



Evaluating Economic Policy Instruments for  
Sustainable Water Management in Europe

## **WP3 EX-POST Case studies**

### **Water tariff system in Italy and tariff structure in the Region Emilia Romagna (RER)**

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## Executive Summary

### Definition of the analysed EPI and purpose

This report analyses residential water tariffs in the administrative Region Emilia Romagna (RER), situated in the Northeast Italy, and partly included in the Po River basin. A residential water tariff is a price of *water service and sanitation (WSS)*; that is abstraction, storage, potabilisation, conveyance, wastewater collection and treatment.

The water pricing and tariffs pursue multiple policy goals, seemingly at odds but reconcilable in principle: water use efficiency, that is avoiding wasteful use of water; allocation efficiency, thus maximising overall society's benefits from water uses; financial viability, meaning ability to compensate capital, skills and technology needed to ensure water services and sanitation; and social equity, standing for affordability of water as a public interest good. For other than economic reasons the actual water tariffs rarely reflect the effective costs of water service, including financial, environmental and resource costs. Here we focus on the extent to which the water tariff system in Italy and RER managed to ensure adequate investments in water supply infrastructure, satisfactory quality of water service provisions, and conservation of water resources.

The water tariff system (WTS) described in this report was introduced in Italy back in 1994. It is embedded in a comprehensive legislative framework that determines the organisational and management structure, as well as legislative jurisdiction of the so-called integrated water service (IWS, in Italian servizio integrato idrico). The framework had been laid down in the law 36/1994 (so-called law Galli), later incorporated into the law 152/2006 (so-called Environmental code).

### Introduction

The Po river is the largest and in many respects the most important Italian river. It is 652km long, whereas the river basin extends over 71,000 km<sup>2</sup> (25 per cent of the national territory). According to the results from the census of 2001, agriculture in the Po basin accounts for approximately half of the overall land surfaces with even higher percentages in the downstream regions (Veneto, Emilia Romagna and Lombardy) (EUROSTAT, 2011),

The Po River depends on an extended hydraulic network of more than 140 major water courses and an almost ten times larger secondary reticulum of natural and artificial water bodies, irrigation and reclamation channels. In the Alpine area, 174 water reservoirs manage 2.803 billion m<sup>3</sup> a year, of which 143 artificial reservoirs for hydropower production, controlling 1.513 billion m<sup>3</sup>, and another 1.290 billion m<sup>3</sup> controlled by natural lakes; furthermore the basin comprises circa 600 km<sup>2</sup> of glacier areas.



The Po Valley covers the economically most important and active area of Italy, hosting 27 per cent of the national population and producing 40 per cent of the national GDP (AdB Po 2006). The GDP per capita (thousands euro) in the regions interested by the river basin ranged, in 2009, from 21.6 € (Piedmont) to 26.8 € (Valle d'Aosta), fairly above the national average of 20 € (ISTAT 2011).

### **Legislative setting and economic background**

The primary piece of legislation that regulate the water services is law 36/1994 (so-called law Galli), in 2006 incorporated into the law 152/2006 (so-called Environmental Code). The water and waste public services are organised within the so-called Optimal Territorial Area (ATO), defined by the regional authorities by apposite regional normative acts. Ideally, the whole territory of an ATO was to be served by a single water utility. In practice, it is common that several water utilities serve the municipalities of a single ATO.

The law 36/1994 assigned the competences for specifying water tariff system to the central government. Article 154 of the Environmental Code (law 152/2006) equals water tariffs to compensation for water services and connects them to quality of water and water services, amortisation of physical capital, costs of maintenance and return to capital investments. The water tariff system is based on the so-called 'Normalised Method' (NM) introduced by decree 1st August 1996 and revised every five years. Using the normalised method, the AATO determines the reference tariff within their jurisdiction. This in turn are translated into actual tariffs by taking into account organizational model of the management, water quantity and quality, the level of quality of water service, financial plan developed in line with by article 11 of law 36/1994 and, last but not least, the actual costs of the management. Usually, the water tariffs for domestic water use employ three blocks – subsidised, standard and penalising the excessive water use. The tariff contains a fixed and a variable component of water supply, purification fee and sewage fee.

The Region Emilia Romagna (RER) transposed the law 36/94 by the regional law (RL) n. 25 of 6 September 1999, later modified. The RL of 14/04/2004 n. 7 assigns the regional government the task of defining the water tariffs. This has been contested by the Constitutional Court with the sentence 29/2010, arguing that the protection of the environment and the guarantee of market competition are of exclusively competence of Central State. The Court affirmed that the aims of water tariff discipline are to protect the environment and to apply a uniform tariff system in all the country without any difference among the various Regions.

In 2006, the regional government's presidential decree (DPRG) n.49 of 13 march 2006 (modified successively by the DPRG n.274 of 13/12/2007) adopted a tariff method for the integrated water service. The peculiarity of the method is the introduction of the performance factor PCn that offers an incentive to deliver a better service, while preserving natural environment and water resource. The water utilities with high performance are allowed to increase the tariff, whereas utilities that fail to do so are penalised with a reduction of the tariff. The DPRG 49/2006 introduced the obligation





that within 5 years, or at the time of the first revision after 1/12/2007, the tariffs have to consider the number of household components (art. 10, comma 5).

### **Brief description of results and impacts of the proposed EPI**

Although the available data is patchy and rife with uncertainty of many kinds, a decreasing trend can be observed in water abstraction/consumption pro-capita and water pipeline leakage. Similarly, the household access to WSS has steadily improved. Region Emilia Romagna performs better than the national average in all environmental outcomes, with a high variability across the Optimal Territorial Areas (ATOs). The price of a cubic metre of water and wastewater services, adjusted for inflation, increased significantly over the past years. Compared to other OECD countries, the water price adjusted by purchasing power parities is still low (OECD 2009), mainly because the initial capital investments borne by the central state are not amortised in the current tariff systems.

However, the tariff system has not guaranteed necessary investments into extension and modernisation of water infrastructures. The planned investments in water infrastructure are by far too low in order to guarantee a sustainable and reliable water services. The failed attempt to reinforce participation of public sector in WSS provision introduced a regulatory uncertainty discouraging from further investments. The water utilities will have access to external sources of finance, such as loans, only if a sufficient and reliable stream of revenue is ensured.

### **Conclusions and lessons learnt**

Empirical evidence shows that water pricing is a suitable tool for encouraging water conservation and demand management. Water is a social good whose service provision can be governed by economic instruments. The recognition of right to water as a fundamental human right is not at odds with the participation of private sector in the water service provision. The access and affordability of water can be reconciled with water pricing in several ways. In RER, it is managed by social tariffs whose costs are distributed among the wealthier consumers. Alternatively, it could be managed either by income support (connected or not to water consumption), or by facilitated payments. See OECD (2009) for further discussion of both.

The extent of litigation with respect to regulatory authority over water supply and sanitation services underlines the unresolved issue of power sharing between the state and regions. Given the large economic and social disparity across the administrative regions, more flexibility and discretion is warranted at the regional level in order to adapt water pricing schemes to specific environmental and socioeconomic conditions. The performance factor introduced in RER is an example of regulatory innovations that are worth to pursue. However, it should be based on a simple set of service quality indicators that can be easily collected and assessed.

The water tariffs system in Italy and elsewhere is vulnerable to arbitrary political interference. The current water pricing scheme blurs the distinction between the





regulator and regulatee. On the one hand, local governments of municipalities assembled in a single Optimal Territorial Area play a part in water services regulation and tariff specification. On the other hand, it is common that the water utilities to which the WSS is commissioned are controlled by local governments.

Regulatory uncertainty is detrimental to the success of an economic policy instrument. The 2011 abrogative referendum in Italy has questioned the remuneration of capital investment into water infrastructure. The lack of regulatory response has negative effect on planned investments and obstructs implementation of the existing plans.

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## Proposed headings for the case studies

### 1 EPI Background

A residential water tariff is a price of *water supply and sanitation* (WSS); that is abstraction, storage, potabilisation, conveyance, wastewater collection and treatment. In other words, it is a price the residents or customers pay for tap water in their dwellings and the discharge of waste water. Proper water tariffs encourage water use efficiency and allocation efficiency, while ensuring financial viability and affordability of WSS. For other than economic reasons the actual water tariffs do not reflect the effective costs of water service, including financial, environmental and resource costs. The EU Water Framework Directive (2000/60/EC), the flagship of Community water-related policies, requests an adequate contribution of the different water uses, including the households, to the recovery of the costs of water services (Article 9). What is the adequate level of cost recovery is left to the discretion of the Member States, taking into account the 'social, environmental and economic effects of the cost recovery as well as the geographic and climatic conditions of the region or regions affected' (Directive 2000/60/EC).

This report addresses the water tariff system (WTS) introduced in Italy back in 1994 and modified since then. The WTS is embedded in a comprehensive legislative framework that determines the organisational and management structure, and legislative jurisdiction of the so-called integrated water service (IWS, in Italian *servizio integrato idrico*). The framework had been laid down in the law 36/1994 (so-called law Galli), later incorporated into the law 152/2006 (so-called Environmental code). The central government exercise authority over the water tariff system, while delegating the power of specifying the water tariff structure and levels to lower authorities. The water services are organised within the so-called Optimal Territorial Area (ATO, in Italian *Ambito Territoriale Ottimale*), presided by an Authority of Optimal Territorial Area (AATO). Article 154 of the Environmental Code (law 152/2006) specifies water tariffs in relation to the quality of service, amortisation of physical capital, costs of maintenance and return to capital investments. The estimation of the water tariffs is based on the so-called 'Normalised Method' (NM) introduced by Decree 1st August 1996 and revised every five years. Using the NM, AATOs determine the reference water tariff within their jurisdiction. The reference tariff is translated into actual water tariff structure and levels in a revenue-neutral way.

This case study focuses on the administrative Region of Emilia Romagna (RER) situated in the North-East of Italy and partially in the Po river basin. The RER government modified the methods to calculate the water tariffs by the regional decree 49/2006. The methods introduces *performance factor* (PCn) that allows to 'penalise' water utilities not encouraging enough the final consumers to conserve





water, while rewarding those who manage to do so. The regional decree 49/2006 introduced the obligation to connect the water tariff to the number of household members (article 10, comma 5). In this report we address the actual implementation of this obligation in three ATOs: Bologna, Parma and Ferrara. The ATO Bologna fulfilled the obligation by implementing the so-called 'pro-capita' tariffs (PCT). The PCT was experimentally introduced in five municipalities in 2008 and fully applied starting from 2009. The tariff is applied only to domestic water uses and includes a fix and a variable component, both dependent on the number of household members.

Finally, this reports analyses whether the water tariffs system succeed in guaranteeing appropriate investments and financial coverage for the improvement and maintenance of water pipeline networks, compliant with the EU Council Directive 91/271/EEC concerning urban waste-water treatment.

## 2 Characterisation of the case study area (or relevant river basin district)

The Po river is the largest and in many respects the most important Italian river. It is 652km long, whereas the river basin extends over 71,000 km<sup>2</sup> (25 per cent of the national territory). The Italian river basin interests partly or entirely six northern Italian regions and the independent provinces of Bolzano and Trento. It comprises furthermore a part of Swiss and some small parts of French territory. The river basin extends from its source situated in the western Alps, over the Po river plains to the delta in the Adriatic Sea.

Following the great topographic variety (approximately two thirds consist of hill and mountain area, and one third of plain areas) prevailing land uses vary across the river basin; forestry for instance is more important in mountain areas (province of Trento and Valle d'Aosta), but is less important in the hilly and flatland areas downstream where urbanization and agricultural uses prevail (AdBPo 2006). According to the results from the census of 2001, agriculture in the Po basin accounts for approximately half of the overall land surfaces with even higher percentages in the downstream regions (Veneto, Emilia Romagna and Lombardy) (EUROSTAT, 2011), forestry for 14 per cent and residential areas account for approximately 10 per cent of the territory (AdBPo 2006).



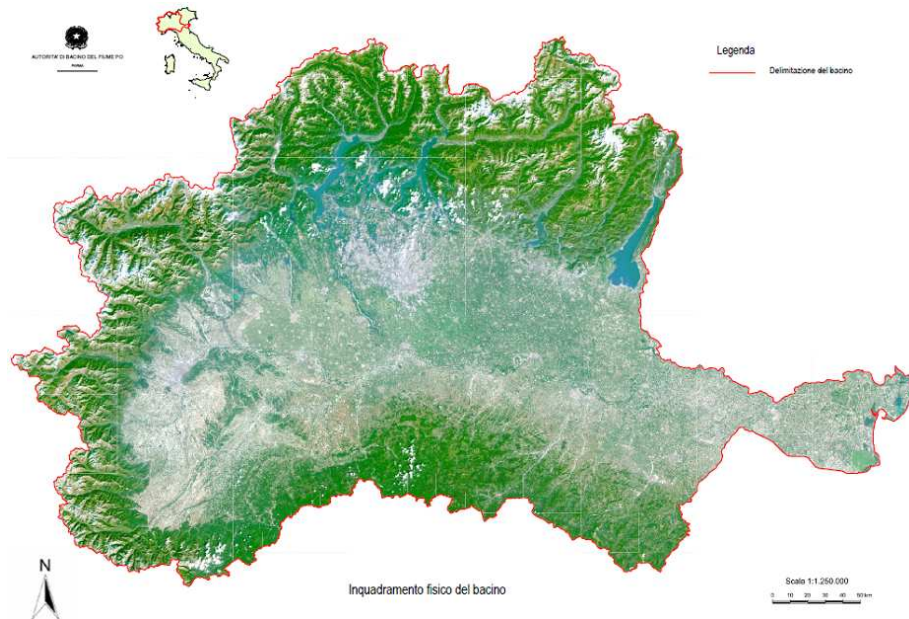


Figure 1 The Po river basin, physical characteristics and delimitation (source: AdB Po 2006)

Surfaces covered by Water and wetlands account for less than 5 per cent throughout the overall basin (EUROSTAT, 2011), with higher percentages in the mountain regions, where artificial and natural water basins are situated, and in the coastal flat (Veneto and Emilia Romagna) due to the extended surface of the River Delta and coastal lagoons.

The Po River depends on an extended hydraulic network of more than 140 major water courses and an almost ten times larger secondary reticulum of natural and artificial water bodies, irrigation and reclamation channels.

In the Alpine area, 174 water reservoirs manage 2.803 billion m<sup>3</sup> a year, of which 143 artificial reservoirs for hydropower production, controlling 1.513 billion m<sup>3</sup>, and another 1.290 billion m<sup>3</sup> controlled by natural lakes; furthermore the basin comprises circa 600 km<sup>2</sup> of glacier areas.

Average annual precipitation is nearly 1,200 mm, which corresponds to a discharge of approx. 78 billion m<sup>3</sup>. Of these, less than two thirds, 47 billion m<sup>3</sup> are discharged into the sea, and evaporation and plant consumption accounts for 31 billion m<sup>3</sup>.

Water uses within the Po basin come from the electricity sector (about 890 hydro-electric power plants power producing 48 per cent of the national hydroelectric production, and 400 thermo-electric plants, 31 per cent of the national thermo-electric production), from inland navigation and for an irrigation based agriculture.

Total water abstractions account for more than 20.5 billion m<sup>3</sup> per annum, most part of which (16.5 billion m<sup>3</sup>) is used in agriculture/irrigation, 2.5 billion m<sup>3</sup> for drinking water and 1.5 billion m<sup>3</sup> for industrial uses. Abstractions account for 14.5 billion m<sup>3</sup> for surface waters and for 6 billion m<sup>3</sup> for groundwater.

The Po Valley covers the economically most important and active area of Italy, hosting 27 per cent of the national population and producing 40 per cent of the national GDP (AdB Po 2006). The GDP per capita (thousands euro) in the regions



interested by the river basin ranged, in 2009, from 21.6 € (Piedmont) to 26.8 € (Valle d'Aosta), fairly above the national average of 20 € (ISTAT 2011).

*Table 1: Incidence of the Po-Valley on socio-economic variables in Italy (adapted from AdB Po 2006)*

<b>Socio-economic Variable under consideration</b>	<b>% of the total in Italy</b>
Energy Consumption	48
Industry	37
Workforce	46
Cattle Breeding	55
Agriculture Production	35
Net Agricultural Surface	21
GDP	40
Population	27

The population living inside the Po River Basin accounts for approximately 17 million persons, more than half of these (9 million) reside in the region of Lombardy with the metropolitan area of Milan, and another 4 million inhabitants in the Turin area. Population density in the river basin of 225 persons/km<sup>2</sup> is above the national average of 188 residents/km<sup>2</sup>. This mean value includes peaks of density of almost 1,500 persons per/km<sup>2</sup> in Milan and in the province of Turin. Patterns of urbanization vary across the basin with high percentages of concentration in the urban areas in the Lombardy region where only 5 per cent of the population lives outside urban centres, and low concentration rates encountered in Veneto (19 per cent of the residents living outside urban centres) and Emilia Romagna (15 per cent living in diffusely urbanized areas). Despite of declining the population numbers, the number of households is increasing significantly, determining a still growing anthropogenic pressure on the territory (AdB Po 2006).

Emilia Romagna surface is 22,445 km<sup>2</sup> with a population of 4,432,439 (Regione Emilia Romagna, 2011). The Region includes 9 districts (Provinces), 9 ATO and intersects 7 primary water basins among which the most important is the Po River Basin.

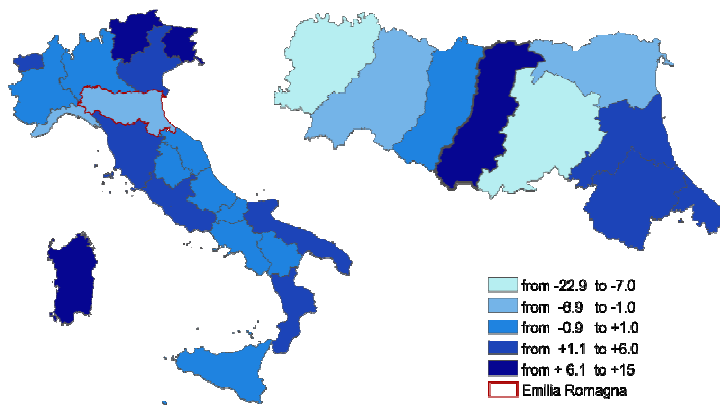


### 3 Assessment Criteria

#### 3.1 Environmental outcomes

The new Italian governance model of the water supply and sanitation (WSS) had been gradually implemented in the Region Emilia Romagna (RER) over late 1990s and early 2000s. Although the available data is patchy and rife with uncertainty of many kinds, a decreasing trend can be observed in water abstraction/consumption pro-capita and water pipeline leakage. Similarly, the household access to WSS has steadily improved. Region Emilia Romagna performs better than the national average in all environmental outcomes, with a high variability across the Optimal Territorial Areas (ATOs).

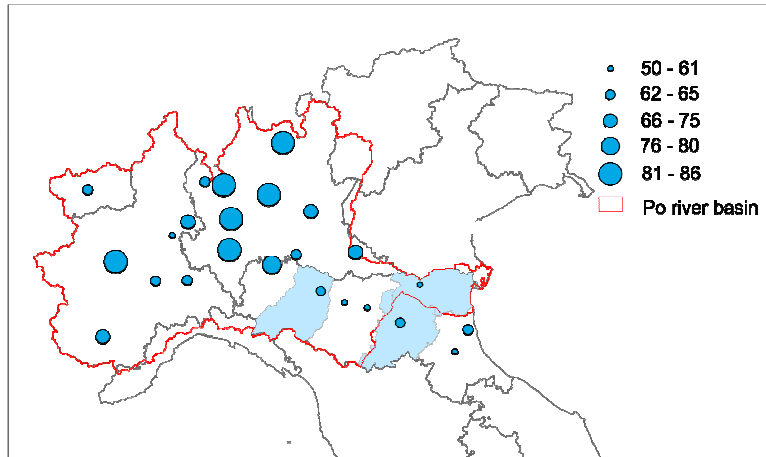
Between 2005 and 2008, the water withdrawals declined by 1,6 per cents. With exception of Modena, the withdrawal declined in all ATOs situated in the Emilia part of the region, and increased in ATOs located in the Romagna part, likely as a result of seasonal water demand of attractive touristic attractive place along the North Adriatic Sea. The observable changes span from -23 per cents in Piacenza to +15 per cent in Modena. Bologna, Parma and Ferrara ATOs show a reduction of -11, -3, and -1 per cent respectively (Map 2). Overall, the water withdrawals for public distribution in RER amount to 121 m<sup>3</sup>/year per capita, which is less than the national average (198 m<sup>3</sup>/year per capita). The variation in the withdrawals pro capita span from 48 m<sup>3</sup>/year (Ravenna ATO) to 184 m<sup>3</sup>/year (Forlì-Cesena).



Map 2: Change in water withdrawals per capita ( per cent) between 2008 and 2005 per by administrative regions (left) and ATOs of Emilia Romagna (right). Data source ISTAT 2008 – own elaboration.

Households' pro-capita water consumption in the district towns in RER is commonly lower than in other cities within the river basin. The highest pro-capita consumption is registered in Piacenza (78 m<sup>3</sup>/year/person) and the lowest Forlì-Cesena (51 m<sup>3</sup>/year/person). Milan has the highest water consumption per capita within the basin (86 m<sup>3</sup>/y) (Map 3).





Map 3: Annual domestic water consumption per capita ( $\text{m}^3/\text{year}$ ) in the main urban centres of the Po River Basin and in Emilia Romagna. Parma, Ferrara and Bologna districts are highlighted in blue. Source: ISTAT 2009, own elaboration.

In the period 2000-2009 national average domestic water use in district towns decreased by 11 per cent. National water consumption variability changed from [36.8,108.9] in 2000 to [35.4, 93.6] in 2009. Except for Piacenza, RER district towns have lower than average rate of water consumption.

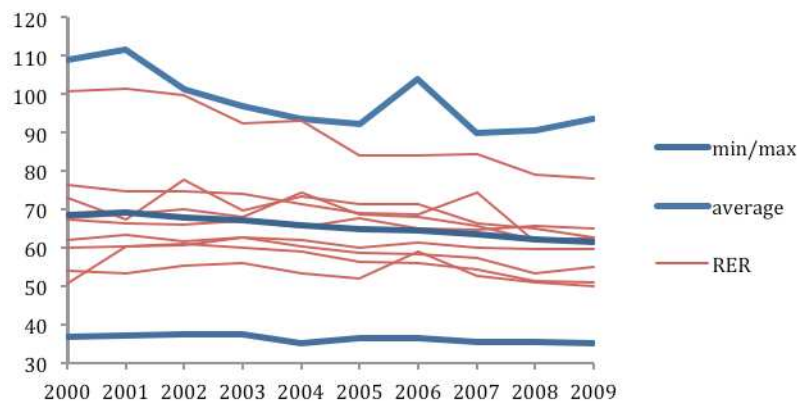


Figure 4 - Domestic water consumption per capita trend from 2000 to 2009 in Italian district towns (ISTAT 2009). Red lines are RER cities. Min-max and average (blue lines) are relative to all Italian district towns dataset.

Water tariffs increased generally in all district towns. Figure 5 shows a general trend of 'low tariff – high consumption', which remains analogous from 2005 to 2009. Higher price is paid in 2009 for the same amount of water then in 2005.



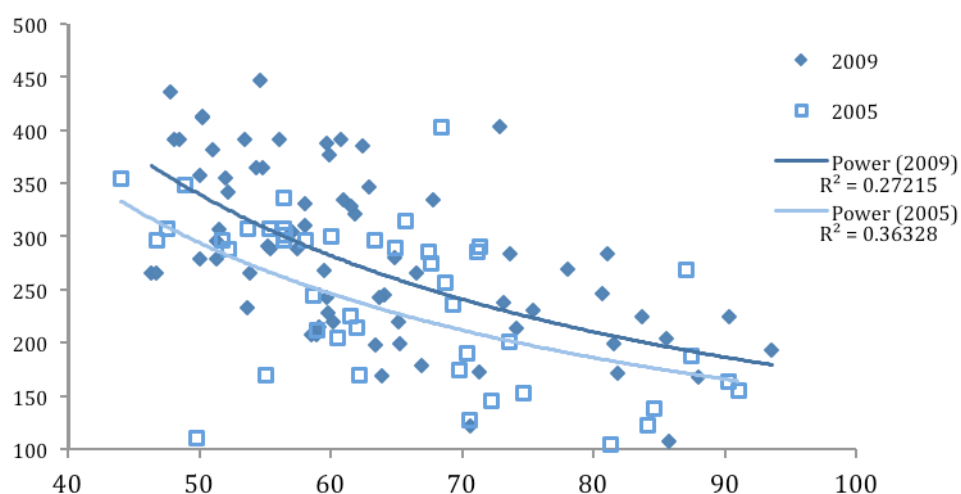


Figure 5 – District towns' water consumption per capita [l/day] and water tariff [euro] estimated for an annual consumption of 200m<sup>3</sup> (2005 and 2009). Regression curve (power) for each dataset is shown. 2005 dataset includes 45 towns, while 2009 dataset includes 70 towns (ISTAT, 2009).

Together with the installation of ATOs, a new tariff system has been introduced in all districts. Even though it not feasible to link directly the effects of the tariff system on water consumption patterns, a general decrease of water demand is observable. Domestic water consumption of RER district towns shows similar reduction trend of other regions (table 2) (ISTAT, 2009).

	Domestic water use per capita		
	2000 [m3]	2009 [m3]	$\Delta$ [%]
Italy	76.7	67.8	-11.6
Piacenza	100.7	78.1	-22.4
Parma	76.5	62.9	-17.7
Reggio nell'Emilia	50.8	51.1	+0.6
Modena	62.1	55.2	-11.0
Bologna	67.3	64.9	-3.5
Ferrara	60.0	59.7	-0.5
Ravenna	73.1	62.5	-14.5
Forlì	54.1	50.1	-7.3
Rimini	67.6	61.6	-9.0

Table 2: Reduction in pro-capita water consumption 2000-2009 in district towns in RER

It is evident from Figure 6 that the variability of water consumption in the RER district towns decreased. Water tariffs increased consistently in all towns from 2001 to 2009. For example the water tariffs doubles in Piacenza over a decade-long period while the consumption declined by 22%. In 2009, compared to 2001, RER cities pay higher tariffs and consume less water.





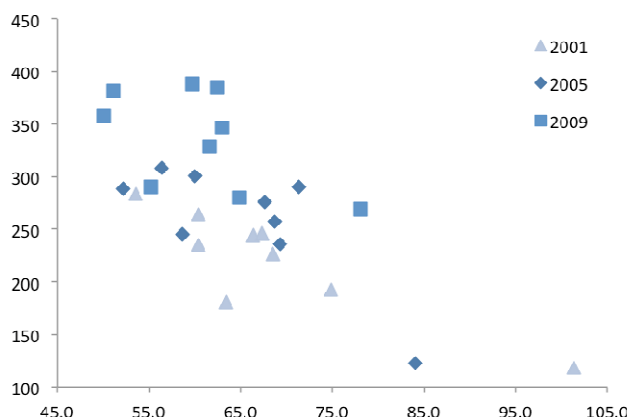


Figure 6 – Water consumption per capita ( $m^3$ ) compared to water tariff (price for 200  $m^3$ /year) for RER district towns.

Also with respect to losses in water pipeline system RER performs better than most of the other regions. Compared to national average (32 per cent) and worst performer (Puglia, 47 per cents), the RER loss rate (24 per cents) is lower by one and three quarters respectively (table 2). Within RER the losses span between 18 (Forlì-Cesena) and 30 per cents (Ferrara) (ISTAT, 2009). The reduction of water losses is a proxy indicator of the investments in water supply networks.

ATO	Water losses in water supply networks		
	2005 [%]	2008 [%]	$\Delta$ [%]
1 - Piacenza	23	20	-3
2 - Parma	28	27	-1
3 - Reggio nell'Emilia	28	26	-2
4 - Modena	29	28	-1
5 - Bologna	26	23	-3
6 - Ferrara	33	30	-3
7 - Ravenna	22	20	-2
8 - Forlì-Cesena	22	18	-4
9 - Rimini	23	19	-3
Emilia-Romagna	26	24	-2

Table 3: Reduction in water losses (difference between emitted and delivered water) in the water supply pipelines across ATOs in RER.

Normally, the quantity of water withdrawn is negligible in the basin's water budget. The city of Ferrara, situated close to the river outlet, is supplied by 72 per cents from the Po River (ATO6, 2010). The long term average discharge of the river at Pontelagoscuro is 1,540  $m^3$ /sec whereas the water abstraction for public water supply varies between 0.9 and 1.2  $m^3$ /sec. However, during the recent drought spells in 2003 and 2006-07, the preventive reduction of the domestic water consumption had sizeable effects. In summer 2007, river discharge at Pontelagoscuro was as low as 168  $m^3$ /sec, barely above the minimum environmental flow of 150  $m^3$ /sec. In the



Romagna part of the region, supplied from the Ridracoli dam, the water shortage reached even more critical levels, triggering the declaration of state-of-the-emergency in May 2007.

The riverine ecosystems along the river network and the delta benefit from the combined effect of reduced water consumption in agriculture, industry and domestic sectors. Po River Delta is one of the most valuable wetlands in Italy and a biodiversity hotspot - NATURE 2000 site - of European importance. The Delta is undergoing lasting changing under significant anthropogenic pressures, sea level rise and sea water infiltration upstream for a considerable distance from the mouth. Hence, the Po River Delta is extremely sensitive to reduced river flow. The climate-change induced changes to precipitation patters and volume will affect river flow for which water conservation remains an imperative.

In addition, the reduced water consumption represents indirect energy savings. In RER, 53.7 per cent of water emitted into the pipelines is treated (Istat, 2009). Based on the estimates of US Department of Energy (US.DOE) the energy required to deliver and treat one cubic meter of clean water ranges between 0.50 and 6.26 kWh/m<sup>3</sup>, depending on the water source and the length of the pipeline network. The amount of CO<sub>2</sub> emitted by thermoelectric power generation is approximately 0.65 kg CO<sub>2</sub>/kWh. A report on climate and energy from the Province of Turin estimated an Italian average emission of 0.518 kg CO<sub>2</sub>/kWh. Hence the reduction of water withdrawals in RER in the period 2005-2008 translates in ca. 2.149 tons of CO<sub>2</sub>/year due to water conservation programmes only.

Decree 152/06 specifies the requirements put on quality and coverage of wastewater treatment, in compliance with the Council Directive 91/271/EEC concerning urban wastewater treatment. In Italy, the 16,901 wastewater plants served 78.5 million population equivalent (PE) in 2008, the year for which the most up-to-date information is available.

In RER, 2,163 wastewater plants served about 6.2 million PE (81.6 per cent coverage) (ISTAT, 2009). The coverage of domestic users increased from 64.2 per cent PE in 2005 to 67.3 per cents (+ 2.9 per cent). The number of urban agglomeration below 2,000 PE without a wastewater treating (WTT) system in 2008 was still high (1.609). However, the number of larger settlements (> 2.000 PE) not connected to treatment plant is only 21, down from 179 in 2005.

According to the State of the Environment in RER, the quality of surface water bodies has not improved notably between 2004 and 2008. This is because agriculture remains the major source of pollution and reduced point pollution is not easily discernible in the quality of water bodies.

### **3.2 Economic Assessment Criteria**

It is hard to define a baseline scenario for the assessment of the current system of WSS pricing. First, because the water supply and sanitation (WSS) governance





system in place before 1994 was fundamentally different and not comparable to the current water pricing regime. Second, because the tariff structure designed by lower WSS authorities (AATOs) is heavily regulated in terms of admitted cost components and subjected to a price cap.

The 1994 reform of public water supply represented a leap change to the water service. The law 36/1994 reorganized the water service, asserted public ownership of water and set out for a modern, more efficient and harmonised water service. Before 1994, public rights to water had first to be ascertained. Water service was management by public hand and the water tariffs were not meant to recover costs of the service. The low water tariffs (less than 1 per cent of household expenditure) and the high awareness of inadequate investments into water infrastructure set the stage for the reform that had aimed at increasing the effectiveness and efficiency of water service. Whereas until 1994 the water infrastructure had been built exclusively using public money, the Galli law set for a private participation in the water service delivery, a topic which grew increasingly controversial.

Compared to the situation before 1994, the reform of the water services and sanitation had helped to modernise WSS, and reduce fragmentation in both service provision and water tariffs in place. Between 2001 and 2010, the number of water utilities operating in the RER went down from initial 157 to 18. The number of tariff basins – areas applying the same tariff structure and levels, was reduced from 214 to 37 (table 2).

ATO	POP 2006	2001		2005		2010*	
		WU	TB	WU	TB	WU	TB
1 Piacenza	278,224	30	47	28	30	2	3
2 Parma	420,077	26	47	26	40	4	7
3 Reggio Emilia	501,364	2	2	2	2	2	2
4 Modena	670,098	32	32	4	5	3	5
5 Bologna	954,682	50	50	4	7	2	8
6 Ferrara	353,303	2	2	2	2	2	2
7 Ravenna	373,449	5	5	1	3	1	5
8 Forlì-Cesena	377,993	8	8	1	3	1	3
9 Rimini	294,074	2	21	1	2	1	2
<b>Total ER</b>	<b>4,223,264</b>	<b>157</b>	<b>214</b>	<b>69</b>	<b>94</b>	<b>18</b>	<b>37</b>

\*\* domestic tariffs only

*Table 4: Evolution of the water services and sanitation sectors in Emilia Romagna between 2001 and 2010. POP 2006 – Population living in the different ATOs in 2006. WU – Number of water utilities operating in the RER. TB – Number of tariff basins.*

The reform however has not managed to ensure level of investments into extension and modernisation of water infrastructures. In 2007 the average annual per capita



investment in WSS amounted to 37.00 Euro (min-max range 19-117 Euro) (CONVIRI 2008). According to the only study available, this is by far too little (Massarutto et al, 2011). Most of the investments (ca. 57 per cent) are designated for new infrastructure, whereas improvement of the existing infrastructure is dedicated only some 37 per cent. These shares tend to be opposite among the developed countries with high WSS connectivity (40 per cent for new infrastructures and to 60 per cent for maintenance of existing infrastructure) (CONVIRI 2008). According to (CONVIRI 2008), the new investments are financed predominantly from the collected revenues (46 per cent) and public transfers (21 per cent). Own capital investments and loans are represented by 11 per cent and 14 per cent respectively.

In each ATO, water supply and sanitation services are commissioned to one or more water utility for the period up to 30 years. In the case of the three case ATO analysed in this report, ATO Bologna commissioned the service until 2021 to HERA Group S.p.A; ATO Ferrara commissioned the service until 2024 to HERA Group S.p.A. and CADF S.p.A.; and ATO Parma commissioned the service to IREN S.p.A., Montagna 2000 S.p.A., Salso Servizi S.p.A. and Emilia Ambiente S.p.A (Regione Emilia Romagna 2006b). The two largest water service providers in RER (Hera and Iren) are multi-utility corporations with large turnover. Business diversification influence positively company's ability to access credits. The tables 3 and 4 show the planned investments in the ATO Ferrara and ATO Bologna. No information is available about ATO Parma.

	HERA	CADF	TOTAL
Population (2006)			353.304
Aqueduct length (km)	2.420	2.264	4.684
Sewage system length (km)	928	905	1.833
Investments 2005-2007 (Euro)	25.872.000	14.039.041	39.911.041
Investments 2008-2012 (Euro)	53.074.000	20.100.000	73.174.000
Investments 2012-2024 (Euro/year)	10.000.000	4.300.000	14.300.000

Table 5: Actual and planned investment in ATO Ferrara. Source: (ATO 6 Ferrara 2007).

	HERA
Population (2008)	960,343
Aqueduct length	8,801 km
Sewage system length	3,504 km
Investments 2004 – 2006	82,000,000 €
Investments 2007 – 2009	108,000,000 €
Investments beyond 2010	194,720,565 €

Table 6: Actual and planned investment in ATO Bologna. Source ATO Catchment Area Plan.



The Normalized Method (NM) is designed to recover full financial costs of the WSS service, that is investment costs, operational and management costs, and administrative and support costs (Folifac and Gaskin, 2011). The RER included an economic incentive for water utilities to reduce water losses and improve the quality of the services; the so-called performance factor (PCn) (see section 3.4). The PCn is determined by two sets of indicators with respect to quality of the service (e.g. unplanned service disruption, customer satisfaction, call centre service), and environmental performance (e.g. water losses and per-capita water consumption) (Regione Emilia Romagna 2006a).

The current tariff systems in Italy led to great differences in water prices across the ATOs (Federconsumatori 2011). Calculated for a representative level of households' water consumption (200 m<sup>3</sup>/year), the water bills across districts' capital range from around 0.58 Euro/m<sup>3</sup> (Milan) and 2.39 Euro/m<sup>3</sup> (Florence) (Federconsumatori 2011). In 2010, average price of water in the three district towns analysed in this study was well above the national average: Bologna 1,51 Euro/m<sup>3</sup>; Parma 1,91 Euro/m<sup>3</sup>; and Ferrara 2,03 Euro/m<sup>3</sup> (Federconsumatori 2011). In general water bills in Italy are lower than in most other European countries. These differences lie in the incomplete amortisation of water pipeline systems initially build using public money.

The investment plans designed by the local ATOs are calculated in order to include the activities mentioned above. The investment for new infrastructures are determined by the valuation of the cost of the planned development of the water and wastewater systems; the cost of the maintenance and restoration is determined by the estimation of value and life expectancy of the existing structures; compensation of the invested capital was determined referring to the IRS (Regione Emilia Romagna 2005); the rule regarding the compensation of the invested capital has been abrogated by the referendum held on June 2011, nowadays this topic is characterised by a certain level uncertainty.

In 2005, the Water Conservation Plan estimated the incidence of some of the costs into the total amount of the tariff for each ATO in the Emilia Romagna region.

	Bologna (Euro/ m <sup>3</sup> )	Ferrara (Euro/ m <sup>3</sup> )	Parma (Euro/ m <sup>3</sup> )
Operating costs	0.019	0.025	0.049
Maintenance	0.042	0.043	0.062
Compensation for the invested capital	0.059	0.050	0.093
Investments in water treatment structures	0.119	0.119	0.205
Investments in water losses reduction	0.091	0.089	0.148

*Table 7 Share of cost components in the water price Source: (Regione Emilia Romagna 2005)*



### 3.3 Distributional Effects and Social Equity

The price of WSS increased substantially since the introduction of the Galli law. Yet compared to other European countries, Italy is still among the countries spending a relatively small proportion of household incomes on water service; the mean expenditure being about 0.8% of the net household income (Censis 2010). However, the number of families which spend more than 3 per cent of their income for water is on the rise (AUTORIDSRU 2011).

Between 2001 and 2010, the average prices paid by households for water services rose by 66.7 per cent in Italy<sup>1</sup> and by 68 per cent in the RER (table 7). In some districts the price increase topped 200 per cent. To compare, from 2001 to 2007 the net household incomes increased only by 17 per cent in Italy and 14 per cent in RER (ISTAT 2009).

	2001 <i>Euro</i>	2010 <i>Euro</i>	Difference %
<b>Italy*</b>	<b>135</b>	<b>225</b>	
Piacenza	67	205	205.97
<b>Parma</b>	<b>135</b>	<b>274</b>	<b>102.96</b>
Reggio Emilia	160	295	84.38
Modena	113	205	81.42
<b>Bologna</b>	<b>152</b>	<b>189</b>	<b>24.34</b>
<b>Ferrara</b>	<b>186</b>	<b>284</b>	<b>52.69</b>
Ravenna	173	267	54.34
Forli-Cesena	196	270	37.76
Rimini	155	239	54.19
Minimum value RER	67	189	182.09
Maximum value RER	196	295	50.51
<b>Medium value RER</b>	<b>149</b>	<b>250</b>	<b>67.79</b>

*Table 8 Average water charges (Euro per typical annual consumption of 160m<sup>3</sup>) in the Region Emilia Romagna (RER) in 2001 and 2010. National average for 2001 based on an annual consumption of 150m<sup>3</sup>(AUTORIDSRU 2011)*

There have been some attempts to define the highest socially acceptable share (SAS) of cost of water service in terms of household incomes, originating from studies on impacts of privatization of water services in 1980s and early 1990s in UK and Wales. Fitch and Price (2002) for example set the SES to 3 per cent, drawing on the measure of fuel poverty (>10 per cent of household income). The average cost of water service



in Italy does not yet reach a level of concern, but raising poverty and related problems of access to services are being raised.

Poverty indicators show that on average 15.2 per cent of households in Italy and 9.5 per cent of households in the Region Emilia Romagna are considered poor according to the EUROSTAT indicator of deprivation. The number of households facing difficulties in paying bills for services (including water and heating), 10.6 per cent in the national average and 4.6 per cent in the Emilia Romagna Region, is especially high among single parent households and elderly people. In these statistics, water consumption is not considered as a separate indicator. In 2009, 10.6 per cent of Italian households and 4.6 per cent of those in the Region of Emilia Romagna were facing problems in providing for adequate heating of their dwellings (AUTORIDSRU 2011). The same report estimates that in 2009, water bills amounted to 0.5 per cent, for waste collection to 0.6 per cent and heating to 3 per cent in terms of household incomes. The poverty line defined by the national institute for statistics is less restrictive than the EUROSTAT poverty indicator cited above, as it is defined in relation to a minimum level of household expenditure for a two person household. For the year 2010 this line has been calculated at an expenditure per capita of 992.46€ per month (ISTAT 2011) for a two persons household, and , households under this line are facing expenditure of approx. 1% of their income for payments corresponding to the medium regional tariffs, a rate which is not yet at the level of 3% defined as problematic, but is nevertheless approaching this data. According to the estimates made by the national institute of statistics, in the Regions of Northern Italy, the incidence of poverty is 4,9% of the number of families. There is no statistical evidence about reduction of water consumption by poor households, but in a qualitative survey from 2007, 25% of poor households states that they had faced problems paying water bills and 90% of them had changed their consumption patterns as a consequence of this. Among households above the poverty line, approx. 6% had had problems in paying their bills and approx 80% of those having experienced problems, stated they had reduced water consumption as a consequence (ISAE 2007).

The concept of increasing block tariffs applied by the water utilities results in higher marginal prices to be paid by larger households (Miniaci, Scarpa et al. 2008). Furthermore, different tariffs produce consistently different expenditure between single cities, as shown in Table 9.

Tariff for 200m3/year (€)			
ATO	Bologna	Parma	Poverty line
2 pers. Household	336.21	334.12	11,909.52
5 pers. Household	235.8	334.12	22,628.09

*Table 9 - Comparison between per capita tariff in Bologna and a volume tariffs in Parma (values for poverty line refer to ISTAT, 2010)*



Whereas tariffs remains equal for large families in both cities, small households (which in Italy are most frequently elderly persons at specific risk of poverty) pay 100 Euros less according to the volume tariff in Parma than to the per capita tariff in Bologna.

An indicator of actual need created by increasing tariffs can be provided by the uptake of compensation measures. The resolution for the regional government n. 560/2008 adopted guideline for the application of social tariff as a way of protecting low-income households. The subsidised water tariffs are offered to all households below a certain threshold, determined with an indicator of wealth ISEE (Indicatore Situazione Economica Equivalente, ISEE). For the territory of the whole region, there is a single threshold that specifies the economically and socially most marginalised and vulnerable households. A second threshold is variable and is determined by each AATO. It specifies households exposed to less extreme economic and social hardship. The social tariff is financed through the application of higher water tariffs (up to 1 per cent) applied to wealthier consumers. Facing the second highest water tariff in RER, the ATO Ferrara was the first one to apply the social tariff (resolution n.5 of 17 December 2007). In 2008, the water tariffs were increased 0.5 per cent and the proceeds collected were designated to co-finance the water consumption by disfavoured clients, elderly citizens and physically impaired persons. ATO Parma adopted the social tariff in 2009 (resolution n.15 of 22/12/2009).

ATO	Most marginalised groups (ISEE) (Euro)	Less marginalised groups (ISEE) (Euro)	Price increase for other users (%)
Ferrara	< 2500	2500 - 5000	0.5
Parma	2500-5000	2500 - 5000	

Table 10: Example of social tariffs in the selected ATO

	Bologna		Ferrara		Parma*	
	No of households	% of all households	No of households	% of all households	No of households	% of all households
First income band	643	0.2	555	0.3	2,400	1.2
Second income band	2,150	0.5	1593	1	7,100	3.6
total	2,793	0.7	2,148	1.3	9,500	4.8

Table 11: Number of households- beneficiaries of social tariffs in 2009. (\*values for Parma refer to 2010, the first year of the tariff in this area (AUTORIDSRU 2011).

The collected funds for social tariffs amounted in 2009 to 59.075 Euro in Bologna, 193.088 Euro in Ferrara and, in 2010, ca. 300.000 Euro in Parma.

The quality of the water supply and sanitation services is regularly evaluated in terms of customer satisfaction. Generally, the communication of water authority yields medium level of satisfaction, whereas price level receives lowest scores. Some





areas within RER display a higher degree of dissatisfaction (AUTORIDSRU 2011). Half of the consumers does not drink tapped water or only on rare occasion, complaining “bad taste” (AUTORIDSRU 2011).

### 3.4 Institutions

#### *National legislation governing water service*

Civil use water supply, wastewater collection and treatment in Italy are managed in a holistic way, referred to as ‘Integrated urban water management’ (IUWM). The primary piece of legislation that regulates the water services is law 36/1994 (so-called law Galli), in 2006 incorporated into the law 152/2006 (so-called Environmental Code). The water and waste public services are organised within the so-called Optimal Territorial Area (ATO), defined by the regional authorities by apposite regional normative acts. The way the ATO were defined differs across the regions: in some cases the whole territory of a region is considered a single ATO (e.g. Puglia, Basilicata, Valle d’Aosta and Sardinia). In some other cases the confines of ATO coincide with the boundaries of lower administrative districts – provinces (e.g. Emilia Romagna). Only in a few cases the ATO have been delimited in a different way than following administrative boundaries. In 2009, the number of ATO amounted to 92.

Until recently, each ATO has been governed by a regulatory authority (Optimal Territorial Area Authority, AATO). Recent reform of the IUWM (law 26 March 42/2010) has abolished the AATO, deferring their competences to the regional authorities. Ideally, the whole territory of an ATO was to be served by a single water utility. In practice, it is common that several water utilities serve the municipalities of a single ATO. For example, the 8 ATO in Emilia Romagna are served by 16 utilities. Each ATO is managed according to a plan (Optimal Territorial Area Plan, hereafter PA) that summarises the water services and infrastructure, and defines the financial plan along with the future investments and water tariffs.

#### *State control of water tariff*

The law 36/1994 assigned the competences for specifying water tariff system to the central government. Article 154 of the Environmental Code (law 152/2006) equals water tariffs to compensation for water services and connects them to quality of water and water services, amortisation of physical capital, costs of maintenance and return to capital investments. The Ministry of Environment, together with the Ministry of Finance, adopts the rule for determining the tariffs. Since 1994, the water tariffs had been based on recommendations made first by Vigilance Committee for Water Resources (CO.VI.RI., abolished in 2009), then by National Commission for Water Resources (abolished in 2011). Most recently, the advisory and compliance control tasks have been assigned to the National Agency for Water Resources Vigilance (by law decree 70/2011, so-called Development Decree).

The water tariff system is based on the so-called ‘Normalised Method’ (NM) introduced by decree 1st August 1996 and revised every five years. Using the



normalised method, the AATO determines the reference tariff within their jurisdiction. This in turn are translated into actual tariffs by taking into account organizational model of the management, water quantity and quality, the level of quality of water service, financial plan developed in line with by article 11 of law 36/1994 and, last but not least, the actual costs of the management. Usually, the water tariffs for domestic water use employ three blocks – subsidised, standard and penalising the excessive water use. The tariff contains a fixed and a variable component of water supply, purification fee and sewage fee.

The reference tariff includes criteria and conditions which AATO is obliged to follow when determining the actual average tariff. The structure of the tariff represents a set of rules which allow defining water prices for different water uses or users, in line with the reference tariff. The reference tariff is connected to the price cap system introduced by the decision n.34 of 18 December 1991 of the “Comitato interministeriale per i Prezzi”.

#### *Water service and tariff in Emilia Romagna*

The Region Emilia Romagna (RER) transposed the law 36/94 by the regional law (RL) n. 25 of 6 September 1999, later modified by RL n.27 of 21/10/2001, n.1 of 28/01/2003, n. 7 of 14/04/2004 and n. 10 of 30/06/2008. The AATO adopts a plan (hereafter referred to as PA) that specifies the guaranteed level of water service. The PA includes a programme of technical measures and the financial means by which these are realised. Finally the PA specifies a single reference water tariff for the whole ATO. The reference tariff guarantees the recovery of costs specified in the law 36/94. In order to incentive water conservation, while respecting social equity aspects, the AATO can vary tariff blocks according to territorial criteria, users’ type and volume of consumption.

The RL of 14/04/2004 n. 7 modified the RL 25/99 in a way that is at odds with the provisions of the law 36/94: it assigns the regional government the task of defining the water tariffs, while taking into account the recommendations of an expert commission established for this purpose, and the results of consultations involving syndicates, and key economic and social players. Among others, the tariff has to include incentives to use natural resources efficiently. Subsequently, the resolution n.5749 of 16 April 2004 established an expert commission consisting of regional administration officers, AATO and experts appointed by Confservizi (a syndicate of enterprises and corporations that manage services of public utility). The Commission’s task is it to revise Normalised Method and make recommendation with respect to the reference tariff. In 2006, the regional government’s presidential decree (DPRG) n.49 of 13 march 2006 (modified successively by the DPRG n.274 of 13/12/2007) adopted a tariff method for the integrated water service. The peculiarity of the method is the introduction of the performance factor PCn that offers an incentive to deliver a better service, while preserving natural environment and water resource. The water utilities with high performance are allowed to increase the tariff, whereas utilities that fail to do so are penalised with a reduction of the tariff. The article 10 specifies that task of AATO to articulate the tariff within their own jurisdiction. In brief, the innovation of tariff system introduced in RER include

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among other the promotion of high quality service and water conservation through the water tariffs, higher flexibility with respect to the price cap, and the option to disentangle the water supply and waste water discharge tariffs, more adequate remuneration of the invested capital.

Recall that in the tariff system introduced by the Galli law it is the competence of national government to determine the components of the tariff method, and subsequently of the AATO to specify the reference tariff within their own jurisdiction. The tariff method is determined and revised by the Vigilance Committee for Water resources (CO.VI.RI.)

The article 2 of the RL 10/2008 instead assigns the task of specifying the reference tariff to the regional government who is also asked to develop an economic and financial plan of integrated water service.

The Constitutional Court, with the sentence 29/2010, ruled unconstitutional the two articles mentioned above. The Constitutional Court argued that the protection of the environment and the guarantee of market competition are of exclusively competence of Central State. The Court affirmed that the aims of water tariff discipline are to protect the environment and to apply a uniform tariff system in all the country without any difference among the various Regions. The regional government argued that the RL 10/2008 acted in order to prevent the specification of water tariffs in a fragmented way, individually for different ATO. With a circular PG2010.0103608 of 13/04/2010 the Directorate General for Environment of the RER confirmed the validity of the tariff method introduced by the RL 49/2006 (along with subsequent modifications).

#### *Pro-capita tariff*

The Water Conservation Plan of RER foresees water tariffs that incentive water conservation. The DPRG 49/2006 introduced the obligation that within 5 years, or at the time of the first revision after 1/12/2007, the tariffs have to consider the number of household components (art. 10, comma 5). The ATO Bologna introduced another change, the so-called 'pro-capite' tariffs (PCT). The ATO Bologna introduced the pro-capita tariff experimentally in five municipalities in 2008 and since 2009 in the whole territory of competence. The tariff is applied only to domestic water uses and includes a fix and a variable component, both dependent on the number of household members. The tariff is organised in 5 blocks, the first two of which are subsidised, the third is standard one, and the last two are penalising the excessive water use. The pro-capita tariffs are specified in five blocs: the first two subsidised, and the last two penalising the high water use.

### **3.5 Policy Implementability**

The governance regime of water supply and sanitation in Italy is based on cooperative arrangements between state and regional governments. The centrally governed water tariff system is a result of a negotiated agreement, and subject of a periodic review conducted in collaboration with the Ministry of Environment and the Ministry of Finance. The vertical disaggregation of regulatory competences



respects the subsidiarity principle and power division between state and regions. At the level of an ATO, the constituting municipalities cooperate for the sake of coordinated and more efficient water service provision.

In RER, the governance regime is a result of a constructive public debate. The regional legislation is a result of an extensive consultation between the regional authority and social stakeholders (Regione Emilia Romagna, 2011). In 2004, the social water tariff was negotiated between regional authorities and labour unions (CGIL, CISL and UIL), resulting in production of a guidance document and pro-capita tariff later codified in the regional law (Regione Emilia Romagna, 2011).

Public understanding of the challenges of water supply and sanitation services in Italy is limited. The adverse public participation arose around the role of private sector in the service provision and the level of remuneration of the invested capital. Eventually, these two issues constituted two out of the four quests of the referendum held in Italy on June 2011.

On 12-13 June a citizen initiated referendum was held in Italy to partially abrogate the law 166/09 (so-called Ronchi law), decree 133/2008 and legislative decree 152/06 (the so-called Environmental Code) referring to the public water supply. Two out of four quest of the referendum address the public water services. The first quest addressed the article 23bis of legislative decree 133/2008 concerning the privatisation of public services with economic relevance, modified by Law 166/2009. Since 1999, public water services were entrusted to public (in-house) or private companies – water utilities. The legislative decree 133/2008 put higher burden on commissioning water supply and sanitation to in-house public water utilities, encouraging greater private sector participation. The law 166/2009 went further and requested that by December 2011 water services are either commissioned to entirely private or public-private companies. In the latter case the private constituent should account of at least 40 per cent of company's capital. The public water utilities were admitted only in transitional mode or in situations in which the market mechanism is either inefficient or useful.

The second quest sought abrogation of article 154 of legislative decree 152/06, determining the return on invested capital (ROIC) by the normalised method (NM). The ROIC provides incentive to invest into modernisation of water infrastructure, modernising the water services and making them more reliable. The NM set the ROIC to 7 per cent. Before the referendum, the Constitutional Court backed the ROIC by ruling that public water service was essentially an economic service (judgment n. 325/2010).

The referendum reached quorum and both quests, as well as the additional two not referring to the water services, were approved by the public ballot. From a legal perspective, the abrogation of article 23bis doesn't mean a return to the previous state of affairs. While waiting for the legislators to propose a new framework, the European rules on open competition in the public services management are in place.



The abrogation of article 154 of legislative decree 152/06 concerning ROIC has uncertain legal outcomes. The referendum abrogates the ROIC but it does not abrogate the normalised method. Unaffected by the referendum is also the article 117 of the legislative decree 267/00 requesting an adequate compensation of the invested capital based on prevailing market conditions.

Referendum triggered a heated public debate and a wide engagement. During the last fifteen years none of the abrogative referenda held in 1997, 2000, 2003, 2005 and 2009 reached the quorum. Hence it is not surprising that initially, the 2011 referendum was embraced by opposition parties, notably the Democratic Party who decided to abstain from the referendum. Other opposition parties, first among them “Italia dei Valori”, engaged actively in designing the referendum. Deeply held values about right to water, mistrust about government’s vested interests in privatisation of water service on the one hand and the poor record of regulatory entities on the other hand were among the factors that determined the success of the referendum. In addition, at least one of the other quests – whether Italy should enrol a nuclear energy programme effectively banned since 1987 public referendum – contributed significantly to the high participation of citizens in referendum. The public discourse about whether the WSS services should be privatised was dominated by ideological views and biased interpretation of facts. The government has not managed to explain the reasons and choices behind its model of privately exercised WSS services, with detrimental effects to the sector. In contrary, the opponents succeeded in framing the issue in terms of loosing public control about water resources per se, and depicting service privatisation as a way of making business and profit from a public good management, to the disadvantage of the ordinary citizens.

The results of the referendum introduced uncertainty about how, or whether at all, the private capital investment should be remunerated. Some believe that as a result of the referendum, the capital invested in the WSS infrastructure is not compensable and thus the service provision should remained in public hand. Others believe that the results of referendum refer to the current level of capital remuneration (7 per cent) and that the possibility to reward invested capital remains untouched. Arguably, the regulatory uncertainty has hindered the much needed investments and put at risk the implementation of existing investment plans. There is evidence that planned investments were put on hold until a new clear regulation is adopted. The concerned citizen committee ‘Two yeses for Water as a Common Good’ advanced a proposal, backed by four hundreds thousands citizens, for a sustainable financing scheme of water services’ infrastructure, initially submitted to the Parliament in 2007. It foresees establishing a central fund providing loans at agreed interest rates to water utilities. Only interest rates are to be paid back, refinancing the fund.



### 3.6 Transaction Costs

At the state level, the costs of regulation of water tariffs include the operative costs of the overseeing agency. The agency is set to collect the data about tariffs applied by ATOs across the country, verify the compliance with the state regulation, revise regularly the tariff system (especially the 'Normalise Method'), and produce annual reports about the state of WSS in Italy. Since 1994, the agency changed twice, incurring further costs due to reorganisation and restructuring. The Vigilance Committee for Water Resources (CO.VI.RI.) was initially established in 1994 and abolished in 2009. Its successor, the National Commission for Water Resources, was abolished in 2011. Most recently, the advisory and compliance control tasks have been assigned to the National Agency for Water Resources Vigilance.

At the level of Optimal Territorial Area (ATO), the transaction or institutional costs (Cardone and Fonseca, 2003) are internalised through water tariffs and born by the consumers. These include costs of negotiated agreements among the participating municipalities, and the operational costs of the Authority of ATO. In addition, the costs of regional vigilance committee or tariff commissions such as that established in RER by the resolution n.5749 of 16 April 2004.

Large proportion of the transaction costs are impaired by the litigation costs. Between 2008 and 2010, the Constitutional Court had intervened several times with respect to the water supply and sanitation service (sentences 335/2008, 246/2009, 307/2009, 29/2010, 142/2010 e 325/2010). The sentence 335/2008 declared illegitimacy of the article 14, comma 1, of the law 36/94 that determined that the tariff component relative to the wastewater treatment is to be paid also in the case when no wastewater treatment (WWT) is in place or if the WWT plants are temporarily suspended. The sentence also declared illegitimacy of the article 155 comma 1 of the Law decree 152/2006 for similar reasons. In the aftermath, the collected revenues for not delivered service have had to be paid back to the consumers. With the sentences 246/2009 and 325/2010 the Court specified that the authority over the WSS prevails over the institutional competences of the regional autonomy. The sentences 307/2009 and 142/10 referred to the way the state legislation regulating the WSS was transposed into regional legislation in Lombardy. Finally, the sentence 29/2010 with respect to the articles 2 and 7 referred to the regional law 10/2008 regulating water tariffs in Emilia Romagna (see section 3.4).

Relevant for the transaction cost is also the discussion of the abrogative referendum, held in June 2011 in Italy and discussed in section 3.5. Finally, the determination of the performance factor (PCn) and the eligibility for subsidised water tariffs as discussed in section 3.2, 3.3. and 3.4 are associated with substantial information collection and costs passed on to the consumers.

### 3.7 Uncertainty

The policy objective of the water tariff system in Italy and RER are not specified in quantitative and measurable targets. Nor are verifiable milestones identified whose



fulfilment could be used to determine the progress of implementation the water service governance. In principle, the latter can be inferred by the date the Optimal Territorial Area (ATOs) have been created, the ATO authority took office, the water service commissioned within the boundary of each single ATO, and the final ATO plan adopted.

The quality of the empirical evidence discussed in the section 3.1-3.3 is summarised in the pedigree matrix (Annex 2). Generally, the empirical evidence documenting the improvements of water supply and sanitation is not unequivocally attributable to the water pricing. Similarly, the water price levels and the recent relative changes cannot be immediately interpreted as a sign of improved cost recovery or efficiency improvement.

The regulatory or institutional uncertainty in the aftermath of the abrogative referendum in discussed in section 3.5.

## 4 Conclusions

The water pricing and tariffs pursue multiple policy goals, seemingly at odds but reconcilable in principle: *water use efficiency*, that is avoiding wasteful use of water; *allocation efficiency*, thus maximising overall society's benefits from water uses; *financial viability*, meaning ability to compensate capital, skills and technology needed to ensure water services and sanitation; and *social equity*, standing for affordability of water as a public interest good. We have analysed the water tariff systems (WTS) in Italy, introduced back in 1994 and gradually implemented until early 2000s, and the way the price system has been transposed in the Region Emilia Romagna (RER).

The domestic water supply is priced with fixed and volumetric components, the latter based on increasing block tariffs (IBTs). The tariff is set to recover full financial costs of the service, that is investment costs, operational and management costs, and administrative and support costs. The environmental and resources costs are not included, contrary to what is required by the Water Framework Directive.

The tariff system in RER applies IBTs adjusted to household size and income. The tariff separates water supply and wastewater treatment components. RER deploys 'social tariff', subsidised by other user groups, in response to the affordability of household water services. The water tariff is connected to the quality of the service provided, assessed using a set of environmental and service performance indicators.

The law 36/1994 reorganized the water service and set out for a modern, more efficient and harmonised water service. The reform had helped to reduce fragmentation in both service provision and water tariffs in place. Although the available data is patchy and rife with uncertainty of many kinds, a decreasing trend can be observed in water abstraction/consumption pro-capita and water pipeline leakage. Similarly, the household access to WSS has steadily improved. RER



performs better than the national average in all environmental outcomes, with a high variability across the Optimal Territorial Areas (ATOs). The price of a cubic metre of water and wastewater services, adjusted for inflation, increased significantly over the past years. Compared to other OECD countries, the water price adjusted by purchasing power parities is still low (OECD 2009), mainly because the initial capital investments borne by the central state are not amortised in the current tariff systems.

However, the tariff system has not guaranteed necessary investments into extension and modernisation of water infrastructures. The planned investments in water infrastructure are by far too low in order to guarantee a sustainable and reliable water services. The failed attempt to reinforce participation of public sector in WSS provision introduced a regulatory uncertainty discouraging from further investments. The water utilities will have access to external sources of finance, such as loans, only if a sufficient and reliable stream of revenue is ensured.

#### **4.1 Lessons learned**

The economic policy instruments such as water pricing operate within the boundaries limit laid down by the regulatory environment. In Italy, the eligible costs of the WSS services are determined by central government, leaving little leverage to the lower authorities. Controversial is the cost item referring to remuneration of invested capital (7 per cent according to the Normalised Method), abrogated by the 2011 public referendum, leaving space for different interpretations as for what is the role of private sector in the service provision.

Empirical evidence shows that water pricing is a suitable tool for encouraging water conservation and demand management. Water is a social good whose service provision can be governed by economic instruments. The recognition of right to water as a fundamental human right is not at odds with the participation of private sector in the water service provision. The access and affordability of water can be reconciled with water pricing in several ways. In RER, it is managed by social tariffs whose costs are distributed among the wealthier consumers. Alternatively, it could be managed either by income support (connected or not to water consumption), or by facilitated payments. See OECD (2009) for further discussion of both.

#### **4.2 Enabling / Disabling Factors**

The extent of litigation with respect to regulatory authority over water supply and sanitation services underlines the unresolved issue of power sharing between the state and regions. Given the large economic and social disparity across the administrative regions, more flexibility and discretion is warranted at the regional level in order to adapt water pricing schemes to specific environmental and socioeconomic conditions. The performance factor introduced in RER is an example of regulatory innovations that are worth to pursue. However, it should be based on a simple set of service quality indicators that can be easily collected and assessed.





The water tariffs system in Italy and elsewhere is vulnerable to arbitrary political interference. The current water pricing scheme blurs the distinction between the regulator and regulatee. On the one hand, local governments of municipalities assembled in a single Optimal Territorial Area play a part in water services regulation and tariff specification. On the other hand, it is common that the water utilities to which the WSS is commissioned are controlled by local governments.

Regulatory uncertainty is detrimental to the success of an economic policy instrument. The 2011 abrogative referendum in Italy has questioned the remuneration of capital investment into water infrastructure. The lack of regulatory response has negative effect on planned investments and obstructs implementation of the existing plans.

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## 6 Data Sources

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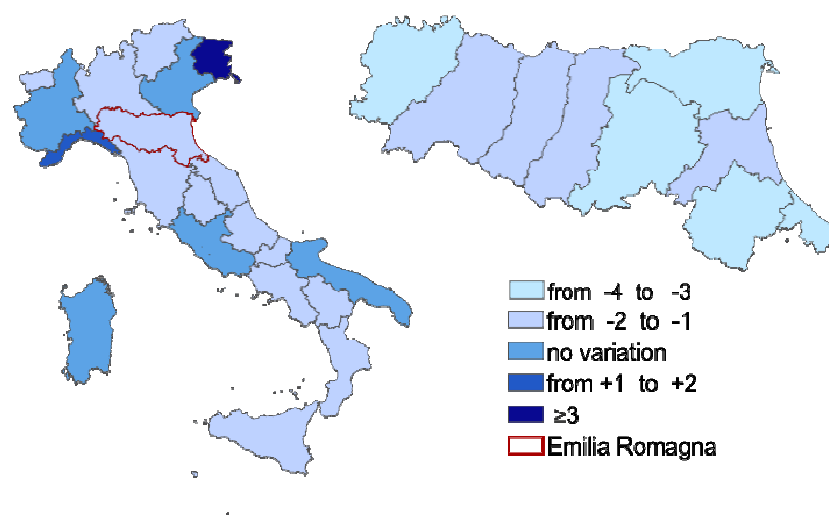
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<http://www.istat.it>

## 7 Annexes



## Annex I:



Map 7: Percentage of water losses change in the network from 2005 to 2008 per Region. Emilia Romagna Region is divided per ATO. Data source ISTAT 2008 – own elaboration.

Table 12 - Annual domestic water uses [m<sup>3</sup>/pc] and water tariff for 200 m<sup>3</sup>/year fro RER district towns

	W use 2001	Tariff 2001	W use 2005	Tariff 2005	W use 2009	Tariff 2009
Bologna	66.4	244.2	67.6	275.50	64.9	280.11
Ferrara	60.4	264	60.0	300.82	59.7	387.95
Forlì	53.6	283.6	52.2	289.00	50.1	357.71
Modena	63.4	180.4	58.6	245.52	55.2	290.64
Parma	74.8	192.5	69.3	236.30	62.9	346.2
Piacenza	101.3	118.8	84.1	122.60	78.1	269.35
Ravenna	67.3	246.4	71.3	290.46	62.5	384.9
Reggio Emilia	60.4	235.4	56.4	308.24	51.1	381.12
Rimini	68.5	226.6	68.7	257.32	61.6	328.89





## Annex II:

*Table A1 Pedigree Analysis for data used in this case study*

Assessment criteria	Value	Proxy	Empirical	Method
Water abstraction, pro-capita consumption		4	4	3
Sanitation services		3	4	3
Investment into water infrastructure		3	3	3
Social impacts of the tariff		2	3	2

## Annex III: Contributors to the report/Acknowledgments

This report has been written by the team of FEEM, led by Jaroslav Mysiak. The team include (in alphabetical order) Margaretha Breil, Fabio Farinosi, Lorenzo Carrera, Antonio Massaruto, and Francesca Testella,

