How to finance water saving in water & wastewater utilities?

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How to finance water saving in water & wastewater utilities?

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RECOMMENDATIONS FOR LOCAL COMMUNITIES

1- Identify the costs associated with transitioning to water sobriety and explore new sources of revenues;

2- Improve communication on the services provided by water and wastewater utilities to users;

3- Improve contractual relationships in Public-Private Partnership contracts;

4- Incorporate the management of the entire hydrologic cycle in the future projects of water and wastewater utilities in order to ensure better adaptation to climate change, improve cost control and have access to more public funding.

How to balance the equation for water and wastewater utilities in France?

For water and wastewater utilities, the past few months have been characterized by a double "sobriety". First, a series of sobriety policies has been implemented to deal with the energy shortages caused by the war in Ukraine. Second, those utilities had to face an increasing number of droughts across the country while already

facing a significant reduction in water consumption. They are thus forced to rethink their financing model which was based until now on the idea of continuous, linear and predictable growth in volume [1]. Furthermore, this double sobriety goes against the « water pays for water » principle that means that water tariffs must be able to finance the operations and investments of those utilities, since a drop in water consumption means a drop in revenue for the local authority, the private operator and the water agencies - all of which depend on the volumes sold to users.

Their financing model is thus incompatible with sobriety since a drop in water consumption means a drop in revenue for the local authority, the private operator and the water agencies - all of which depend on the volumes sold to users. Moreover, a decrease in water consumption also leads to an increase in costs, notably due to the inertia of the current infrastructure. The transition to water sobriety thus weakens utilities that are already chronically underinvested in, as some local authorities refuse to raise the price of water to finance them.

This policy paper summarizes a study that examined the adaptation of the economic model, which is essentially based on fixed costs but variable revenues, to the context of sobriety.

We have come to the conclusion that:

1) The level of awareness of the need to make the transition to water sobriety and of the costs involved varies among the respondents;

2) This transition will entail additional costs, which requires water utilities to have a better understanding of the solutions, innovative practices and funding available to them;

3) Regulatory changes, such as the introduction of an economic regulator, are needed to ensure a virtuous transition.

Introduction

A costly transition adding up to a huge investment deficit

Given the cost-recovery principle, commonly referred to as the "water pays for water" principle, water and wastewater utilities need to increase water sales in order to finance the renewal of their networks. However, they currently face chronic under-investment which results in the aging of networks in France (see Box 1). At the current rate of investment, it takes on average 200 years to replace the water pipes, even though their lifespan does not exceed 60 years, which results in a leakage rate of 20% in France. **Consequently, while utilities must already face the issue of chronic under-investment, water sobriety leads to an increase in the operating costs at the same time of a decrease in revenues, at constant prices and population** [2].

[1] The issue of the transition to water sobriety is not new in France, since the fall in water consumption was identified more than ten years ago. This is largely the result of improvements in household appliances and a growing awareness of water scarcity.

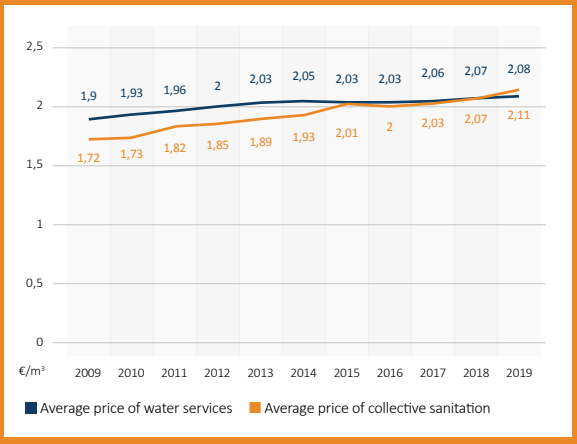
[2] If water consumption decreases, additional costs are likely to rise given the oversizing networks and plants. However, sobriety might also downgrade the quality of the water consumers will receive, due to longer hydraulic detention times, less dilution of wastewater and therefore more inconvenient smells and toxic gas formation, as well as greater concentration of micropollutants.

BOX 1

The capital expenditure required for water and wastewater services in France and their equivalent price rises

In its latest report, the *Union Nationale des Industries et Entreprises de l'Eau* (UIE) assesses the required capital expenditure for water and wastewater networks and the resulting price increase, all other things being equal (UIE 2022). As the report points out, in a context of declining water consumption (18 fewer litres of water consumed per person per day over 20 years (FP2E - BIPE, 2019)), the decline in spending while operating costs and water prices are rising illustrates the limited room for manoeuvre available to utilities.

Furthermore, given the current inflation, spending on services is likely to rise sharply, notably due to the explosion of input prices (chemicals, building materials, etc.).
This could result in a rise in the price of water services and a drop in the number of capital expenditure, thus leading to a greater need for network replacement.



Source : UIE 2022

The UIE estimates the funding deficit in water services at between €1 and €3 billion per year on average. Applied to the price of a m³ of drinking water paid by consumers, the overall investment deficit represents between €0.13 and €0.38 per m³, namely between 6% and 18% of the price of the drinking water service including taxes, based on a 120 m³ drinking water bill of €249.60 (which corresponds to the average consumption of a three-person household). Alleviating this deficit through water bills only would represent an average additional cost of €15 to €45 per year.
As for wastewater services, the annual deficit is between €0.5 and €2 billion on average. In terms of the price of the m³ paid by consumers, the overall investment shortfall represents €0.07 to €0.26/m³, or 3% to 12% of the sanitation price including tax, based on a 120 m³ bill of €252.40 (which corresponds to the average consumption of a three-person household). This would represent an additional cost of €7.5 to €30 per year.

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Methodology

This policy brief summarizes the results of a research that was conducted between September 2022 and January 2023. The aim of the study was to provide a clear picture of the level of awareness of the double-edged sword that water sobriety represents in the face of the challenges of reducing consumption and protecting water. It also examined the difficulties that the transition to water sobriety might entail. This assessment was carried out by means of a survey that was sent to managers of water and wastewater services in France (486 respondents)[3]. The questionnaire was divided into three main sections: i) the urgency of the transition to sobriety and its financing model, ii) innovative practices and iii) changes required to facilitate this transition[4].

> “THE LEVEL OF AWARENESS OF THE CHALLENGES RELATED TO THE TRANSITION TO WATER SOBRIETY VARIES ACROSS THE TERRITORY. ”

Study results

Have the actors in the sector truly become aware of the impact of sobriety on their economic model?

The level of awareness regarding the challenges related to the transition to water sobriety varies across the territory. In January 2023, **42% of the respondents considered water sobriety issues (preservation of quantity/quality of the resource, network efficiency, and consumption reduction) to be irrelevant.**

Regarding the solutions considered to maintain financial balance in case of reduced consumption, the majority of the respondents mentioned efficiency and price increase. Lower investments ranked third (See Table 1).

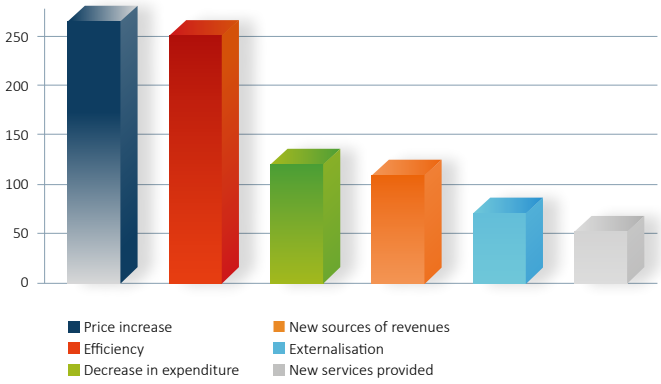

TABLE 1

Question 11: How do you deal with the reduction in revenue caused by the decrease in consumption, if applicable? (Multiple answers possible)

How to control operating costs in a context of sobriety?

While 47% of the respondents believe that sobriety and increased costs do not necessarily go hand in hand (See Table 2), research has shown that rising temperatures or significant decrease in water quantities in the water pipes have adverse effects on water quality. Rising temperatures and prolonged drought periods in

[3] Respondents to the survey are relatively representative of the water and wastewater utilities in France. The survey was carried out among 9,000 managers of water and wastewater services between January 5 and 15, 2023. The response rate was close to 5% (486 responses obtained, 686 utilities concerned in total), with 63% of utilities in rural areas, the majority managed by public authorities (60%) and an average utility size of around 30,000 inhabitants.

[4] The study focused essentially on the issue of financing the transition to sobriety, deliberately leaving aside the question of demand management, conflicts of use and the sociological impacts associated with this transition.

sanitation networks can require additional treatment, resulting in over-costs [5]. Less water in the networks can also degrade the quality of the resource due to increased residence time, reduced dilution of wastewater effluent, and can therefore lead to more odor nuisance and toxic gas formation, with a greater concentration of micropollutants at the outlet [6].

Sobriety and costs	Frequency	Percent	Total
No	150	30,86	30,86
Doesn't know	76	15,64	46,50
Yes	260	53,50	100
Total	**486**	**100**	

TABLE 2

Question 9: Do you think that greater water sobriety and higher water service costs go hand in hand?

To ensure financial balance, a price increase appears to be the primary lever available to water management authorities. However, it seems challenging to implement for a majority of respondents: **only 25% of communities believe that water prices could be increased significantly (by more than 10%) to finance the transition to water sobriety.**

Therefore, the second lever to ensure cost recovery through revenue is the control of operating costs, particularly through the identification of new areas for savings, namely nature-based solutions, solar energy, better management of non-conventional water sources such as reclaimed water or rainwater (See Table 3).

The survey results highlight the limited number of innovative solutions currently implemented in France [7]. Potential areas for better cost control, such as kinetic water capture or riothermia, are underutilized by services undergoing the transition to sobriety.

However, the responses vary depending on the management mode and whether it is an urban or rural area. For example, while more than 50% of the publicly managed services declare that they have not implemented any innovative practices to achieve greater water sobriety, it is less than 40% of the services managed as part of a public-private partnership.

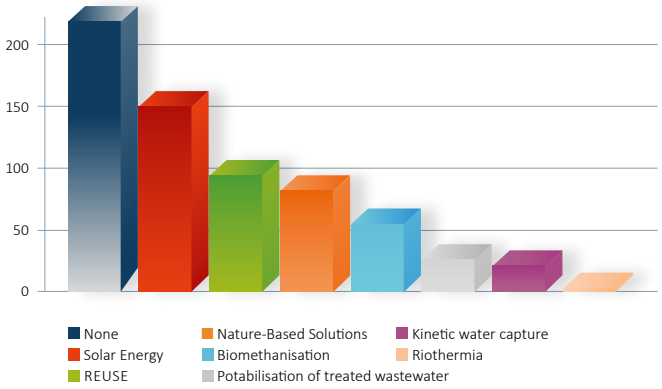

TABLE 3

Question 15: What innovative practices have you developed or are you considering developing to facilitate the transition to water sobriety? (Multiple answers possible)

Innovations implemented to achieve greater water sobriety appear to be more frequently deployed when services are managed under a public-private partnership rather than directly managed, although the difference is not substantial [8].

Additionally, the majority of respondents in rural areas (55%) stated that they had not yet implemented innovative practices for greater water sobriety. Only 20% of them have developed or planned to develop nature-based solutions and solar energy production. In urban or mixed areas, the results are different. Only 27% of respondents said they had not implemented or considered implementing innovative practices to achieve greater water efficiency. Finally, over 45% said they had implemented or considered implementing REUT or solar energy solutions.

> "47% OF RESPONDENTS BELIEVE THAT SOBRIETY AND INCREASED SERVICE COSTS DO NOT NECESSARILY GO HAND IN HAND."

[5] Maria Salvetti, « Patrimoine Eau Potable, Assainissement Collectif, Eaux Pluviales En France - Une Approche Des Enjeux Financiers de La Sécurité Hydrique. » (Union des Industries et Entreprises de l'Eau 2022).

[6] Florentin, Daniel. 2015. « La vulnérabilité des objets lents : les réseaux d'eau. Les enjeux des diminutions de consommation d'eau vus à travers un exemple allemand ». Les Annales de la recherche urbaine, Ville et vulnérabilités, n°110: 152-63.

[7] Remote water meter reading (télérelève) has also been regularly mentioned by respondents as an innovative solution.

[8] The result is paradoxical since 33% of respondents believe that public utilities are better equipped than delegated management contracts (DSP) to succeed in the transition to water sobriety, while 56% of respondents do not see a link between sobriety and the mode of management.

How to facilitate the transition to water sobriety?

Regarding the factors that would facilitate the transition to water sobriety, the reform of water agency grants, the implementation of tiered pricing, price increases, and the easing of the legislation regarding wastewater reuse are highlighted. These factors mentioned by the respondents were also mentioned by the President of the Republic during the presentation of the Water Plan on March 30, 2023 (see Box 2). Respondents also frequently emphasize the usefulness of seasonal pricing or water stress-based pricing [9].

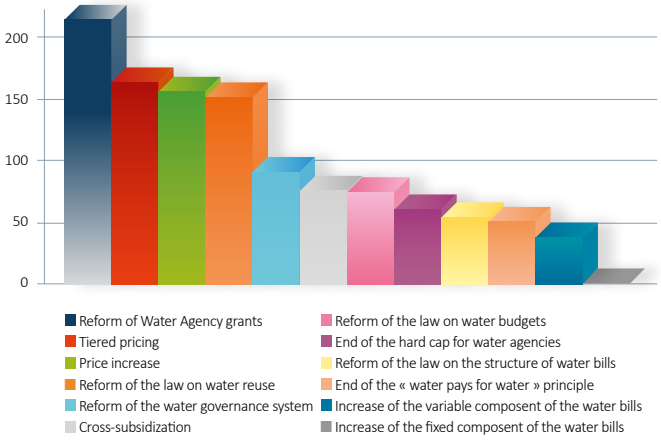

TABLE 4

Question 20: Among these factors, which ones can facilitate the transition to water sobriety? (Multiple answers possible)

Opinions diverge regarding the establishment of a national economic regulator. Some see the establishment of a strong national regulation as a means to "depoliticize the debate," "set quality objectives at the national level," or even "move beyond a focus solely on price," to move towards stronger price equalization for water in France and, above all, to find the means (including financial means) to achieve it. Others express concerns about the difficulties of taking into account the variety of situations.

The way water services are regulated abroad is interesting in this regard. For example, the Italian regulator has implemented multiple mechanisms to incentivize investment, reduce water leaks, decarbonize, and reuse treated wastewater. The Danish regulator, on the other hand, has established an increased revenue ceiling for operators involved in climate change adaptation projects (see Box 3). Stronger regulation of the water sector could enhance cooperation among stakeholders.

[9] It should also be noted that a tiered pricing or an eco-solidarity pricing can ultimately increase the service's revenue, as demonstrated by the case of Dunkirk (Mayol, Alexandre, et Simon Porcher. 2019. « Discriminatory pricing and monopolies in water public services: An analysis of consumers' reaction to the price-signal distortions ». Revue économique 70: 461.).

BOX 2

❯ Presentation of the Water Plan: Water conservation at the heart of ecological planning

On March 30, 2023, the President of the Republic Emmanuel Macron presented the Government's 'Water Plan,' which consists of a series of measures aiming at redefining water management policies in France, in order to adapt to climate change. The challenge was twofold, as this plan aims to both prepare for the summer of 2023, which is expected to be particularly critical, and to establish long-term water sobriety, with a target of a 10% reduction in water consumption across all sectors by 2030.

The measures proposed by the Government are similar to those proposed in the conclusion of our study: It is urgent to promote water conservation in all uses, and for that, combating leaks, modernising the infrastructure, simplifying legislation allowing for the reuse of treated wastewater, and implementing a progressive water pricing system are essential. The Government has also announced the end of the hard cap for water agencies starting from the next intervention program, as well as the development of Nature-Based Solutions.

However, while the President announced an additional aid of 180 million euros per year dedicated to the water pipes, the investment deficit is estimated by the UIE to be between 1 and 3 billion euros for water services and between 0.5 and 2 billion euros per year for sanitation. It is now up to the local authorities to find suitable solutions to finance their transition.

Regarding public-private partnerships, the vast majority of interviewees emphasize the importance of reforming them as greater transparency is needed as well as better information sharing, and increased cooperation between the community and the operator.

Implications and recommendations

What funding models are available for water conservation in public water and sanitation services?

If under the "water pays for water" principle, the main source of revenue is the user's bill, this means that an increase in costs should correspond to an increase in price.

BOX 3

European case studies

As the system needs to be reformed, some of the respondents believe that a stronger economic regulation of the water sector could enhance cooperation among stakeholders. In France, regulation is currently managed "through contracts" by the local authorities. As illustrated abroad, there are different forms of stronger regulation.

1- The case of the Italian regulator
The Italian Regulatory Authority for Energy, Networks, and the Environment, ARERA, undertakes the following functions:
- Calculation of revenue and tariffs;
- General and specific standards for service quality;
- Regulation of technical and infrastructure quality;
- Accounting transparency and data collection;
- Consumer protection;
- Monitoring service delivery conditions, with the power to request documents and data, impose sanctions, and determine cases where operators may be required to reimburse consumers.

ARERA encourages operators to invest in leak reduction, decarbonization, and water by granting them additional revenue. By implementing a "menu regulation", ARERA ensures that investments have specific and measurable impacts on tariff levels. Between 2012 and 2015, overall investment levels increased by 55% thanks to the establishment of this mechanism. In 2016, ARERA also introduced six macro-performance indicators, including leak reduction, for which operators are either rewarded or penalized. Between 2016 and 2019, this led to a reduction of over 15% in the proportion of the population being provided water by poorly performing operators. In 2020, indicators for the level of reuse of treated wastewater and decarbonization were also implemented.

2- The Danish regulator
The Danish Competition and Consumer Authority, a government agency under the Danish Ministry of Industry, Business, and Financial Affairs, hosts the Danish Water Regulation Authority. It sets revenue caps and efficiency requirements for operators in the water and sanitation sectors charging more than 200,000 m^3 or for municipally managed services. In 2019, it represented 334 operators. Revenue-capping regulation aims to limit the total revenue of a company operating a public service under natural (local) monopoly conditions. Regulated companies are allowed to adjust their prices as long as they do not exceed the maximum revenue constraint.

Following a cost-benefit analysis and to incentivize water and sanitation services to undertake climate change adaptation projects, resource preservation, or better wastewater treatment, the regulator can grant an increase in the regulatory revenue cap for project-carrying operators. Due to the difficulty of estimating benefits, the Danish regulator is considering using stated preference methods, such as willingness-to-pay, to assess the willingness of certain user categories to pay for improvements in water supply security and the quality of distributed drinking water (beyond regulatory obligations).

Although it is likely that, ultimately, a temporary or permanent increase in water prices will be necessary, the implementation of new forms of pricing can also contribute to funding the transition to water sobriety.

However, this increase in revenue can also come from new services or new sources of income (such as water reuse, methanization, etc.). In the medium term, the implementation of the extended producer responsibility can also contribute to the service revenues while limiting price increases for users in the sector.

Furthermore, the end of the hard cap aims to reinstate the principle of water pays for water. However, it is still important to reconsider the contribution of water agencies to the financing of the *Office Français de la Biodiversité*, as they currently account for 80% of its budget. Ensuring that water agencies exclusively contribute to water-related projects seems crucial to facilitate the transition, according to several respondents.

Integrating the management of the hydrologic cycle into the new projects of water and wastewater utilities is essential to ensure better adaptation to climate change and to achieve better cost and financing control

As reaffirmed by the French Minister for Ecological Transition and Territorial Cohesion on January 25, 2023, water reuse only represents 1% of treated water in France, while Spain reuses 14% of its treated water and Israel 80%. While the development of reuse technologies is necessary, particularly in coastal areas to avoid discharging freshwater into the sea, it is also important for operators, both public and private, to develop parallel projects focusing on environmental and social performance and on under-exploited sources of revenues. The implementation of some sustainable solutions (e.g., nature-based solutions,


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> “THE INTRODUCTION OF THE GEMAPI TAX ENCOURAGES THE EXTENSION OF INVESTMENT PROJECTS TO THE HYDROLOGIC CYCLE.”

solar energy, etc.) abroad demonstrates better cost control and their ability to reduce water consumption, in parallel with pricing or targeted incentive communication actions. Anglian Water in England, for example, utilises Nature-Based Solutions (NBS) such as wetlands, a type of green infrastructure that combines soil purification capacity with CO_2 storage capabilities [10].

In France, the subsidies available to water and wastewater utilities are also geared to this objective: most of the subsidies offered by the French government, water agencies and the European Union require socio-environmental objectives. More recently, the introduction of the GEMAPI tax has become an incentive to extend investment projects to the hydrologic cycle.

In addition, a major challenge for water and wastewater utilities is to share water more effectively among users. This can notably be achieved through the implementation of better communication channels between drinking water and wastewater operators, farmers, industrials and energy providers.

Working on subscribers' trust is essential to ensure better service management

While an increase in water prices may seem inevitable due to cost recovery, it can only occur by i) communicating and raising user awareness about the services provided [11] and ii) implementing pricing and communication strategies that incentivize responsible water usage. The PIPAME (Interministerial Plan for Water Management and Aquatic Environments) encourages the establishment of a framework of trust with a shared vision of the investment challenges in this sector, either through

[10] "Anglian Water" <https://www.anglianwater.co.uk/>.

[11] The population does not know how water is delivered to the tap or how it is treated. In fact, in 2019, one in two people stated that they consume bottled water, particularly due to a lack of trust regarding the quality of tap water. David Afriat and Sébastien Soleille, « L'eau Du Futur- Enjeux et Perspectives Pour Les Entre- prises Du Secteur » (La Fillière française de l'eau- Direction Générale des Entreprises - PIPAME 2019) Rapport final <https://www.entreprises.gouv. fr/files/2019-06-25-eaudufutur-rapport.pdf> accessed 24 November 2022.

citizen consultation or awareness campaigns and information regarding the necessary infrastructure for accessing water. With two-thirds of users unaware of the amount of their water bill, it is crucial to raise awareness and depoliticize the debate on this topic to move away from the "tyranny of water prices" [12]. Additionally, the Government's Water Plan ensures the launch of a "public awareness campaign" to promote water conservation and raise awareness of water issues.

Furthering contractual ties with the operator when services are privately managed

The transition to water sobriety is seen as a game-changer for public service delegations, which currently appear rigid, awarded through tenders without genuine cooperation among stakeholders. To address this, shared objectives during contract negotiation and the establishment of a governance structure that fosters ongoing cooperation are essential. Moreover, shared objectives would partially decouple the operator's remuneration from the quantities sold. This decoupling could be achieved, for example, through partial performance-based remuneration, price adjustments based on quantities sold (landscape clauses), or conditional contract duration tied to the operator's revenue.

Other contractual solutions can strongly or completely decouple volumes from the operator's remuneration. The global performance contract, in which investments are low or funded by the community, or availability-based contracts, in which investments are funded by the operator, allow for such decoupling. In both cases, the operator is remunerated based on key performance indicators defined in the contract.

Covering costs through revenues: International practices

Beyond the aforementioned economic regulators, French water agencies can draw inspiration from innovative solutions used abroad that have shown their ability to control costs, particularly in inflationary contexts. For example, the public operator Vivaqua in the Brussels region provides an average of 360,000 m^3 of drinking water daily while also managing most stormwater basins and flood control missions. As a decrease in consumption resulted in reduced revenue, the operator identified additional sources of funding and identified areas for savings to better control operating costs, particularly energy costs. This was achieved through a paid service for fire hydrants, the implementation of riothermia and the production of electricity through turbine and solar energy [13].

> “THE REVISION OF THE URBAN WASTEWATER TREATMENT DIRECTIVE WILL ENCOURAGE THE SECTOR TO INCREASINGLY ADOPT CIRCULAR ECONOMY PRACTICES AND PROGRESS TOWARDS CARBON NEUTRALITY.”

Conclusion: The future of water and sanitation service financing

Water and sanitation services are expected to evolve due to upcoming regulations. At the European level, the revision of the Urban Wastewater Treatment Directive will encourage the sector to increasingly adopt circular economy practices and progress towards carbon neutrality, with anticipated positive effects by 2040. In addition to the obligation to provide and ensure low-cost access to sanitary facilities in public spaces, the revision of the Directive also introduces the binding objective of energy neutrality for the entire sector at the member state level. Wastewater treatment plants will have to significantly reduce energy consumption and generate energy from renewable sources (e.g., solar energy, wind energy, and notably, biogas production). Operators will also be required to publish key performance indicators. Furthermore, the Directive establishes extended producer responsibility by ensuring funding for the treatment of micro-pollutants by the pharmaceutical and cosmetic industries.

Across the EU, these measures are expected to save nearly €3 billion per year, reduce greenhouse gas emissions by 62.5% compared to 1990 levels, decrease water pollution by over 365,000 tons of organic matter, nitrogen, and phosphorus, and reduce microplastic emissions by 9% through improved stormwater management.

In conclusion, it is urgent for municipalities and their water and sanitation services to rapidly undergo the water transition to avoid being subjected to it. Implementing such a transition allows for much better control of operating costs and adaptation to the effects of climate change. ■

[12] « Audition de Monsieur Olivier Thibault - Résilience Hydrique de La France » (n 2).

[13] « Vivaqua » <https://www.vivaqua.be/fr/>.

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