (Renda et al 2019, European Commission 2017b). This innovation deal resulted in a report detailing hurdles for the implementation of anaerobic membrane technology for waste water treatment and argues for the initiation of pilot studies. So far this innovation deal had no impact on policy (cf. Renda et al 2019).

## 6 Synthesis

The invocation of the precautionary principle in the context of the European Water Directives has far reaching consequences. Not only does it facilitate precautionary measures in the regulation of the water sector, but it inadvertently triggers secondary risks in the highly complex and integrated infrastructure sector where it is to be implemented.

Given the quintessential role of water for the human metabolism, which has been codified by the UN as a human right to clean water and sanitation, the application of the precautionary principle is adequate. However, the **highly integrated nature of the**



**water sector makes it difficult to see all repercussion of the application of the precautionary principle.** The plethora of directives born from the WFD illustrates this complexity. This report focusses foremost on issues related to the UWWTD and has shown how in this particular realm the conceptual core of the precautionary principle is put under tension. Scientific uncertainty is defined by increasing complexity across the three risk groups. The financial risk group becomes even further complicated by the fact that certain actors profit from this complexity and instrumentalize it to their own ends. This emphasizes the **critical role of ambiguity** in the sector, as costs and impacts are spread across society for extended periods of time, the consensus process itself is critical for successful project developments. As the cases have shown, **transparency is a fundamental issue for achieving balanced solutions** which take the multi-risk environment and long timescales into consideration. These uncertainties become further complicated by the fact that decision making processes are always defined by those actors who end up at the table. Their particular evaluation of significant timescales, complex interrelations of risks and eventual personal benefits have significant impact on whether solutions will be achieved proportionally and in a cost-effective manner. The obduracy of the solutions stands in direct opposition to the reversibility of measures and outlines the significance of path dependencies born from the decision-making processes.

The **governance of these processes has differed significantly between the cases.** London's case with the focus on an individual infrastructure project has shown how across the project's phases (pre-emptive studies phase, the tender-process phase, construction phase and operation phase) risk governance has evolved and how this evolution has impacted the final infrastructure project. The longer-term perspective on Milan has shown how questionable practices have improved over time and how this experience has informed a better-balanced process for financial planning.

The legal histories represent these differing storylines: London's case begins with a private sector actor, Thames Water, contesting the definition of waste water, in order to avoid the implementation of costly infrastructure upgrades. Only thereafter does it escalate to a state level UWWTD case. This shows how the issue in London is more of a bottom up process, where local issues and actors escalate the conflict to the European level. Milan's case on the other hand is characterized by an opposite trajectory: state level implementation of the UWWTD is slow and initial legal trigger, thus causing even more hesitance locally in overcoming the problem. Only when the state level issues become resolved does the local implementation move ahead. This exemplifies **where the decision makers are located in the two differing water systems**, and what the impacts of this dynamic are for the implementation of precautionary principle based regulation.

The role of innovation also differs significantly across the cases. As argued before, innovation occurs at different stages and levels of the process, with both cases employing technological innovations to overcome their specific issues, however, the more interesting aspect is the financial constructs they devise in order to fill the infrastructure funding gap.

London's individual infrastructure case shows how the implementation of a **market-based strategy** skews the selection of actors and the resulting decision-making process towards an **overly economically focussed solution**, that fails to address some of the long-term planning and financial risks. The viability of this strategy will only become known with time, the early phase of the Milan case though provides some evidence towards the risks inherent in this strategy.

Milan presents the longer-term perspective and the effects of past decisions in terms of path dependencies for the adaptation of the water system to future challenges. The process that was developed was informed by the complicated history of the case and innovative in the regard that it developed a **process that involved a more balanced set of opinions during the decision-making process** than the previous case.

Tensions between the precautionary principle and innovation principle are thus as follows. The **precautionary principle sets a high-level guiding principle** for the water sector with far reaching repercussions. Some of these repercussions **stimulate innovation in different areas, though not always to the benefit of the cases**. A more thorough understanding/definition of the innovation dimension inherent to the precautionary principle would equip cities with a broader arsenal of tools for overcoming the infrastructural gap.

All of these findings mirror Koop and Van Leeuwen's **key elements for good water governance** (see box 1). Particularly the first element's emphasis on a shared long-term perspective becomes evident and is further supported by the second and third element for the involvement of all affected actors and acknowledging the complexity and long-term effects. Resulting from this, better long-term solutions can be implemented (4). The sharing of data (5) and the role of financial innovation have been well documented in the cases (6). Effective monitoring (7) functions as quality assurance and as means to remain on track for long-term goals.

#### **BOX 2: Key Elements for Good Water Governance (Koop and Van Leeuwen 2016)**

1. Develop a shared long-term vision between stakeholders.
2. Involve civil society and the commercial sector, along with stakeholders: recognising that citizens and private businesses can individually contribute to success.
3. Manage the process and expertise: to address the complexity of the challenge, conflicting interests, and the need to remain focused on a long-term vision.
4. Stop excessive focus on technology development: recognising that good governance is equally essential for success.
5. Make data accessible, and share knowledge.
6. Carry out a thorough cost-benefit analysis and remove financial barriers: Success is not dependent on simply providing more money. Limited finance can drive innovation, improve stakeholder cooperation, and help leverage new funding sources.
7. Monitor implementation: Legislation and a good strategy must be supported by a demonstration that implementation and achievements progress as intended

This case study for the role of the precautionary principle for urban waste water infrastructure provision thus stands out for several reasons:

- It provides a **reverse perspective on the precautionary principle**: it does not follow the introduction of a new product or technology in tension with the precautionary principle, but it follows the long-term impacts of a precautionary principle regime for cities

- It emphasizes the **significance of ambiguity** in a highly complex sector, and how this dimension implies the importance of transparent and effective decision-making processes for successful solutions
- It shows how **implementation strategies of EU Regulations** is effectively handled both from a bottom up process (London) and a top down implementation (Milan)
- It shows **how the precautionary principle interacts with a highly complex multi-risk environments** and how the handling of primary risks can create secondary risks elsewhere
- It **raises questions for the definition of the threshold of damage**: in the cases primary damage is not to the health of citizen, but to financial viability of cities. Immense costs and obligations significantly impact how they can maintain other essential services to citizens
- It details the **innovation dimension inherent in the precautionary principle**

## 7 Conclusion

The wise approach to urban planning is that cities should plan and invest in advance to prepare for future challenges. As we have shown, this is not always possible, especially in a scenario where immense costs and future commitments are put upon cities by increasing legal requirements. This often leads to more **reactive and ad-hoc implementation of infrastructural solutions**. This dynamic paired with the vested interests of certain actor groups in the water sector increases the **risk of the creation of 'white elephants'**, that is expensive infrastructure assets that are more trouble in the long-run than they are worth in the short-term. The case of London provides a classic example of this dynamic. The case of Milan on the other hand shows how past experience and a pro-active use of the innovation aspect of the precautionary principle can foster an **innovative environment that achieves good local governance practices and transparent processes** that help avoid the creation of further white elephants.

The precautionary principle's impact on European cities by means of the WFD and its daughter directives is immense. The repercussions of these are not yet fully explored, especially when it comes to the innovation aspect. A more thorough examination of the innovation dimension contained within the precautionary principle would further our understanding of the risk dynamics in highly integrated environments such as the water sector and consequentially qualify the precautionary principle as a mechanism that tries to evaluate the whole picture. The innovation principle on the other hand appears as even less competent in this regard, especially when viewed from an angle as complex as urban water infrastructure.

Both precaution and innovation have guided the symbiotic development of human society and its cities for centuries. As both of these grow ever more complex, the evaluation of repercussions and risks becomes ever more difficult. As the case studies have shown, open, transparent and egalitarian processes help navigating contemporary multi-risk environments with more success.

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## 9 Appendix

### 9.1 Judgment of the Court (First Chamber), 18 October 2012, ECLI:EU:C:2012:633

#### Judgment

1 By its application, the European Commission requests the Court to declare that, by failing to ensure that appropriate collecting systems pursuant to Article 3(1) and (2) of, and Annex I(A) to, Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment (OJ 1991 L 135, p. 40) are in place in Whitburn and at Beckton and Crossness in London and that appropriate treatment is provided with regard to waste waters from the Beckton, Crossness and Mogden treatment plants in London pursuant to Article 4(1) and (3) and Article 10 of, and Annex I(B) to, Directive 91/271, the United Kingdom of Great Britain and Northern Ireland has failed to comply with its obligations under those provisions.

#### Legal context

2 According to Article 1 thereof, Directive 91/271 concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors. Its objective is to protect the environment from the adverse effects of waste water discharges.

3 Article 2 of Directive 91/271 states:

'For the purpose of this Directive:

1. "urban waste water" means domestic waste water or the mixture of domestic waste water with industrial waste water and/or run-off rain water;

...

5. "collecting system" means a system of conduits which collects and conducts urban waste water;

6. "1 p.e. (population equivalent)" means the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 g of oxygen per day;

...'

4 Article 3 of Directive 91/271 provides:

'1. Member States shall ensure that all agglomerations are provided with collecting systems for urban waste water,

- at the latest by 31 December 2000 for those with a population equivalent (p.e.) of more than 15 000 ...

2. Collecting systems described in paragraph 1 shall satisfy the requirements of Annex I(A). ...'

5 As set out in Article 4 of Directive 91/271:

'1. Member States shall ensure that urban waste water entering collecting systems shall before discharge be subject to secondary treatment or an equivalent treatment as follows:

- at the latest by 31 December 2000 for all discharges from agglomerations of more than 15 000 p.e.,



...

3. Discharges from urban waste water treatment plants described in paragraphs 1 and 2 shall satisfy the relevant requirements of Annex I(B). ...

4. The load expressed in p.e. shall be calculated on the basis of the maximum average weekly load entering the treatment plant during the year, excluding unusual situations such as those due to heavy rain.'

6 Article 10 of Directive 91/271 provides:

'Member States shall ensure that the urban waste water treatment plants built to comply with the requirements of Articles 4, 5, 6 and 7 are designed, constructed, operated and maintained to ensure sufficient performance under all normal local climatic conditions. When designing the plants, seasonal variations of the load shall be taken into account.'

7 Annex I to Directive 91/271, entitled 'Requirements for urban waste water', provides in Section A, headed 'Collecting systems':

'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 not entailing excessive costs, notably regarding:

- volume and characteristics of urban waste water,
- prevention of leaks,
- limitation of pollution of receiving waters due to storm water overflows.'

8 Footnote 1 to Annex I(A) to Directive 91/271, placed at the heading 'Collecting systems', is worded as follows:

'Given that it is not possible in practice to construct collecting systems and treatment plants in a way such that all waste water can be treated during situations such as unusually heavy rainfall, Member States shall decide on measures to limit pollution from storm water overflows. Such measures could be based on dilution rates or capacity in relation to dry weather flow, or could specify a certain acceptable number of overflows per year.'

9 Annex I(B) to Directive 91/271, headed 'Discharge from urban waste water treatment plants to receiving waters', sets the requirements that must be satisfied by discharges from urban waste water treatment plants into receiving waters. The footnote to Annex I(A) to the directive, cited in the preceding paragraph, is reproduced in Annex I(B).

#### Pre-litigation procedure

10 The Commission received a complaint concerning the Whitburn Steel pumping station and other complaints regarding excessive storm water overflows in other parts of the United Kingdom.

11 On 3 April 2003 the Commission sent a letter of formal notice to the United Kingdom in which it stated that the Whitburn Steel pumping station failed to comply with the urban waste water collecting obligations imposed by Article 3(1) and (2) of, and Annex I(A) to, Directive 91/271.

12 In its reply of 3 June 2003, the United Kingdom stated that the agglomeration in question met the collecting obligations set out in Article 3 of Directive 91/271. However, it accepted that, following further investigations of the collecting system in the area, it was necessary to improve the pass forward flow in that system. Moreover, the United Kingdom explained that the discharge consent conditions under which the water company was operating the Whitburn Steel sewage pumping station had been changed, as a result of which fewer discharges were to be expected. Those improvements were expected to be completed by 31 March 2004 at the latest.

13 On 21 March 2005 the Commission sent a second letter of formal notice to the United Kingdom in which it stated that the urban waste water collecting and treatment systems in

the London area failed to comply with the obligations on the collecting and treatment of urban waste water imposed by Article 3(1), Article 4(1) and (3) and Article 10 of, and Annex I(A) and (B) to, Directive 91/271. The Commission stated that untreated waste water was being discharged into the River Thames, even in moderate rainfall conditions, and that no immediate measure was foreseen to resolve that problem, which would therefore persist and even grow worse.

14 In its reply of 20 May 2005, the United Kingdom explained that the waste water collecting system for London was a combined system that collected and conveyed domestic and industrial waste water and run-off rainwater from a catchment of 557 km<sup>2</sup> for secondary treatment at the Beckton, Mogden, Crossness, Long Reach and Riverside treatment plants prior to discharge into the River Thames. However, it accepted that there were problems related to the volume, load and frequency of wet weather discharges resulting from overflows in announcing its decision to establish the Thames Tideway Strategic Study ('the TTSS') to assess the environmental impact of such discharges.

15 With regard to its obligations to provide adequate treatment of urban waste waters, the United Kingdom stated that, while improvements would be completed as soon as possible, the treatment plants serving the London agglomeration had been compliant with the requirements in Directive 91/271 since 31 December 2000. Also, the United Kingdom explained that the discharges of August 2004 occurred due to unusually heavy rainfall.

16 Since the Commission was not satisfied with the United Kingdom's response, by letter of 10 April 2006 it sent a reasoned opinion to the United Kingdom stating that, in its view, the United Kingdom had failed to fulfil its obligations under Article 3(1) and (2) of, and Annex I(A) to, Directive 91/271 in relation to Whitburn and its obligations under Article 3(1), Article 4(1) and (3) and Article 10 of, and Annex I(A) and (B) to, Directive 91/271 in relation to the nine treatment plants serving the Greater London area.

17 In reply to the reasoned opinion, the United Kingdom, by letter of 15 June 2006, stated that the whole collecting system and the treatment plants serving Whitburn and the metropolitan agglomeration of Sunderland were in compliance with Directive 91/271.

18 Following a meeting on 6 July 2007 between representatives of the Commission and of the United Kingdom, the latter provided clarification on that issue by letter of 23 October 2007.

19 In relation to the situation in London, the United Kingdom replied that, while improvements needed to be made to the treatment plants at Beckton, Crossness and Mogden, that did not mean that those treatment plants were in breach of Directive 91/271. The United Kingdom, in accepting the need for those improvements, was simply showing its desire to provide a higher level of environmental protection.

20 At a meeting on 26 January 2007, representatives of the Commission and the United Kingdom discussed the two possible options for London, which had been suggested by the TTSS report, and the United Kingdom decided to opt for the single 30 km tunnel along the length of the River Thames and the separate tunnel for its tributary, the River Lee. The whole project was to be completed by 2020.

21 Following two further letters of 29 June 2007 and 4 February 2008 sent by the United Kingdom, the Commission, which was still not satisfied with the replies provided by the United Kingdom, issued by letter of 1 December 2008 an additional reasoned opinion in which it clarified its interpretation of Directive 91/271 in relation to the obligations on Member States to control the release of urban waste waters through storm water overflows. It also confirmed its concerns in relation to the inadequacy of the collecting system put in place around Whitburn, of the collecting systems of Beckton and Crossness, and of the treatment plants at Mogden, Beckton and Crossness.

22 However, the Commission decided not to pursue the case further with regard to the collecting systems and the treatment plants in Beddington, Esher, Crawley, Deephams, Hogsmill, Long Reach and Riverside. The Commission thus called upon the United Kingdom to take the necessary measures to comply with the additional reasoned opinion within two months of receipt thereof.

23 Exchanges of correspondence and meetings between the Commission and the United Kingdom then ensued, but did not result in a solution.

24 Since the Commission was still not satisfied with the response provided by the United Kingdom, it decided to bring the present action.

The action

Arguments of the parties

25 The principal points of disagreement between the Commission and the United Kingdom concern the interpretation of Directive 91/271.

26 In the Commission's view, Member States are obliged to ensure that a collecting system is designed and built so as to collect all the urban waste water generated by the agglomeration it serves and that that waste water is conducted for treatment. The capacity of the collecting system must therefore be able to take into account natural climatic conditions (dry weather, wet weather, even stormy weather) as well as seasonal variations, such as non-residential populations, tourists and seasonal economic activities.

27 It submits that 'storm water overflows', referred to in Annex I(A) to Directive 91/271, are a part of urban waste water collecting systems and treatment facilities. The directive must be interpreted as providing for an absolute obligation to avoid spills from storm water overflows save for exceptional circumstances. That reasoning is reflected in footnote 1 to Annex I(A) to Directive 91/271 which provides that in practice it is not possible to collect and treat all waste waters 'during situations such as unusually heavy rainfall'.

28 The Commission puts forward factors such as the frequency and the volume of the overflows to show that there has been a failure to fulfil obligations under Directive 91/271. Contrary to what the United Kingdom fears, it does not propose a strict 20 spill rule but points out that, the more an overflow spills, particularly during periods when there is only moderate rainfall, the more likely it is that the overflow's operation is not in compliance with Directive 91/271.

29 The Commission and the United Kingdom also disagree in relation to the significance that must be attributed to the concept of 'best technical knowledge not entailing excessive costs' ('BTKNEEC') which is prescribed in Annex I(A) to Directive 91/271.

30 The Commission submits that that concept must be read in the context of Directive 91/271, of its aims and of its objectives, namely to protect the environment from the adverse effects of waste water discharges.

31 It submits that the concept of BTKNEEC allows Member States to choose between several solutions that promote compliance with both the provisions and the objective of Directive 91/271, such as building new or increased storage facilities or diverting rainwater before it can enter the collecting systems.

32 In the United Kingdom's view, Directive 91/271 must be interpreted as leaving it to Member States to determine the manner in which urban waste water should be collected and treated in order to realise the directive's objective, which is to protect the environment from the adverse effects of waste water discharges.

33 The United Kingdom considers that Directive 91/271 must be interpreted by reference in particular to the environmental impact of discharges on receiving waters.

34 So far as concerns the concept of 'unusually heavy rainfall', the United Kingdom considers that the fact that footnote 1 to Annex I(A) to Directive 91/271 expressly acknowledges that it will not be possible to avoid discharges in particular circumstances, notably when there is unusually heavy rainfall, does not impose an absolute obligation to avoid discharges in other circumstances. It considers that whether discharges are appropriate in other circumstances is to be determined by application of the concept of BTKNEEC and an assessment of the environmental impact of the discharges on receiving waters.

35 In the view of the United Kingdom, Directive 91/271 does not lay down requirements regarding the circumstances in which or the frequency with which discharges into receiving waters may occur. To evaluate whether collecting systems or treatment plants conform with

Directive 91/271, a detailed assessment of the performance of the collecting system or the treatment plant concerned must be carried out by reference to the environmental impact of the discharges on receiving waters.

36 The concept of 'sufficient performance' provided for in Article 10 of Directive 91/271 must also be assessed in light of the objective of protection of the environment as set out in Article 1 of the directive and therefore by reference to the impact on receiving waters.

37 While the Commission does not take issue with the United Kingdom's methodology for calculating what constitutes a single spill event, that does not, in the United Kingdom's submission, resolve the problem linked to the fact that the definition of a spill event may differ from one Member State to another. There would therefore be no guarantee of consistency of approach across Member States if compliance with Directive 91/271 were to be determined by reference to the occurrence and frequency of spills.

38 The United Kingdom also submits that the Commission errs by basing the determination that collecting systems and treatment plants are compliant with Directive 91/271 on the volume of spills.

39 So far as concerns, more specifically, the agglomeration of Sunderland (Whitburn), the Commission complains that, at the date of the expiry of the deadline fixed in the additional reasoned opinion, excessive storm water overflows from the Whitburn leg of the Sunderland collecting system were still occurring and that that system was therefore not compliant with Article 3 of, and Annex I(A) to, Directive 91/271.

40 While the frequency of the spills has been reduced (in the years 2002 to 2004, between 56 and 91 spills per year and annual volumes of untreated urban waste water discharges of between 359 640 m<sup>3</sup> and 529 290 m<sup>3</sup>), the collecting system is still not compliant with the requirements of Directive 91/271, particularly given the close vicinity of the bathing waters in Whitburn and Seaham and the numerous complaints received by the Commission concerning debris on the beaches around Whitburn.

41 The United Kingdom considers that those storm water overflows are compliant with Directive 91/271.

42 The United Kingdom also submits that the bathing waters around Whitburn have been found compliant with Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water (OJ 1975 L 31, p. 1) and that they are thus compliant with Directive 91/271. Furthermore, it is unlikely that the debris comes from Whitburn, but rather from the Tyne where the overflow channels were not equipped with screens until the end of March 2010.

43 As regards the agglomeration of London, the Commission alleges that the frequency and quantity of discharges of untreated waste water from the Beckton and Crossness collecting systems and the Beckton, Crossness and Mogden treatment plants are of such a magnitude as to constitute a breach of Articles 3 and 4 of, and Annex I(A) to, Directive 91/271, in particular given that those spills occur even during times of moderate rainfall.

44 Also, it submits that Article 10 of Directive 91/271 requires urban waste water treatment plants built to comply with the requirements of Article 4 of the directive to be designed, constructed, operated and maintained to ensure sufficient performance under all normal local climatic conditions.

45 The United Kingdom considers that those treatment plants satisfy the provisions of Directive 91/271.

46 It also notes that the London sewerage network is very old and has been progressively upgraded since 1875. Improvements have been examined and carried out since the adoption of Directive 91/271. Furthermore, the scale and exceptional nature of the works that are being carried out on the River Thames, at a cost of GBP 4.4 billion, mean that they require a lot of time. It submits that it cannot be penalised for implementing, in the long term, an ambitious solution.

Findings of the Court

## Interpretation of Directive 91/271

47 As stated in the second paragraph of Article 1, the objective of Directive 91/271 is to protect the environment from the adverse effects of urban waste water discharges (see, *inter alia*, Case C-280/02 Commission v France [2004] ECR I-8573, paragraph 13).

48 The objective pursued by Directive 91/271 goes beyond the mere protection of aquatic ecosystems and seeks to conserve man, fauna, flora, soil, water, air and landscapes from any significant adverse effects of the accelerated growth of algae and higher forms of plant life that results from discharges of urban waste water (Commission v France, paragraph 16).

49 The concepts of 'sufficient performance' appearing in Article 10 of Directive 91/271, 'unusually heavy rainfall' mentioned in footnote 1 of Annex I to the directive and 'best technical knowledge not entailing excessive costs' (BTKNEEC) referred to in Annex I(A) to the directive should be interpreted in the light of that objective, but also of Article 191 TFEU.

50 First, the concept of 'sufficient performance', which concerns only treatment plants, does not have its scope defined numerically, as Article 10 of Directive 91/271 provides only that treatment plants must ensure 'sufficient performance under all normal local climatic conditions' and taking account of seasonal variations of the load when those plants are designed.

51 In this connection, the Court has already found a failure to fulfil obligations in cases where the collection or treatment rate for urban waste water amounted to 80% or even 90% of the existing load (judgments of 7 May 2009 in Case C-530/07 Commission v Portugal, paragraphs 28 and 53, and 14 April 2011 in Case C-343/10 Commission v Spain, paragraphs 56 and 62).

52 Indeed, given the objective pursued by Directive 91/271, recalled in paragraphs 47 and 48 of the present judgment, failure to treat urban waste water cannot be accepted under usual climatic and seasonal conditions, as otherwise Directive 91/271 would be rendered meaningless.

53 Thus, it is established that, in order to meet the objective of protecting the environment, the concept of 'sufficient performance', although not defined numerically, must be understood as meaning that, under usual climatic conditions and account being taken of seasonal variations, all urban waste water must be collected and treated.

54 Consequently, failure to treat urban waste water can be tolerated only where the circumstances are out of the ordinary, and it would run counter to Directive 91/271 if overflows of untreated urban waste water occurred regularly.

55 Second, the concept of 'unusually heavy rainfall' in footnote 1 of Annex I to Directive 91/271 applies to the collecting systems provided for in Article 3 of the directive and to the treatment plants provided for in Article 4.

56 By that footnote, the European Union legislature acknowledged that situations exist in which all the urban waste water will not be capable of being collected or treated. In particular, it stated that 'it is not possible in practice to construct collecting systems and treatment plants in a way such that all waste water can be treated' and it provided that failure to collect and treat waste water may be tolerated during 'situations such as unusually heavy rainfall'. However, in that case, Member States are to decide on 'measures to limit pollution from storm water overflows'.

57 It is clear that the term 'unusually heavy rainfall' is mentioned in footnote 1 of Annex I to Directive 91/271 by way of illustration only, since the term is preceded by the words 'during situations such as'. Thus, failure to collect or treat waste water may also be allowed in other circumstances.

58 However, contrary to the United Kingdom's assertions, the objective pursued by Directive 91/271 does not permit the inference that it is normal and common for those other circumstances to arise, in particular as the word 'unusually' clearly indicates that failure to collect or treat waste water cannot occur in normal circumstances.

59 The United Kingdom's line of argument seeking acceptance that discharges might take place even outside exceptional situations cannot therefore be upheld.

60 Furthermore, it should be pointed out that, where a Member State is faced with an exceptional situation not allowing it to collect or treat waste water, it remains obliged to adopt appropriate measures to limit pollution under footnote 1 of Annex I to Directive 91/271.

61 Also, since the concept of 'unusually heavy rainfall' is not defined by Directive 91/271, it is legitimate for the Commission, in carrying out its supervision of compliance with European Union law, to adopt guidelines and, as the Court does not have jurisdiction to define numerically obligations laid down by that directive, the concept of 'unusually heavy rainfall' must therefore be assessed in the light of all the criteria and conditions prescribed by the directive, in particular the concept of BTKNEEC.

62 Third, the concept of BTKNEEC, which is mentioned in Annex I(A) to Directive 91/271, must, like the other concepts referred to by Directive 91/271 that have already been elaborated upon, be examined in the light of the objective of protecting the environment. Also, it is to be noted that the obligations of that directive which require the collection and treatment of all waste water, except in the case of exceptional or unforeseeable events, must be complied with at the date laid down by the directive.

63 Although the concept of BTKNEEC appears in Annex I(A) to Directive 91/271 only in relation to collecting systems, it nevertheless constitutes a concept inherent in all the provisions of Directive 91/271 designed to secure its objective of protecting the environment whilst avoiding too strict an application of the rules laid down. Thus, that concept is also to be extended to treatment plants in so far as in certain cases it allows discharges of untreated waste water even though the latter has adverse effects on the environment.

64 The concept of BTKNEEC thus enables compliance with the obligations of Directive 91/271 to be secured without imposing upon the Member States unachievable obligations which they might not be able to fulfil, or only at disproportionate cost.

65 However, in order not to undermine the principle set out in paragraph 53 of the present judgment that all waste water must be collected and treated, the Member States must invoke disproportionate costs of that kind by way of exception only.

66 In this connection, it should be borne in mind that, in accordance with settled case-law, a Member State may not plead practical or administrative difficulties in order to justify non-compliance with the obligations and time-limits laid down by a directive. The same holds true of financial difficulties, which it is for the Member States to overcome by adopting appropriate measures (judgment of 30 November 2006 in Case C-293/05 Commission v Italy, paragraph 35 and the case-law cited).

67 The concept of BTKNEEC must be examined by weighing the best technology and the costs envisaged against the benefits that a more effective water collection or treatment system may provide. Within this framework, the costs incurred cannot be disproportionate to the benefits obtained.

68 In that context, account will have to be taken, as the United Kingdom submits, of the effects of the discharges of untreated waste water on the environment and in particular on the receiving waters. The consequences that those discharges have for the environment would thus enable examination as to whether or not the costs that must be incurred to carry out the works necessary in order for all urban waste water to be treated are proportionate to the benefit that that would yield for the environment.

69 Should it prove impossible or very difficult to collect and treat all the waste water, it will be for the Member State concerned to demonstrate that the conditions for applying the concept of BTKNEEC are met.

70 It is true that the Court's case-law provides that in proceedings under Article 258 TFEU for failure to fulfil obligations it is for the Commission to prove the allegation that the obligation has not been fulfilled. It is therefore the Commission's responsibility to place before the Court the information needed to enable the Court to establish that the obligation has not been fulfilled, and in so doing the Commission may not rely on any

presumptions (see, inter alia, Case C-494/01 Commission v Ireland [2005] ECR I-3331, paragraph 41; Commission v Portugal, paragraph 32; Case C-335/07 Commission v Finland [2009] ECR I-9459, paragraph 46; and the judgment of 10 December 2009 in Case C-390/07 Commission v United Kingdom, paragraph 43).

71 The Member States are nevertheless required, under Article 4(3) TEU, to facilitate the achievement of the Commission's tasks, which consist inter alia, pursuant to Article 17(1) TEU, in ensuring that the provisions of the FEU Treaty and the measures taken by the institutions pursuant thereto are applied. In particular, account should be taken of the fact that, where it is a question of checking that the national provisions intended to ensure effective implementation of a directive are applied correctly in practice, the Commission, which does not have investigative powers of its own in the matter, is largely reliant on the information provided by any complainants and by the Member State concerned (see, inter alia, Commission v Ireland, paragraphs 42 and 43, and Commission v United Kingdom, paragraph 44).

72 It follows in particular that, where the Commission has adduced sufficient evidence of certain matters in the territory of the defendant Member State, it is incumbent on the latter to challenge in substance and in detail the information produced and the consequences flowing therefrom (see, inter alia, Commission v Ireland, paragraph 44 and the case-law cited, and Commission v United Kingdom, paragraph 45).

73 Accordingly, for the purpose of examining the present action, the Court must, first of all, examine whether the discharges from the collecting systems or the treatment plants of the various agglomerations in the United Kingdom are due to circumstances of an exceptional nature, and then, if that is not the case, establish whether the United Kingdom has been able to demonstrate that the conditions for applying the concept of BTKNEEC were met.

Whitburn

74 With regard to the obligation to have a collecting system as referred to in Article 3(1) of Directive 91/271, it should be recalled first of all, that, according to settled case-law, the question whether a Member State has failed to fulfil its obligations must be determined by reference to the situation prevailing in that Member State at the end of the period laid down in the reasoned opinion and the Court cannot take account of any subsequent changes (see, inter alia, Commission v United Kingdom, paragraph 50, and Commission v Spain, paragraph 54).

75 The additional reasoned opinion dated 1 December 2008 prescribed a period of two months from receipt thereof for the United Kingdom to comply with its obligations resulting from Directive 91/271. On the date set in the reasoned opinion, untreated urban waste water was still being discharged through storm water overflows. The number of discharges and their volume are not contested by the United Kingdom: it merely submits that, contrary to what is put forward by the Commission, the debris found on the beaches around Whitburn cannot come from the Whitburn collecting system given that the sea outfall used for the discharge of waste water is equipped with 6 mm screens, and the debris is probably from the Tyne where the overflows were not equipped with screens until the end of March 2010.

76 In order to establish whether, as the Commission submits in its complaint, the United Kingdom has failed to fulfil its obligations arising from Article 3 of, and Annex I(A) to, Directive 91/271, the examination set out in paragraph 73 of the present judgment should be carried out.

77 It must be stated, first, that, in accordance with the letter of 2 March 2005 sent by the United Kingdom to the Commission, the number of waste water discharges indicated for 2001 was 310 with an annual volume of 561 240 m<sup>3</sup> and that, during the period covering the years from 2002 to 2004, that number varied between 56 and 91 with volumes between 359 640 m<sup>3</sup> and 529 290 m<sup>3</sup>. Also, it should be noted that, between 2006 and 2008, the number of waste water discharges per year varied between 25 and 47 with a volume from 248 130 m<sup>3</sup> to 732 150 m<sup>3</sup>, while the volume for 2009 was 762 300 m<sup>3</sup>. The Commission, basing its observations on the frequency of those discharges and their intensity, has clearly demonstrated that, both before and after the expiry of the period laid down by the additional reasoned opinion, they were a normal occurrence, as such a number of discharges cannot be linked to



exceptional circumstances. Indeed, the United Kingdom does not contend in its observations that those discharges are exceptional in nature.

78 Second, it is to be noted that according to a study carried out in 2010 it would be possible, from a technological point of view, to reduce the number of waste water discharges from the Whitburn collecting system by enlarging the interceptor tunnel that already exists, a fact which has not been contested by the United Kingdom.

79 So far as concerns the costs required to be incurred and the benefits obtained, that study shows that an improvement of 0.3% in respect of the quality of the receiving waters could be achieved by the tunnel enlargement works, on the basis of 20 discharges per year.

80 Although the improvement in water quality appears marginal and, as the United Kingdom contends, Directive 76/160 is complied with, a fact which can be taken into account in the general examination of the conditions for applying the concept of BTKNEEC, it must be stated that the costs of such an enlargement of the tunnel are not mentioned at any time, either in the observations of the parties or in the reports and studies carried out.

81 Thus, the Court is not in a position to examine whether the costs of such works are excessive and disproportionate to the environmental benefit obtained

82 It follows that the United Kingdom has not demonstrated to the required legal standard that the costs of works to increase the capacity of the collecting system were disproportionate to the improvement in the state of the environment.

83 Accordingly, the Commission was right in finding that the collecting system put in place in Whitburn does not meet the obligations laid down in Article 3 of, and Annex I(A) to, Directive 91/271.

London

84 In the case of the agglomeration of London, it is not in dispute, in accordance with the contentions of the United Kingdom itself, that, at the end of the period laid down in the additional reasoned opinion, that agglomeration had neither treatment plants at Beckton, Crossness and Mogden performing the secondary treatment of all the urban waste water entering the collecting system, in accordance with Articles 4(1) and 10 of Directive 91/271, and guaranteeing that the discharges from them satisfied the requirements of Annex I(B) thereto nor collecting systems at Beckton and Crossness with a sufficient capacity, in accordance with Article 3 of the directive.

85 The Commission, relying on a TTSS report of February 2005, observes that there were approximately 60 waste water discharges from storm water overflows in London per year, even in periods of moderate rainfall; untreated water having a volume of several million tonnes was thus discharged into the River Thames every year.

86 So far as concerns the treatment plants of the collecting system for London, that report shows that their capacity is sufficient in dry weather, but not sufficient in the slightest in the case of rainfall.

87 The United Kingdom does not dispute the facts relied upon by the Commission and observes that a project is in fact underway for the construction of a new 30 km long tunnel under the tidal part of the River Thames to intercept collecting system overflow discharges and convey them for treatment at the Beckton treatment plant. Also, it is proposed to construct another tunnel, the Lee Tunnel, with the aim of reducing overflow discharges from the Beckton and Crossness collecting systems. Finally, improvement works are taking place to install extra capacity at the Beckton, Crossness and Mogden treatment plants.

88 In order to establish whether, as the Commission submits in its complaint, the United Kingdom has failed to fulfil its obligations arising from Articles 3, 4 and 10 of, and Annex I(A) to, Directive 91/271, the examination envisaged in paragraph 73 of the present judgment should again be carried out.

89 It must be stated that the Commission, in reliance upon the TTSS report mentioned in paragraph 85 of the present judgment, which is not disputed by the United Kingdom and which indicates that the frequency and volume of the discharges come about in the case not



only of exceptional events but also of moderate rainfall, has demonstrated clearly the normality of the waste water discharges into the River Thames.

90 As regards whether it is technologically impossible to reduce the number of waste water discharges from the collecting system for London and whether the costs are disproportionate to the environmental benefit obtained, it is to be noted that the United Kingdom decided, in April 2007, to carry out the works proposed by the TTSS report of November 2005 consisting in particular in the construction of a new underground tunnel. Thus, technological solutions to the problem of the collecting system for London exist and their costs cannot be regarded as disproportionate given that the United Kingdom has already taken the decision to implement them.

91 So far as concerns the United Kingdom's argument that it cannot be found to have failed to fulfil its obligations given that projects designed to ensure compliance with Directive 91/271 were examined as soon as the directive entered into force and the works decided upon are costly and achievable only over a number of years, it should be recalled that the question whether the defendant Member State has failed to fulfil its obligations must be determined by reference to the situation prevailing in that Member State at the end of the period laid down in the additional reasoned opinion and that a Member State cannot secure dismissal of the action merely because the activities and works which will, in future, cure the failure to fulfil obligations are underway. Unless a directive has been amended by the European Union legislature for the purpose of extending the periods prescribed for implementation, the Member States are required to comply with the periods originally laid down (see the judgment of 8 July 2004 in Case C-27/03 Commission v Belgium, paragraph 39).

92 It was therefore incumbent upon the United Kingdom to initiate in good time the procedures necessary for implementing Directive 91/271 in the national legal order, so that those procedures were completed within the time-limit prescribed in the first indent of Article 3(1) and the first indent of Article 4(1) of that directive, namely 31 December 2000.

93 Accordingly, the Commission was right in finding that the collecting system put in place in London (Beckton and Crossness) does not meet the obligations laid down in Article 3 of, and Annex I(A) to, Directive 91/271 and that, by failing to make urban waste water from the agglomeration of London (Beckton, Crossness and Mogden) subject to secondary treatment or an equivalent treatment, in accordance with Article 4 of that directive, the United Kingdom has failed to fulfil its obligations under the directive.

94 It follows from the foregoing that the failure on the part of the United Kingdom to fulfil its obligations that is alleged by the Commission has been established for each agglomeration referred to in the application.

95 Consequently, it must be held that, by failing to ensure:

- appropriate collection of the urban waste water of the agglomerations with a p.e. of more than 15 000 of Sunderland (Whitburn) and London (Beckton and Crossness collecting systems), in accordance with Article 3(1) and (2) of, and Annex I(A) to, Directive 91/271, and

- appropriate treatment of the urban waste water of the agglomeration with a p.e. of more than 15 000 of London (Beckton, Crossness and Mogden treatment plants), in accordance with Article 4(1) and (3) and Article 10 of, and Annex I(B) to, Directive 91/271,

the United Kingdom has failed to fulfil its obligations under that directive.

#### Costs

96 Under Article 69(2) of the Rules of Procedure, the unsuccessful party is to be ordered to pay the costs if they have been applied for in the successful party's pleadings. Since the Commission has applied for costs and the United Kingdom has been unsuccessful, the latter must be ordered to pay the costs.

On those grounds, the Court (First Chamber) hereby:

1. Declares that, by failing to ensure:

- appropriate collection of the urban waste water of the agglomerations, with a population equivalent of more than 15 000, of Sunderland (Whitburn) and London (Beckton and Crossness collecting systems), in accordance with Article 3(1) and (2) of, and Annex I(A) to, Council Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment, and
- appropriate treatment of the urban waste water of the agglomeration, with a population equivalent of more than 15 000, of London (Beckton, Crossness and Mogden treatment plants), in accordance with Article 4(1) and (3) and Article 10 of, and Annex I(B) to, Directive 91/271,

the United Kingdom has failed to fulfil its obligations under that directive;

2. Orders the United Kingdom to pay the costs.

[Signatures]

## 9.2 Judgement of the Court (Sixth Chamber), 25 April 2002, ECLI:EU:C:2002:261

### Judgment

1. By application lodged with the Registry of the Court on 26 October 2000, the Commission of the European Communities brought an action under Article 226 EC for a declaration that, by not ensuring that by 31 December 1998 at the latest the discharges of urban waste water of the city of Milan, located within a catchment area draining into areas of the delta of the River Po and the north-west coast of the Adriatic Sea defined by Decree-Law No 152 of the Italian Republic of 11 May 1999, enacting provisions on the prevention of water pollution and implementing Directive 91/271/EEC concerning urban waste-water treatment and Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (GURI of 29 May 1999, ord. suppl., hereinafter 'the Decree') as sensitive, within the meaning of Article 5 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment (OJ 1991 L 135, p. 40, hereinafter 'the Directive'), were subjected to more stringent treatment than secondary treatment or an equivalent treatment prescribed by Article 4 of that directive, the Italian Republic has failed to fulfil its obligations under Article 5(2) of the aforementioned directive, as specified in Article 5(5).

#### Legal background

2. According to Article 1 of the directive, it concerns the collection, treatment and discharge of urban waste water and the treatment and discharge of waste water from certain industrial sectors, and has as its objective the protection of the environment from the adverse effects of waste water discharges.

3. Article 2 of the directive defines 'urban waste water' as 'domestic waste water or the mixture of domestic waste water with industrial waste water and/or run-off rain water'.

4. The second subparagraph of Article 3(1) of the directive provides that, for urban waste water discharging into receiving waters which are considered 'sensitive areas' as defined under Article 5, Member States are to ensure that collection systems are provided at the latest by 31 December 1998 for agglomerations with a population equivalent of more than 10 000. In Article 2, the directive defines one population equivalent (hereinafter 'p.e.') as 'the organic biodegradable load having a five-day biochemical oxygen demand (BOD5) of 60 g of oxygen per day'.

5. The general rules applicable to urban waste water are contained in Article 4 of the directive, which provides in the first indent of Article 4(1):

'Member States shall ensure that urban waste water entering collecting systems shall before discharge be subjected to secondary treatment or an equivalent treatment as follows:

- at the latest by 31 December 2000 for all discharges from agglomerations of more than 15 000 p.e.'

6. Article 5 of the directive provides:

'1. For the purposes of paragraph 2, Member States shall by 31 December 1993 identify sensitive areas according to the criteria laid down in Annex II.

2. Member States shall ensure that urban waste water entering collecting systems shall before discharge into sensitive areas be subjected to more stringent treatment than that described in Article 4, by 31 December 1998 at the latest for all discharges from agglomerations of more than 10 000 p.e.

...

4. Alternatively, requirements for individual plants set out in paragraphs 2 and 3 above 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 the total phosphorus and at least 75% for total nitrogen.

5. Discharges from urban waste water treatment plants which are situated in the relevant catchment areas of sensitive areas and which contribute to the pollution of these areas shall be subjected to paragraphs 2, 3 and 4.

...'

7. Article 18(2) (b) and (c) of the Decree identify as sensitive areas 'the Po delta' and 'the coastal areas of the north-west Adriatic from the mouth of the Adige to Pesaro and the water courses which flow into them over a distance of 10 kilometres from the coast'.

#### Pre-litigation procedure

8. By letter of 18 November 1997, the Commission asked the Italian Government to provide it with information on progress in the collection and treatment of urban waste water for the agglomeration of Milan.

9. On 29 January 1998, the Italian Government replied that there were plans to build three waste water treatment plants intended to cover 95% of discharges. It attached to its reply a note from the Ministry of the Environment and a technical report on the progress of collection and treatment of urban waste water in the Milan area.

10. The Commission concluded from that reply that the agglomeration of Milan did not have a waste water treatment plant, so that the waste from a population of roughly 2.7 million was being discharged without prior treatment into the Lambro-Olona river system, a tributary of the Po, which drains into an area of the Adriatic which is very polluted and susceptible to eutrophication.

11. Taking the view that the Italian Republic had not adopted any concrete measures, the Commission sent a letter of formal notice dated 30 April 1999 to that Member State, asking it to submit its observations on a possible infringement of its obligations under the directive. It drew particular attention to the fact that the failure to subject to more stringent treatment than the secondary treatment prescribed by Article 4 of the directive the urban waste water of the city of Milan, which discharges into a catchment area of an area which should have been identified, by 31 December 1998, as sensitive within the meaning of Article 5(1) of the directive, constituted a infringement of Article 5(2) of the directive.

12. By letters of 9 July and 27 October 1999, the Italian authorities contested that allegation, arguing inter alia that they were not required to subject the waste in question to more stringent treatment in so far as it did not, at least not directly, discharge into an area identified as sensitive by the Decree.

13. Not satisfied with that response, the Commission issued a reasoned opinion on 21 January 2000, calling upon the Italian Republic to take the measures necessary to comply with the opinion within two months of notification thereof.

14. In its reply of 6 April 2000, the Italian Government maintained its position, but stated that it had asked for a state of emergency to be declared, which would allow for the adoption of a simplified procedure to enable the city of Milan to proceed rapidly with the construction of the three planned treatment plants.

15. It was in those circumstances that the Commission brought the present action.

#### Merits of the case

16. The Commission is asking the Court to declare that the Italian Republic has failed to fulfil its obligations under Article 5(2) of the directive and to order it to pay the costs.

17. Anticipating the arguments of the Italian Government in its defence, the Commission considers that it is contrary to the legislative content of the directive to exclude any treatment of urban waste water originating from a city such as Milan on the sole ground that it does not discharge directly into a sensitive area.

18. The Commission argues that it is evident from Article 5(2) and 5(5) of the directive that all urban waste water originating from agglomerations having a p.e. of more than 10 000 and which discharges into sensitive areas was to be made subject, by 31 December 1998 at the latest, to more stringent treatment than that prescribed in Article 4 of the Directive.

19. The implication of Article 5 is that if the catchment areas which discharge into sensitive areas receive urban waste water originating from agglomerations of more than 10 000 p.e., this contributes to the pollution of those areas, and they should be equipped with treatment plants whose discharges meet the same requirements as discharges which reach sensitive areas directly.

20. Thus, according to the Commission, all urban waste water from agglomerations of more than 10 000 p.e. and which reaches sensitive areas, either directly or by passing through catchment areas, had to be treated using the more stringent treatment method by 31 December 1998 at the latest.

21. The Italian Government asks the Court to dismiss the action and to order the Commission to pay the costs.

22. Although the Italian Government indicates that it accepts responsibility for the urgency and gravity of the situation and will implement all possible measures to hasten the construction of the treatment facilities for the urban waste water of the city of Milan, it nevertheless points out that the city area is not part of either a sensitive area or a relevant catchment area of a sensitive area.

23. It emphasises that the Decree has not defined all of Italy as a sensitive area. Furthermore, since the definition of sensitive areas under the Decree has not been contested by the Commission, it should be accepted as an adequate criterion by which to verify the performance of the obligations under Article 5 of the directive.

24. According to the Italian Government, the area of the city of Milan is not in any of the sensitive areas identified directly by the Decree or designated as such by the Lombardy region.

25. It maintains that the fact that all of the urban waste water of the city of Milan is discharged into the Lambro-Olona river system, a tributary of the Po, which drains into an area of the Adriatic which is very polluted and susceptible to eutrophication is of no relevance to the alleged infringement.

26. It points out that not all of the Po has been identified as a sensitive area, but rather only the delta, more than three hundred kilometres away from Milan. Moreover, no part of the Po has been defined as a sensitive area by the Lombardy region.

27. That argument cannot be accepted.

28. It is clear from Article 5(2) of the directive that all urban waste water originating from agglomerations having, like Milan, a p.e. of more than 10 000, and which discharges into a sensitive area, had to be subjected to treatment more stringent than that mentioned in Article 4 of the directive, by 31 December 1998 at the latest.

29. Contrary to the arguments put forward by the Italian Government, it makes no difference in this regard whether the waste water discharges directly or indirectly into a sensitive area.

30. The second subparagraph of Article 3(1) of the directive, which deals with discharges of urban waste water into receiving waters considered sensitive areas, and Article 5(2) of the directive, which requires urban waste water entering collecting systems to be subjected to more stringent treatment before discharge into sensitive areas, make no distinction between direct and indirect discharges into sensitive areas.

31. That interpretation is, moreover, supported by the objective of the directive, which is, according to Article 1, the protection of the environment, and by Article 174(2) EC, which provides that Community policy on the environment is to aim at a high level of protection.

32. That objective would be undermined if only waste water which discharges directly into a sensitive area had to be subjected to more stringent treatment than that mentioned in Article 4 of the directive.

33. With respect to the argument of the Italian Government to the effect that, since the definition of sensitive areas under the Decree has not been contested by the Commission, it should be accepted as an adequate criterion by which to verify the performance of the obligations under Article 5 of the directive, it is sufficient to note that the Commission's complaint does not concern the definition of sensitive areas applied by the Italian authorities, but rather the application of the measures provided for by the directive with respect to discharges of urban waste water in sensitive areas defined by the Italian authorities.

34. In the present case, the urban waste water from the city of Milan, which, as is not contested by the Italian Government, is not subjected to more stringent treatment than that mentioned in Article 4 of the directive, passes through the Po basin and ends up in the sensitive areas of the Po delta and the north-west Adriatic coastal areas.

35. In those circumstances, the action brought by the Commission must be regarded as well founded.

36. Accordingly, by not ensuring that, by 31 December 1998 at the latest, the discharges of urban waste water of the city of Milan located within a relevant catchment area draining into the areas of the delta of the River Po and the north-west coast of the Adriatic Sea, defined by the Decree as sensitive within the meaning of the directive, were subjected to more stringent treatment than secondary treatment or an equivalent treatment prescribed by Article 4 of that directive, the Italian Republic has failed to fulfil its obligations under Article 5(2) of that same directive.

#### Costs

37. Under Article 69(2) of the Rules of Procedure, the unsuccessful party is to be ordered to pay the costs if they have been applied for in the successful party's pleadings. Since the Commission has applied for costs and the Italian Republic has been unsuccessful, the latter must be ordered to pay the costs.

On those grounds,

THE COURT (Sixth Chamber),

hereby:

1. Declares that, by not ensuring that, by 31 December 1998 at the latest, the discharges of urban waste water of the city of Milan, within a relevant catchment area draining into the areas of the delta of the River Po and the north-west coast of the

Adriatic Sea defined by Decree-Law No 152 of the Italian Republic of 11 May 1999, enacting provisions on the prevention of water pollution and implementing Directive 91/271/EEC concerning urban waste-water treatment and Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources as sensitive, within the meaning of Article 5 of Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment, were subjected to more stringent treatment than secondary treatment or an equivalent treatment prescribed by Article 4 of that directive, the Italian Republic has failed to fulfil its obligations under Article 5(2) of that same directive;

2. Orders the Italian Republic to pay the costs.

Macken

Colneric

Gulmann

Schintgen

Skouris

Delivered in open court in Luxembourg on 25 April 2002.

R. Grass

F. Macken

Registrar