

Infrastructure Needs, Water Regulation, Financing Options and Areas of Improvements

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INTRODUCTION**

The European water industry operates under country specific regulatory frameworks. In 2000 the approval of the Water Framework Directive imposed a set of common rules aiming at promoting sustainable water use. The Directive recognised cost-oriented tariffs as an instrument to promote such sustainable use: the tariff calculation has to be based on an economic analysis which estimates the volume, prices and costs associated with water services, the relevant investments and a forecast of investments. The Water Framework Directive, however, does not detail mechanisms for cost recovery and tariff design.

The water industry, as other network industries such as electricity and gas, is highly capital intensive and each country has set its own rules to set tariffs to recover the costs of providing the water services (including capital charges) as well as to govern the relationships between the different stakeholders, including central and local governments.

Differently from the electricity and gas industries, however, no attempt has been made so far to introduce in the water sector a more comprehensive and harmonized set of rules at European level such as to have an homogeneous approach to cost recovery and governance across countries.

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Both governance and tariffs are keys to attract investments in a sector which needs significant investments to be carried out to develop and maintain infrastructures at a time when public budgets are unable to finance the required capital expenditures. It is perhaps also time to reflect on the best way to move forward and in particular the need to create a harmonized European approach to foster investments.

This working note intention is to provide some evidence on the European water sector, with a focus on tariff regulation from the point of view of several European regulators, water companies, infrastructure funds and lending institutions in order to identify areas for improvements of the regulatory design of the water sector.

The structure of this working note is as follows:

- Section 1 provides an overview of the different governance arrangements in the water sector;
- Section 2 summarizes the key features of water tariff regulation for a few European countries;
- Section 3 describes the set of conditions which attract private investors;
- Section 4 provides evidence of the importance that regulation has on access to financial sources;
- Section 5 concludes with a list of questions which could be addressed at the Seminar.

1. GOVERNANCE IN THE WATER SECTOR

The water sector is crucial in the development of a country for its role in production (e.g. in agriculture) and for the access to quality water services has on public health.

Granting access to water services and a proper quality of service require European policy makers and regulators to set a governance structure and an economic regulation that will allow water operators, whether public or private, to understand the targets to be achieved in terms of availability and quality of water services and to timely and properly recover the costs of providing water services of the required quality.

Targets to be achieved in the provision of water services are best identified by a clear long-term strategic planning. As water management involves different stakeholders at local, national and international level, long term planning requires identification of the role and competencies of each stakeholder and of the relationships between them.

There is no “one-fits-all” solution as each country has a specific territorial organisation and a different degree of development of institutions involved in the water management. As an example of such complexity, we report the results of a survey the OECD carried out in 2009-2010 across 17 OECD countries on the number of authorities at national level involved in water policy making (Table 1) and at local level (Table 2).

*Table 1
Authorities at National Level Involved in Water Policy Making
(2009-2010 Survey Results)*

Country/Region	Numbers of Principal Actors in Design and Implementation	Number of Actors in Regulation	Role of Central Government (dominant actor, joint role with local actors, none)	Specific water regulatory agency (yes/no)
Europe				
Belgium (Flanders)	7	-	None	No
Belgium (Wallonia)	-	-	None	No
France	5	5	Joint	No
Greece	13	12	Dominant	Yes
Italy	6	5	Joint	Yes
Netherlands	2	2	Joint	Yes
Portugal	3	5	Dominant	Yes
Spain	5	6	Joint	No
United Kingdom	11	5	Joint	Yes
Other OECD Countries				
Australia	4	4	Joint	Yes
Canada	9	3	Joint	No
Chile	15	10	Dominant	No
Israel	4	4	Dominant	
Japan	4	-	Dominant	No
Korea	6	4	Dominant	No
Mexico	6	4	Dominant	Yes
New Zealand	14	7	Joint	Yes
United States (Colorado)	11	7	Joint	No

Source OECD: OECD Studies on Water, Water Governance in OECD Countries- A multi-level approach, 2011.

Table 1 shows that in European countries the number of actors involved at national level in water policy making ranges from a minimum of 2 actors involved in design and implementation of provisions in the water sector and 2 in regulation in the Netherlands to 13 actors involved in design and implementation of provisions in the water sector and 12 in regulation in Greece. In non-European countries the number of actors involved at national level ranges from a minimum of 4 actors involved in design and implementation of provisions in the water sector in Japan to a maximum of 15 actors involved in design and implementation of provisions in the water sector and 10 in regulation in Chile. Regarding the role of Central Government in governance, in European countries the joint role of Central Government and local authorities is the prevailing arrangement, while the role of Central Government is predominant in other OECD countries.

Allocation of roles and responsibilities at local level shows the same degree of variability across countries.

Table 2
Involvement and Responsibilities of Local Authorities
(2009-2010 Survey Results)

Country/Region	Type of involvement (dominant actor, joint role with Central Government, no competence)	Water resources	Water supply (domestic)	Water Budget
Europe				
Belgium (Flanders)	Dominant	Regions, Municipalities	Regions, Municipalities, Intermunicipal bodies	CG, SNG, RBO
Belgium (Wallonia)	Dominant		Regions, Municipalities, Intermunicipal bodies	CG, SNG, RBO
France	Joint	Regions, RBOs	Regions, Intermunicipal bodies	CG, SNG, RBO
Greece	Joint	Regions	Municipalities	CG, SNG
Italy	Joint	Regions, RBOs, Water-specific bodies, Intermunicipal bodies	Municipalities	CG, SNG, RBO
Netherlands	Dominant	Regions, Municipalities	Regions, Municipalities	CG, SNG
Portugal	Joint	RBO, SNG (Azores and Madeira)	Municipalities, Regional and intermunicipal bodies	CG, SNG, RBO, RDA
Spain	Joint	Regions, RBOs	Municipalities, Regions and Intermunicipal bodies	CG, SNG, RBO, RDA
United Kingdom	Joint	Regions, Municipalities	Regions, Municipalities	CG, SNG
Other OECD Countries				
Australia	Joint	Regions, Water Bodies, RBOs	Municipalities, Water Bodies	CG, SNG, RBO
Canada	Dominant	Regions, Municipalities, Intermunicipal bodies, Water-specific bodies	Regions, Municipalities	CG, SNG
Chile	None (except municipalities for sanitation in rural areas)	None	None	CG, SNG
Israel	No competence	-	-	CG
Japan	Joint	n/a	Prefectures, Municipalities	CG, SNG
Korea	Joint	Regios, Water-specific bodies	Regios, Water-specific bodies	CG, SNG
Mexico	Joint	Regions, Municipalities, Intermunicipal bodies, RBOs	Regions, Municipalities, Intermunicipal bodies, RBOs	CG, SNG
New Zealand	Dominant	Regions, Intermunicipal bodies	Regions, Intermunicipal bodies, Municipalities	CG, SNG
United States (Colorado)	Dominant	Regions, Municipalities, RBOs, Water-specific bodies	Regions, Municipalities, RBOs, Water-specific bodies	CG, SNG, RBO, RDA

Note:

CG= Central Government

SNG= Sub National Government

RBO= River Basin Organisation

RDA= Regional Development Agencies

Source OECD: OECD Studies on Water, Water Governance in OECD Countries- A multi-level approach, 2011.

An example of the institutional layers of water management is provided for the Netherlands in Box 1.

Box 1
Water Management in the Netherlands

In the Netherlands, water management is carried out at both centralised and local level. There are different institutional layers in the water sector governance, ranging from the European to the municipal level:¹

- At the European level, the European Union sets legislation and regulation for water, floods and the environment while the International River Basin Commissions (Rhine, Scheldt, Meuse, Ems) are in charge of cross-border water management;

- At National level, the Ministry of Infrastructure and the Environment is in charge of water, spatial planning and flood protection at national level, of planning of the national water policy and of coordination with other policy areas such as spatial planning, environment, economic development, agriculture, etc, while the National Water Authority is in charge of the operation and maintenance of the main water system. In 2009 the Dutch Government adopted the River Basin Management Plans for the Dutch section of the international river basin districts. Such plans include a chapter with the economic analysis of water use which details cost recovery mechanisms for water services. Calculation of cost recovery includes the following costs: financial costs, including investments., opex, costs for research and implementation of groundwater measures;

- At Provincial level, the 12 provinces are in charge of integrated spatial and environmental planning, of the supervision of regional water authorities, of groundwater regulation and of coordination with other regional policy areas;

- At the Watershed level, the 24 Regional Water Authorities are in charge of operation and maintenance of regional water systems, flood defence, water quality and water quantity, wastewater transportation and treatment;

- At Municipal level, the 408 municipalities are in charge of local spatial planning, sewage collection and wastewater transport, urban drainage and stormwater collection.

In addition to the above institutional bodies, a number of other actors have a role in water management:

- 10 drinking water companies;

- The Delta Commissioner, which leads the Delta program in collaboration with the ministries and other stakeholders;²

- Institutes, advisory committees and associations.

The survey results highlights that the number of national and local institutional bodies involved in the design, implementation and regulation of the water sector requires governance to be carefully designed and implemented in order to provide the transparency in the planning and decision process required by water operators to run the system efficiently and to make the required investments.

¹ OECD, *Water Governance in the Netherland – Fit for the Future?*, 2014.

² The Delta program is a national program for flood defence and for freshwater supply.

Since the survey results were published, a rationalization of the water sector has been observed in several countries (as an example Netherlands, Portugal, Italy), together with a clearer definition of roles and competencies.³

Despite efforts towards a more efficient water management structure, governance appears still fragmented, and overlapping competencies of different institutions remain a barrier to consistent long term planning and sector development.

Table 3
Institutional Layers Involved in Setting the Policy of the Alfeios River Basin – Greece (Example)

Layer	Competent Authority	Role
Government	National Water Council	Advisory
	National Water Commission	Advisory
Ministry	Ministry of Environment, Energy and Climate Change + Special Secretariat for Water	Supervisory
	Ministry of Rural Development and Food	Participatory
	Ministry of Transport and Networks	Participatory
	Ministry of Finance	Participatory
	Ministry of Interior, Decentralisation and E-Government	Participatory
	Ministry of Maritime Affairs, Islands and Fisheries	Participatory
	Ministry of Health and Social Solidarity	Participatory
	Ministry of Infrastructure	Participatory
	Ministry of Culture and Tourism	Participatory
	Ministry of Development and Competitiveness	Participatory
Decentralised Administration	2 Regional Water Authorities	Supervisory, Executive
	2 Departments of Environment & Planning	Participatory
	Regional Forestry Department	Participatory
	2 Departments of Rural Planning	Participatory, Executive
	Department of Civil Protection	Participatory
Regional Unit	Department of Local Administration and Decentralisation	Participatory
	3 Departments of Environment and Hydro-Economy	Executive
	3 Departments of Rural Economy	Executive, Participatory
	3 Departments of Public Works	Executive, Participatory
	3 Departments of Planning	Participatory
	3 Departments of Health and Welfare	Participatory
Municipality	3 Departments of Civil Protection	Supervisory, Participatory
	Enterprises for Water Supply and Sewerage	Executive
	Directories of Technical Services	Executive
	Local Organisation for Land reclamation	Executive
Other	Public Power Corporation S.A.	Executive
	Archaeological authority	Supervisory, Participatory
	Land public authority	Supervisory, Participatory
	NGOs	Supervisory, Advisory, Participatory

Source: Marianthi V. Podimata and Panayotis C. Yannopoulos, 2012, *Kallikrates Scheme and Water Governance in Greece*, paper presented at the International Conference on the protection and Restoration of the Environment

³ As an example, in Greece, the so-called “Kallikrates Law” in 2010 reformed local and regional public administration by reducing the number of local administrative bodies and such reform is expected to have a positive impact also on the governance of the water sector.

A poor regulation of the relationships within and across institutional layers, for example lack of coordination between Ministries and regulators, overlapping of competencies, etc. would result in poor definition of targets to achieve and in low transparency of decisions on the investments to be carried out.

A poor identification of which investments are required to achieve the targets will, in turn, have a negative impact on economic regulation, which will not be able to identify the most efficient investments to be remunerated in tariffs. Poor governance, therefore, will translate in lack of investments and higher costs of the system to achieve the required standards in term of quality of service and access to the service.

2. Water Tariff Regulation in Selected European Countries

Further to the differences in Governance, European countries show also a variety of approaches to economic regulation. As an example, Table 4 provides an overview of the differences in water tariff regulation across Member States for a sample of five European countries (Denmark, England & Wales, Ireland, Italy, and Portugal).⁴

Table 4
Regulatory Provisions of a Sample of European Countries

Country	Regulatory Period	Who is responsible for economic and quality of service regulation	Tariff control	Treatment of costs
Denmark	1 year	<ul style="list-style-type: none"> Regulator is the Nature Agency (Ministry of the Environment) and define the economic and environment regulation as well as climate change policies Tariffs approved by Competition Authority (Ministry of Economic Development) 	<ul style="list-style-type: none"> Revenue cap calculated as opex plus net financial items plus pass-through costs plus depreciation plus correction for over/undercovery of costs in previous years Opex are calculated using benchmarking 	<ul style="list-style-type: none"> Valuation on opex efficiency by benchmarking
England & Wales	5 years	<ul style="list-style-type: none"> Tariff approved by the Regulatory Independent Authority Regulator is also responsible for setting quality of service targets 	<ul style="list-style-type: none"> Price cap: RPI – K formula (k is the efficiency factor) with forecasts of expected RAB, new investments, opex, and volumes Output based regulation based on control of total expenditures (TOTEX) for the regulatory period 2015-2020 	<ul style="list-style-type: none"> Valuation on opex , capex and quality of services efficiency (by benchmarking and industry expert reviews) RPI used for RAB, capex and opex Economic depreciation No time lag for remuneration Penalties & Rewards
Ireland	6 years	<ul style="list-style-type: none"> Tariff approved by the Regulatory Independent Authority Regulator is also responsible for quality of service 	<ul style="list-style-type: none"> Revenue cap: RPI – X formula (X is productivity gain) with forecasts of expected RAB, new investments, opex, volumes Targets in terms of quality of services (output regulation) 	<ul style="list-style-type: none"> Valuation on opex , capex and quality of services efficiency (by benchmarking and industry expert reviews) RPI used for RAB, capex and opex No time lag for remuneration
Italy	4 years	<ul style="list-style-type: none"> Tariff approved by the Regulatory Independent Authority Regulator is also responsible for quality of service 	<ul style="list-style-type: none"> Revenue cap: depreciation+financial costs+opex+component for financing new investments+environmental costs+revenue balance with previous year 	<ul style="list-style-type: none"> Valuation on opex efficiency (profit sharing in place between users and companies) Fixed deflator used for RAB and capex, RPI used for opex 2 years' time lag for remuneration Economic depreciation (financial in some cases)
Portugal	1 year	<ul style="list-style-type: none"> Tariff approved by Ministry of the Environment after the Regulator opinion Regulator responsible for quality of service 	<ul style="list-style-type: none"> Today cost plus: depreciation+opex+financial costs+equity costs less other revenues /volumes Shift toward revenue cap under discussion No full cost recovery 	<ul style="list-style-type: none"> Valuation on opex efficiency

⁴ Analysis of regulator's websites and public information.

Our analysis shows that:

- tariffs are approved by the regulator in England & Wales, Ireland and Italy, and by the Ministry in Denmark and Portugal;
- Denmark and Portugal have one-year regulatory periods, while England & Wales, Ireland and Italy have multi-annual regulatory periods;
- Cost-plus regulation is adopted in Portugal, a price cap regulation applies in England & Wales and Denmark, and revenue cap regulation is utilized in Ireland and Italy;
- operating and capital expenditures are under efficiency valuations scrutiny in England & Wales and Ireland, operating expenditures efficiency is evaluated in Denmark, Italy and Portugal. Efficiency of quality of services is evaluated in England & Wales and Ireland;
- tariffs increase according to the achievement of quality of services goals fixed ex-ante in Ireland and England & Wales.

Appropriate cost recovery mechanisms are needed to ensure financial viability of water management. The Water Framework Directive does not provide details on requirements for cost recovery as there is no agreement among European countries on the costs to be recovered and on water use which can be qualified as “water service”. Such uncertainty has led to a lack of investments that will negatively influence the development of water infrastructures.

3. Water Infrastructure Needs and Investors Requirements

Table 5 provides for illustrative purposes data on annual projected capital expenditures on water infrastructures in the main EU countries by 2015 and 2025. Those data are expressed as a percentage of Gross Domestic Product (“GDP”) and USD billions.

Table 5
Water Infrastructures Needs

Nation	Projected Expenditures on Water Infrastructure % of GDP		Average Annual Expenditures USD Billions	
	By 2015	By 2025	By 2015	By 2025
Austria	0.8	0.9	2.6	3.9
Belgium	0.8	0.7	2.8	4.4
Czech Republic	1.9	0.9	3.1	2.8
Denmark	0.8	0.9	1.8	2.7
Finland	0.8	0.7	1.4	2.2
France	0.8	0.8	16.9	25.8
Germany	0.8	0.8	23.4	35.8
Greece	0.8	0.8	2.2	3.3
Hungary	0.8	1.4	2.0	2.8
Ireland	0.8	0.7	1.4	2.2
Italy	0.8	0.9	16.8	25.2
Luxembourg	0.8	0.6	0.2	0.4
Netherlands	0.8	1.1	5.4	7.9
Norway	0.8	0.6	1.6	2.6
Poland	1.9	0.9	7.9	7.2
Portugal	0.8	0.9	2.0	3.0
Slovak Republic	1.9	0.9	1.4	1.2
Spain	0.8	1.1	11.0	16.0
Sweden	0.8	0.7	2.3	3.6
Switzerland	0.8	0.6	2.0	3.2
United Kingdom	0.7	0.9	19.1	28.0
Total	0.8*	0.9*	127.1	184.1

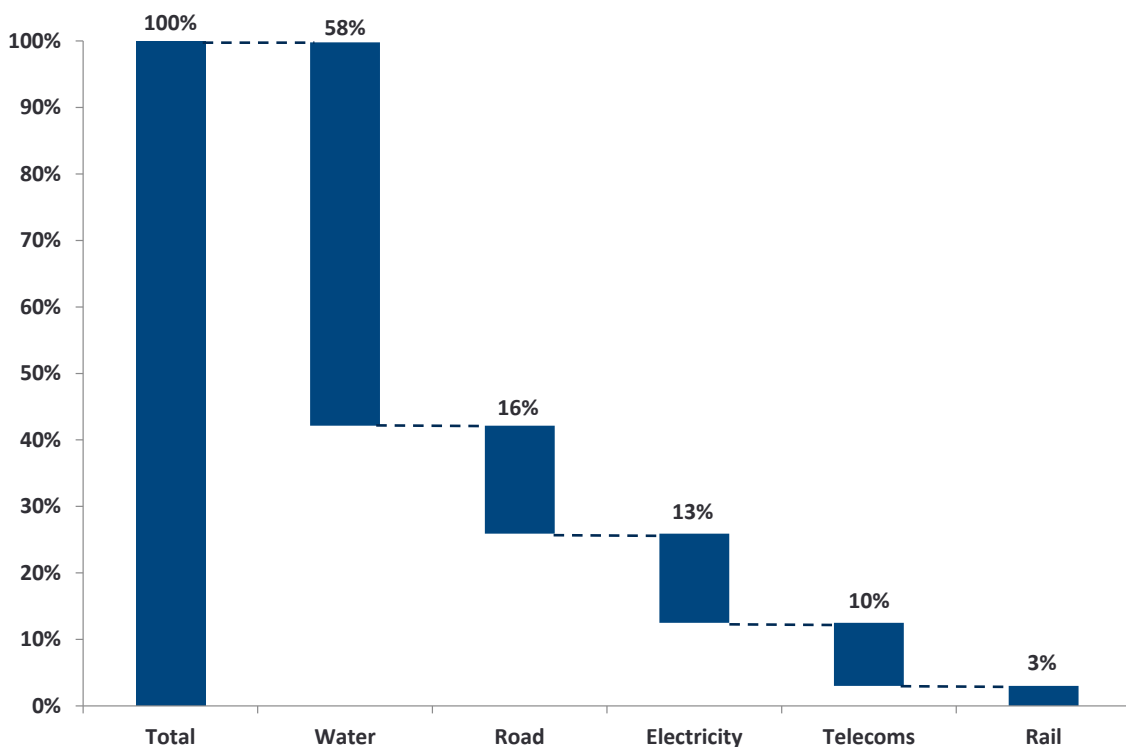
Source: The Brattle Group on OECD Infrastructure to 2030: Telecom, Land Transport, Water and Electricity, Volume 2 (2007)
*% of GDP is weighted average for total GDP.

Annual projected capital expenditures on water infrastructures by 2015 and 2025 amount to 0.8% and 0.9% of GDP on average. The percentage of GDP ranges from a minimum of 0.7% to a maximum of 1.9% by 2015, and from a minimum of 0.6% to a maximum of 1.4% by 2025.

Total expenditures amount to 127.1 USD billion by 2015 and 184.1 USD billion by 2025. Expenditures ranges from a minimum of 0.2 USD billion to a maximum of 23.4 USD billion by 2015 and from a minimum of 0.4 USD billion and a maximum of 35.8 USD billion by 2025.

Data on capital expenditures in the main EU countries for other infrastructures (roads, electricity, telecoms and rails) are not available for comparison. For illustrative purposes, we report results of such comparison at world level published in the 2007 OECD study, which show that capital expenditures in the water sector represent about 60% of the total world’s annual capital expenditures in infrastructures (about € 10 trillion over a total of € 1.8 trillion) during the period 2020-2030 (Table 6).

Table 6
*Relative incidence of world’s capital expenditures by sector
(average values during the period 2020-2030)*



Source: The Brattle Group on OECD Infrastructure to 2030: Telecom, Land Transport, Water and Electricity, Volume 2 (2007), Values for Water and Telecom are considered by 2025.

Investments required by the water sector can hardly be funded by public budgets due to the fiscal constraints. This implies that the role of private investors in financing the required investments has to increase.

The water industry is characterized by significant investments in infrastructures with an economic life of at least forty years. Private investors should be will be willing to commit their capital as long as they expect that their investments in water assets will not become stranded, i.e. as long as they expect that they will be able to remunerate their investments.

Investors' expectations are met when a regulatory framework exists which meets the following general criteria:

1. Tariff mechanisms that are able to provide predictable cash flows for the entire life of the assets on the basis of stable and transparent rules agreed ex-ante (and periodic updates of parameters);
2. "Safeguard clauses" that allow proper remuneration of invested capital in case of unpredictable events that are outside the control of the regulated company;
3. Clear rules that allow investors to recover the value of their assets when early termination in the provision of water services is allowed and at end of the concession in those cases where water services are provided after a concession has been granted.

4. Regulation and Access to Financial Sources

The importance of the regulatory framework in investors’ decisions is highlighted by the weight given by credit rating agencies in the evaluation of credit quality. The latter is a key consideration as to whether companies can access the financial sources necessary to fund their investment programs and credit rating agencies form their judgment by taking into account a wide range of factors – including the regulatory framework (Table 7).

Table 7
Example – Moody’s Credit Factors

Credit Factors for Moody's	Weighting
1. Regulatory Environment & Asset Ownership Model	40%
1. a) Stability & Predictability of Regulatory Environment	15%
1. b) Asset Ownership Model	10%
1. c) Cost and Investment Recovery (Ability & Timeliness)	12%
1. d) Revenue Risk	3%
2. Operational Characteristics & Asset Risk	10%
2. a) Operational Efficiency	5%
2. b) Scale & Complexity of Capital Programme & Asset Condition Risk	5%
3. Stability of Business Model & Financial Structure	10%
3. a) Ability & Willingness to Pursue Opportunistic Corporate Activity	3,33%
3. b) Ability & Willingness to Increase Leverage	3,33%
3. c) Targeted Proportion of Revenues Outside Core Water and Wastewater	3,33%
4. Key Credit Metrics	40%
4. a) Adjusted Interest Coverage OR FFO Interest Coverage	15%
4. b) Net Debt to Regulated Asset Base OR Debt/Capitalisation	15%
4. c) FFO / Net Debt	5%
4. d) RCF / Capex	5%
TOTAL	100%

Source: Moody’s Global Infrastructure Finance, 2009.

Table 7 shows that the “Key financial credit metrics” and the “Regulatory environment & asset ownership model” have the highest weights (40% each) while weights for the “Operational characteristics & asset risk” and the “Stability of the business model and financial structure” are the lowest (10% each).

Evaluation of the “Regulatory environment & asset ownership model” requires evaluating the following features:

- a) Stability and Predictability of the Regulatory Environment: this feature captures the level of strength that derives from the regulatory and/or concession framework under which the company operates;
- b) Asset Ownership Model: this feature analyzes whether regulated companies own their assets in perpetuity, or for a defined time horizon under a concession, or under other contractual agreements. In those cases where the assets are owned in perpetuity, an assessment is made on the ownership rights that are subject to a license and the risk of license termination. In the other cases, an assessment is made on the recovery mechanism of the residual assets value at the end of the concession or the other contractual arrangement;
- c) Cost and Investment Recovery: this feature analyzes the ability of a regulated company to recover the cost of its operations and/or investment in a timely manner, thus verifying the stability of the cash flow;
- d) Revenue Risk: this feature analyzes the potential unpredictability of revenues by taking into account fluctuations in volumes of goods and services sold.

The factors utilized by credit rating agencies in their judgment give additional evidence of the importance that regulation has on access to financial sources.

5. Questions to be addressed

The need for very significant investments, together with the inability of public funds to finance such expenditures, motivates the following questions:

- To what extent can water sector governance be rationalized and harmonised across countries, so as to provide the required transparency to carry out investments?
- Would it be useful to envisage the introduction of a long-term tariff mechanism where rules are defined for the entire life of the asset and parameters are subject to periodic reviews?
- How should risks to be allocated between companies and end users (e.g. operating risks, cost overruns for new investments, changes in law/regulation, force majeure and other unpredictable events and events that are outside the water company's control)?
- What rules should be introduced, if any, for the determination of the value of assets in case of early termination of provision of water services or at the end of the provision of service?

The introduction of a harmonized set of rules so as to have a common approach to cost recovery and to governance across European countries would provide a consistent answer to the questions above, that would benefit all consumers in European countries by attracting the investments required to improve water infrastructures and by enhancing efficiency in water use.

Harmonisation, however, is a costly process for both regulators and companies. There is, therefore, a trade-off between the degree of harmonization to be achieved and the costs that harmonization will impose on European countries. This implies identifying the minimum general requirements to be imposed in order to create the required regulatory framework to foster investments without imposing undue constraints on countries.

REFERENCES

AEEG. (2013). AEEGSI Resolution 643/2013/R/idr.

C.W.C. (2009). Sudden Impact. An Assessment of Short-Term Economic Impact of Water and Wastewater Construction Projects in the United States. Arlington VA: Clean Water Council.

CWRSF (2009). Annual Report.

Co.N.Vi.R.I. (2011). Rapporto sullo stato dei servizi idrici (Vol. I). Roma: Commissione Nazionale per la Vigilanza sulle Risorse Idriche.

EPA. (2008). Clean Watersheds Needs Survey 2004. Report to Congress. Washington DC: Environmental Protection Agency.

IJ GLOBAL (2014). Global PPP Market Review.

MARIANTHI V. PODIMATA and PANAYOTIS C. Yannopoulos, 2012, *Kallikrates Scheme and Water Governance in Greece*, paper presented at the International Conference on the protection and Restoration of the Environment.

MCKINSEY GLOBAL INSTITUTE (2013). Infrastructure productivity: How to save \$1 trillion a year.

MOODY'S (2009). Infrastructure Finance.

MOODY'S (2011). Europe 2020 Project Bond Initiative.

OECD (2007). Volume 2, Infrastructures to 2030, Mapping policy for electricity, water and transport.

OECD (2011), Water Governance in OECD Countries: A Multi-Level Approach.

OFWAT (2011). Financeability and financing the asset base - a discussion paper.

OFWAT (2013). Setting price control for 2015-2020 – framework and approach.

UTILITATIS (2014). Blue Book, I dati sul servizio idrico in Italia.

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