New regulatory tools for ecological transition in the water sector

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1. Introduction

In 2019 the conclusions of the first European Forum on the Regulation of Water Services launched the idea to renovate the set of regulatory tools adopted by water authorities by activating innovation-based and risk-based approaches, besides classical economic regulation focused on cost recovery (input-based) and quality standards (output-based).

Risk-based regulation seems to be well suited for interruptions when water services are performed well: in this case, the risk of service interruption can be considered as "medium" when it is unlikely to happen but can generate high negative impacts. Under these conditions, a "risk-based approach" is more reliable than an output-based approach since it is better to measure the risk level before an adverse event occurs than to count the number of times a target was not achieved. This approach is already adopted by some regulators in Europe, like the Italian ARERA[1], to improve the resilience of the electricity grid in the event of particularly severe weather conditions (e.g. unforeseen heat waves, icing, etc.). A similar approach can be applied also to the water sector, considering that the recent reform of the Drinking Water Directive has promoted a new paradigm of water management, based on risk instead of ex-post control (*Directive (EU) 2020/2184, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020L2184&from=EN)*

Water utilities in Europe are growing fast, not only by investing in new businesses related to circular economy but also by developing research activities and focusing on innovation-based solutions. The EU has financed many research projects on water management and involved water utilities as research partners. Currently, water utilities are critical players in many research projects, acting as innovation hubs by engaging their stakeholders (i.e. consultants, researchers, suppliers, investors, and regulators). One of the most evident effects of this type of innovation strategy is a profound change in operations, which requires a continuous evolution of skills and capabilities to work in a water utility company. For instance, the need for plumbers has been substituted by the need for drone pilots or high-tech experts to search for leakages in water mains.

2. What will be the role of regulators amidst such innovative strategies?

First of all, innovation aims at changing administrative, commercial, and productive processes and at launching new products and services, in order to accelerate competitive success in a competitive market and to achieve regulatory targets in a monopoly supervised by a public authority.

An economic regulator can indirectly stimulate innovation through input-based and output-based tools. In Italy, for instance, the independent national Regulator sets specific service quality targets using performance indicators that measure water leakages, the number of interruptions of water and sanitation services, quality of water, floods caused by wastewater pipes, sludge disposed in landfill and quality of treated wastewater. Following the introduction of these performance targets, many water utilities started to improve their operations by adopting more innovative solutions.

In addition to this indirect stimulus, regulators can use direct levers to promote innovation, such as allowing companies to derogate from rules if they wish to achieve certain specific targets (i.e. allowing pilot projects and regulatory experiments), or using funds generated through tariffs and available to finance eligible projects presented by water utilities to regulators. Similar regulatory

incentives are also adopted in the energy sector and recently launched by water regulators (e.g. OFWAT, innovation funds initiative; ARERA strategic plan 2019-2022).

3. Why should a regulator stimulate innovation in the water utility?

There are four reasons to answer this question:

1. **Consumers** will benefit from an accelerated process of quality increase, facilitated by a stimulus to innovation linked to the pre-existent output-based regulation or to a particular outcome like for instance environmental sustainability.
2. **Companies** will receive benefits in terms of a mitigation of their costs and of their risk of failure due to innovation processes.
3. **The Regulator** will have the opportunity to drive part of the innovation stream in the sector, choosing which projects should be incentivised; then, it could receive feedbacks on the effectiveness of the rules tested with regulatory experiments and sandboxes the faculty to adapt ordinary rules.
4. **The sector** will be affected by a vast knowledge transfer among water utilities and, on a vertical base, between the supply chain and utilities, becoming more attractive for consultancy, researchers, and investors.

4. A taxonomy of the direct stimulus for innovation.

Beside an indirect stimulus, a direct way to boost innovation can be developed through different tools.

1. **Derogation** to ordinary rules in case new process and services are introduced. In this case, utilities can gain more flexibility in their obligations to achieve regulatory targets (e.g. the regulatory experiment for electricity Distribution System Operators made by ARERA in Italy) or with a lower degree of compliance with norms (e.g. sandboxes introduced by OFGEM in the UK); utility, regulators and consumers can experiment new processes and technologies in a controlled environment, with a limitation of risks and negative drawbacks.
2. **Funding** of projects directly selected by the Regulator, eventually in cooperation with an institutional, technical partner (e.g. the innovation fund initiative of OFWAT in England and Wales)
3. **Tools at point 1) and 2) might be connected to:**
    1. Pre-existent targets set by means of output-based regulation, which can be achieved differently from ordinary regulation;
    2. New targets bargained between utilities and the Regulator before the experiment starts (e.g. introduction of risk measures);
    3. General outcomes concerning, for instance, net-zero emissions, not included in ordinary regulation.

5. Conclusion. Main features of regulatory experiments.

Experiments, apart from their design, should have at least the following four main features.

1. They should be **temporary**, with a defined deadline and assigned milestones to allow its periodical evaluation and to avoid the risk that innovation-based regulation becomes a way to regularly derogate from rules in the long term.

2. They should be **measurable** by indicators to allow the Regulator to effectively select their applications and to assess, ex-post, the costs and benefits of the selected project.
3. They should be presented on a **voluntary basis** by a water utility, since innovation is not an obligation.
4. Their outputs must be spread throughout the water sector, to facilitate knowledge transfer and **open innovation**.

[1] The Italian Regulatory Authority for Energy, Networks and Environment (www.arera.it).