December 2025

Briefing note

EurEau

The criticality of energy security to achieve resilient water services

Water services (including both drinking water and wastewater services) are critical and essential services that not only allow for the realisation of the human rights to water and sanitation, but also protect human health and the environment, and contribute to strengthen Europe's climate resilience, competitiveness and security, and to reduce its dependence on external energy sources.

The security of Europe relies on water security and resilient water services. Water services will not be resilient if the sector cannot have a reliable, secure and affordable energy supply. However, energy security has become an increasingly critical concern for the European water sector.

The purpose of this paper is to look into the challenges and opportunities for the water sector to ensure energy security. It highlights the potential of water services to contribute to a resilient European energy system, and explores innovative economic and financial instruments to address the investment needs to realise this potential and ensure energy security.

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1. Introduction

Following the commitments made by the European Union and its Member States on signing the Paris Agreement in 2015, the EU leaders endorsed the objective of achieving a climate-neutral European Union by 2050. This objective is at the heart of the EU Green Deal, and is a legally binding target through to the European Climate Law. As stated in the EU Climate Law, climate neutrality by 2050 means achieving net zero greenhouse gas emissions for EU countries as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment. The law aims to ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part.

Water services (including both drinking water and wastewater services) are critical and essential services[1] that not only allow for the realisation of the human rights to water and sanitation, but also protect human health and the environment, and contribute to strengthen Europe's climate resilience, competitiveness and security, and to reduce Europe's dependence on external energy sources. Energy security is essential for Europe and particularly for the water sector itself: without energy, there is no water. The entire water cycle - from abstraction and treatment to distribution of drinking water and wastewater management - relies heavily on a stable and secure energy supply.

Obviously, water services are key stakeholders in building a water resilient Europe, having an essential role to play in the success of the recently adopted European Water Resilience Strategy, which is crucial for a resilient Europe.

In addition, European water services have an important role in contributing to achieve the main objectives of Europe's 8th Environment Action Programme (EAP):

- achieving the 2030 greenhouse gas emission reduction target and climate neutrality by 2050 (as endorsed through the EU Climate Law, following the commitments made by the EU and its Member States on signing the Paris Agreement in 2015);
- enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change;
- advancing the transition to a circular economy;
- pursuing a zero-pollution ambition; and
- protecting biodiversity.

Furthermore, water services can have an important part in the fulfilment of other relevant policy areas. Water services have the potential to contribute to achieving the goals set in the EU energy policy. Enhancing the production of renewable energy, not only contributes to the reduction of GHG, but also to reduce fossil fuel consumption and Europe's external energy dependency, as set in the REPowerEU plan, increasing the resilience of the EU's energy system. By further implementing energy efficiency, the sector reduces energy demand, in line with the Energy Efficiency First Principle.

[1] Drinking water and wastewater services are included as critical entities and essential services in the Directive (EU) 2022/2557 on the resilience of critical entities and the Directive (EU) 2022/2555 on measures for a high common level of cybersecurity across the Union.

The competiveness of Europe requires securing water for all economic activities. Besides, the water sector contributes to a circular economy by recovering nutrients and resources, such as phosphorus, or through the production of safe reclaimed water for different uses.

The security of Europe relies on water security and resilient water services. But **water services will not be resilient if the sector cannot achieve a reliable, secure and affordable energy supply**. However, energy security has become an increasingly critical concern for the European water sector, not only in relation to energy pricing, which has been fluctuating substantially over the last years, but also because the reliability of water services is deeply interconnected with stable electricity supply.

The purpose of this paper is to look into the challenges and opportunities for the water sector to ensure energy security, highlighting why energy security should prevail over energy self-supply or energy neutrality. It is highly unlikely that a one size fits all approach will fit the sector. Flexibility and local considerations and solutions must be allowed to prevail.

In addition, the paper highlights the potential of water services to contribute to a resilient European energy system, mainly through the increase in the generation of renewable energy and the implementation of energy efficiency. However, developing this potential will take decades and considerable investment.

Section 2 presents the current situation of water services in terms of energy consumption and production and highlights the criticality of energy security to ensure water service providers can deliver on their core responsibilities. In addition, this section shows the current status regarding energy self-supply and the need for enhanced energy self-supply as a means to energy security, allowing the sector to face energy price volatility and highly disruptive events.

Section 3 presents the ways forward for the sector to ensure energy security, and how it can contribute to a resilient European energy system. It shows how the water sector is already generating renewable energy and what are the possible ways forward in relation to increases in energy self-supply. In addition, it delves into the possibilities of the sector to further implement energy efficiency.

Section 4 lays out other challenges facing the sector that can jeopardise achieving energy security, such as the obligations regarding energy neutrality in combination with both new and stricter treatment requirements set out within the recast Urban Waste Water Treatment Directive (UWWTD), the contribution of the sector to the EU long term climate neutrality demands, improving water savings and the growing threat and investment needs regarding climate adaptation.

Finally, **Section 5** explores the economic and financial considerations associated ensuring energy security. It presents the considerable investment needs that will be needed to achieve energy security, which come at a time when there is already an investment gap in the water sector. Furthermore, it looks into potential economic and financial solutions that could facilitate energy security for the water sector.

2. Water operators in the energy system

The link between water and energy is both complex and relevant. On the one hand, the water sector is a major consumer of energy. On the other hand, it contains many energy-generating opportunities within its processes. Historically, water supply was achieved almost exclusively through gravity, without the need for additional energy. Nowadays, we can use energy to desalinate seawater but also generate renewable electricity from water and wastewater sectors.

In today's context of rapidly escalating climate breakdown, the increasing demand for resources, and the ever-increasing range of pollutants requiring treatment for both drinking water and wastewater, the relationship between water and energy is becoming ever more critical. Water service providers face the challenge of managing the water cycle efficiently and sustainably, while minimising energy consumption.

Picture 1. Digesters in Romania

The urban water cycle involves water abstraction and treatment of water intended for human consumption, distribution of drinking water, and wastewater collection and treatment, each demanding a significant amount of energy. Nonetheless, energy can also be recovered from the water cycle: for example, anaerobic digestion of wastewater sludge generates biogas as a valuable energy source. Understanding water and energy consumption in each phase allows for the identification of critical areas to optimise:

1. **Abstraction of water intended for human consumption**: the abstraction of water intended for human consumption from surface or groundwater sources consumes energy, primarily for pumping.
2. **Treatment of water intended for human consumption**: the processes needed to produce water for human consumption from raw water, like membrane filtration, reverse osmosis or desalinisation, are very energy consuming.

3. **Distribution of drinking water**: in potable water distribution, energy is primarily required for pumping such water to high levels.
4. **Collection of wastewater**: the primary energy demand is due to the need to overcome natural or artificial obstacles.
5. **Wastewater treatment**: energy in wastewater treatment is consumed in several stages of the process, including pumping, aeration necessary for biological processes, mixing and agitation in treatment tanks. Additionally, the use of advanced technologies, such as membrane separation, ozonation or thermal sludge treatment, also significantly contribute to energy consumption. Optimising these stages is crucial for improving the efficiency and sustainability of the treatment process.

Water operators are continuously increasing the efficiency of their processes. However, their energy consumption depends on multiple factors, many of which are beyond their control. On the drinking water side, this includes the sources used (groundwater, surface water, sea water), the topography (elevation/gravity), population density (length of the network per capita), and the required treatment to remove pollutants. In particular, desalination of sea water is a highly energy-intensive process. The energy consumption of wastewater collection and treatment depends on the level of pollution of the untreated wastewater, the flow rate, the weather conditions, the topography, population density or the treatment requirements prior discharge into the receiving water bodies.

The highly context-dependent characteristics of the water services mean that direct comparison of the performance of individual operators or countries should be always contextualised in order to understand what the differences mean and avoid a simplistic and potentially wrong assessment.

Nevertheless, gathering data of the overall and average energy consumption of the water sector can help to have a snapshot of its situation. In this regard, according to different sources (European Alliance to Save Energy[2], Joint Research Centre[3], and International Energy Agency[4]) the electricity consumption of the water sector represents around 2.6% and 3.5% of the EU consumption.

In addition, and based on the data gathered among EurEau members through its next edition of 'Europe's water in Figures' report, to be published in 2026[5], which should be understood as a "picture" of the European water services and not as benchmark, the average energy required to manage 1 cubic meter of water in Europe is of around 1.72 kWh (encompassing both drinking water (0.89 kWh/m^3) and wastewater (0.83 kWh/m^3) management). Figure 1 shows the significant difference in energy consumption among EurEau members, which was already highlighted and explained in previous paragraphs.

[2] Unleashing the energy efficiency potentials in the EU water sector. EUASE, 2018.
[3] Water – Energy nexus in Europe. JRC, 2019.
[4] Water-Energy Nexus. World Energy Outlook Special Report. IEA, 2016.
[5] The updated report is due to be published in Spring 2026. The 2021 version is here.

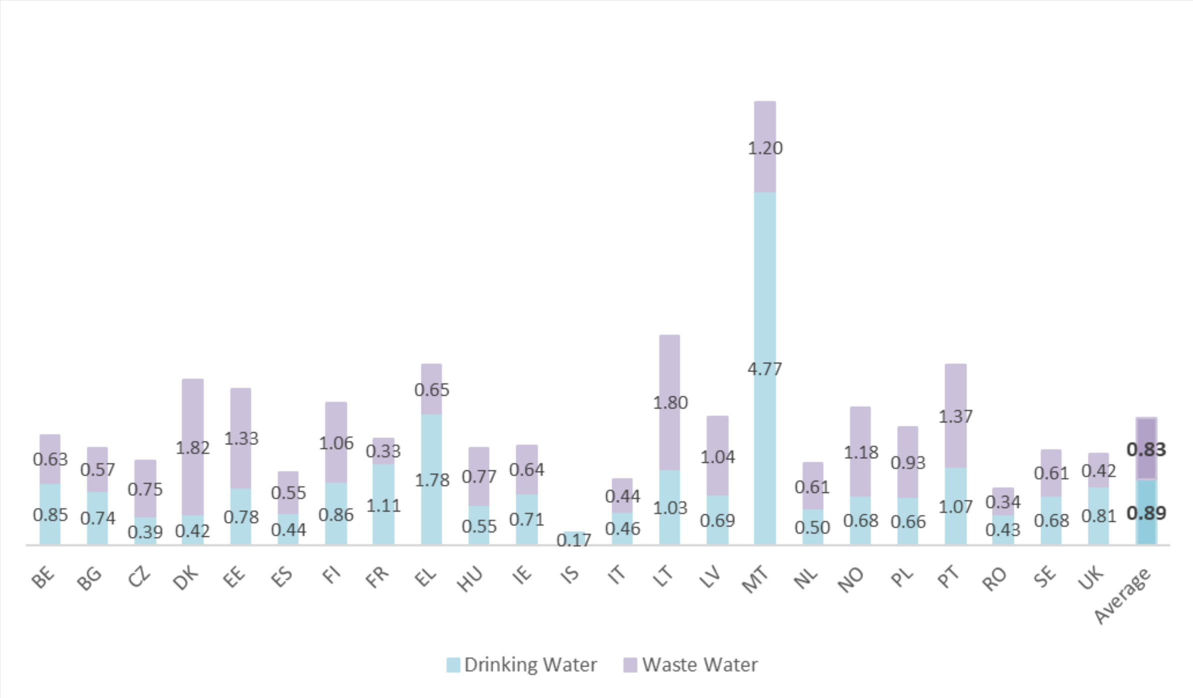


Figure 1. Average energy consumption of the water sector (kWh/m^3)[6]

These figures show the energy demand of the sector and point to opportunities for improving energy efficiency. However, it is important to underline that these figures only reflect the energy demand to comply with the 1998 Drinking Water Directive (DWD) (98/83/EC) and the 1991 Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC). **The recast DWD ((EU) 2020/2184) and recast UWWTD ((EU) 2024/3019) will bring a substantial increase in the energy consumption** to comply with the new and more demanding treatment requirements of both directives.

Water utilities across Europe are well aware of the critical role energy plays in their operations and environmental impact. Particularly, since 2021 water utilities have experienced a very volatile period with a substantial increase of energy prices, showing the sector's vulnerability to such fluctuations and the impact of these on their operations. In response, many operators are not only focusing on reducing energy consumption but also actively generating their own energy, particularly from renewable sources, such as biogas from sludge treatment, solar panels, and small-scale hydropower.

However, despite these efforts, the water sector in Europe currently generates on average around 24% of the energy it needs[7]. This contrast highlights the potential - and necessity - for further investment in energy efficiency and self-supply, as well as innovation, within the sector. Figures 2 and 3, show the volume of some types of energy currently produces in the water sector.

[6] Source: Europe's Water in Figures report, due to be published in Spring 2026.
[7] Source: Europe's Water in Figures report, due to be published in Spring 2026.

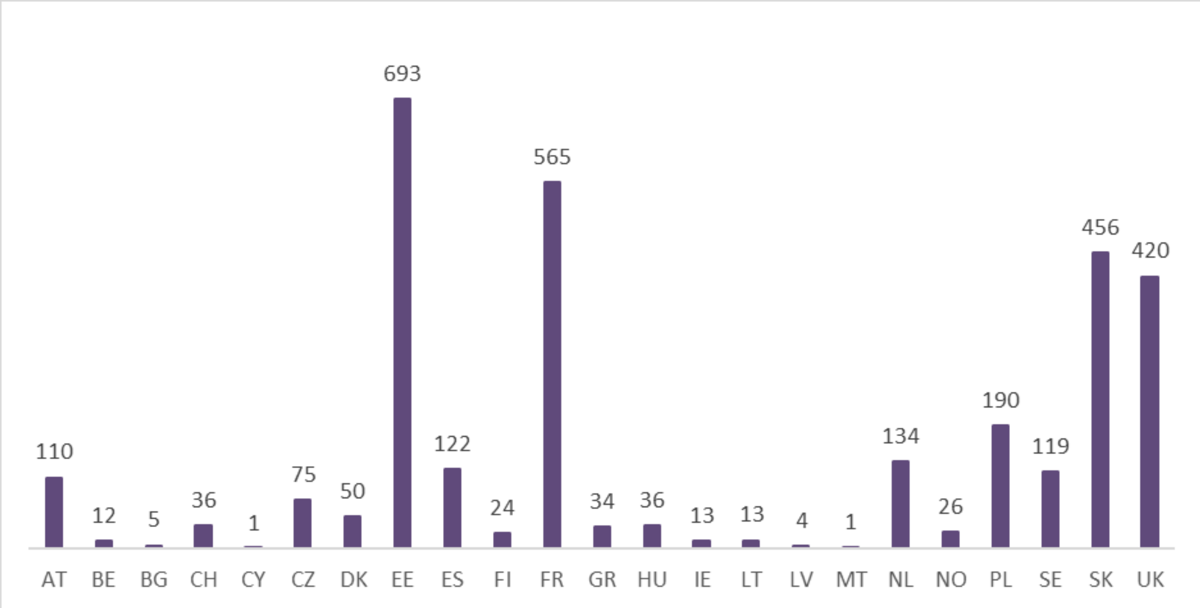


Figure 2. Total volume of produced biogas and biomethane (million m³/year)[8]

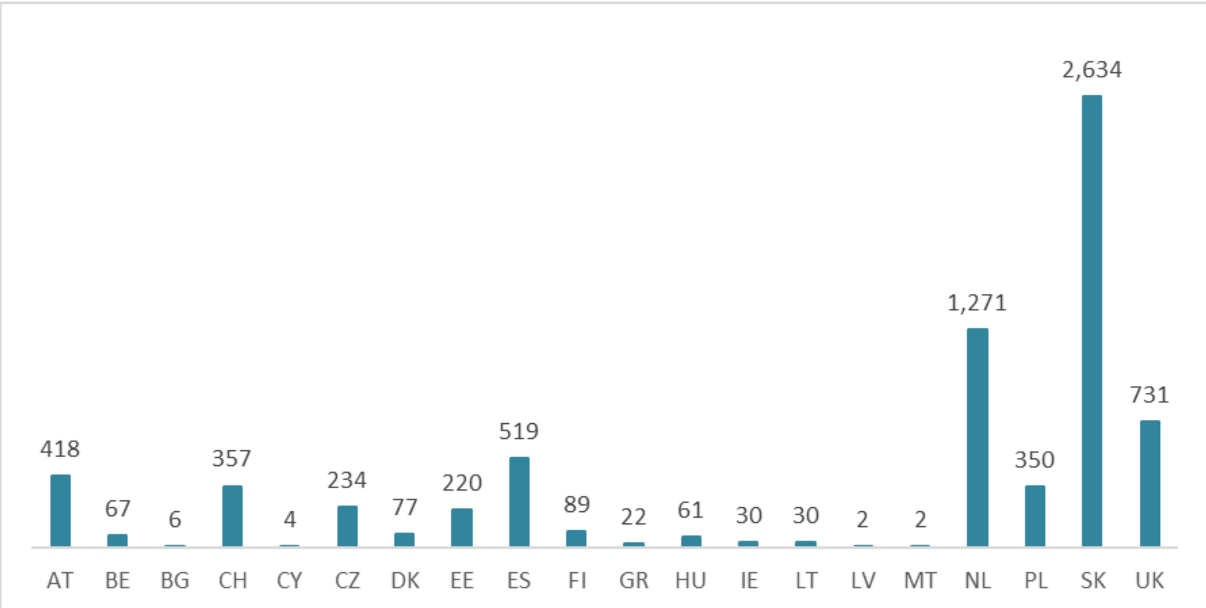


Figure 3. Total volume of produced electricity (GWh/year)[9]

2.1. Energy security

The first priority of water service providers is to ensure the provision of safe and affordable drinking water and the collection and treatment of wastewater at a high quality, to protect

[8] Source: Europe's Water in Figures report, due to be published in Spring 2026.
[9] Source: Europe's Water in Figures report, due to be published in Spring 2026.

human health and the environment. The members of EurEau strive to adhere to all relevant European legislation pertaining to the sector. This also includes new and updated rules and provisions for drinking water and wastewater services, in the form of the revised DWD (2020/2184/EU) and UWWTD (2024/3019/EU). This new legislation sets stricter rules and more demanding and new treatment requirements that will require the implementation of advanced treatment technologies in many cases, while extending the scope of the legislation to smaller agglomerations and water supply systems.

It is important to remember that any further and more demanding treatment increases the energy demand. For example, the implementation of quaternary treatment of urban wastewater (intended to remove micropollutants) will drastically increase the energy requirements at urban wastewater treatment plants (UWWTPs), for instance if ozonation or membrane technology are used.

Resilient water and wastewater services require reliable, secure and affordable energy supply in order to achieve the primary goal of water services providers to protect human health and the environment.

The experience of the last years has shown that energy is an increasingly expensive commodity. Already in 2021, the price for energy had been rising steadily. Furthermore, Russia's aggression against Ukraine and increasing global instability, the growth in global energy demand, the need to invest in renewable energy sources, and the geopolitical instability of many world regions caused, or are causing, energy prices to fluctuate substantially and to be difficult to foresee. This fluctuation of energy and electricity prices is shown in Figures 4 and 5.

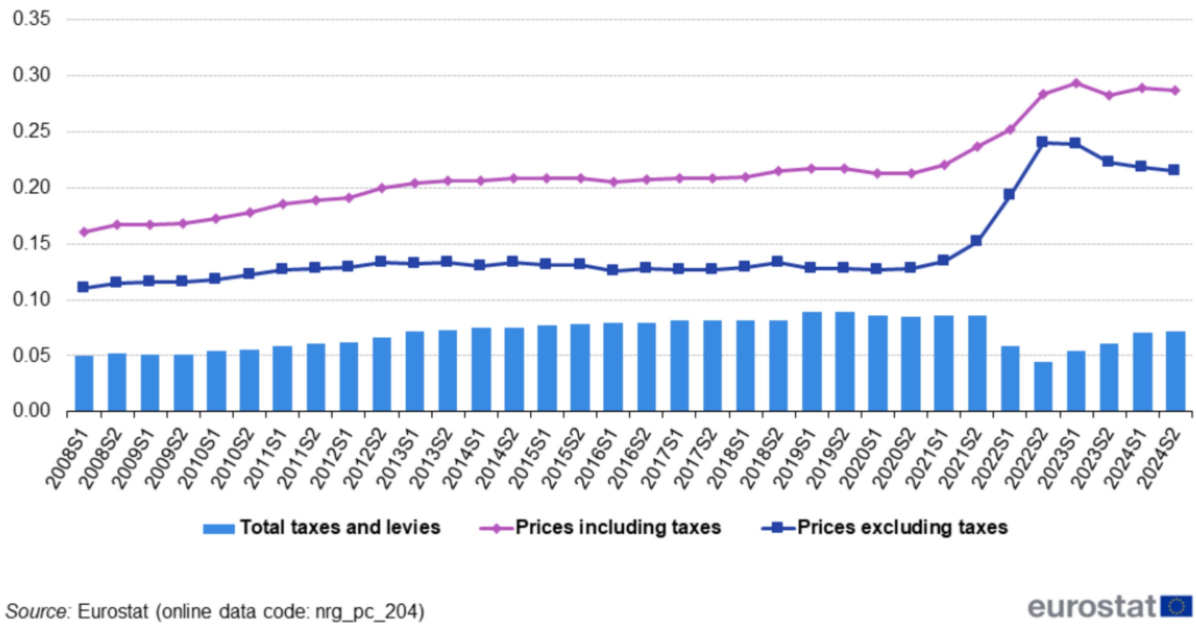


Figure 4. Development of electricity prices for household consumers EU (2008-2024) (€/kWh)

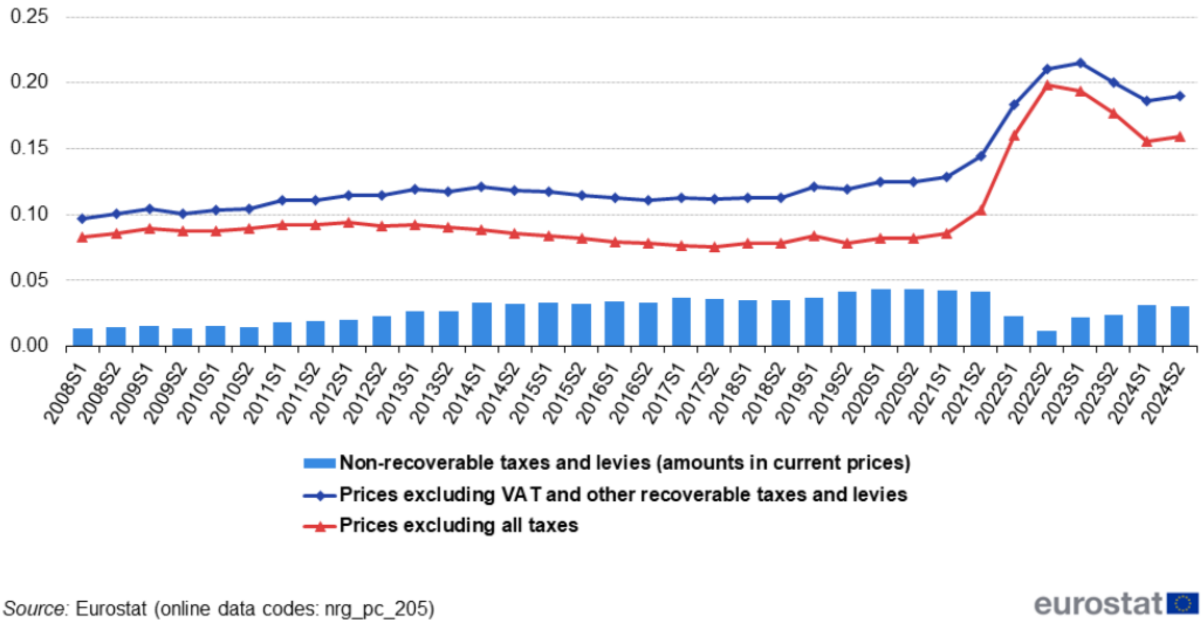


Figure 5. Development of electricity prices for non-household consumers EU (2008-20224) (€/kWh)

The impact of the inflation ratio on energy prices in the EU is also important in this context. Figure 6 shows the fluctuations in the annual inflation in the EU and its main components between 2014 and 2024. The geopolitical volatility and yo-yoing of energy prices further underpins the need for enhanced energy self-supply.

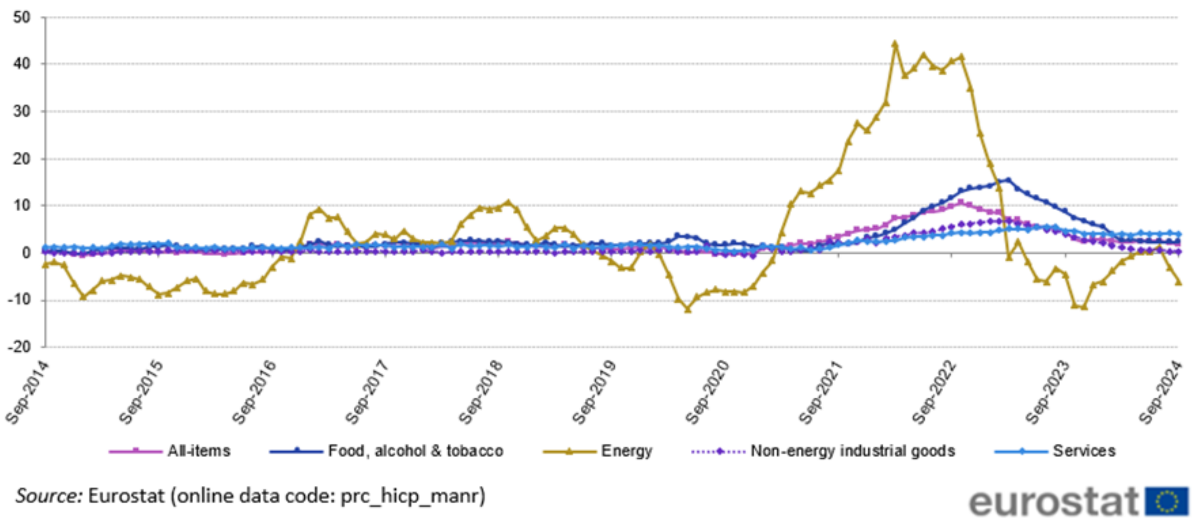


Figure 6. Euro area annual inflation and its main components, September 2014 – September 2024 (estimated) (%)

Energy security is becoming an increasingly critical concern for the European water sector, not only in relation to energy pricing but also because the reliability of water services is deeply intertwined with stable electricity supply. This was starkly shown during the April 2025 blackout in the Iberian Peninsula, when a sudden failure in the transmission grid triggered a cascading outage across the Peninsula. The event disrupted electricity for several hours (in some cases even close to 24 hours), severely affecting water utilities, which reported interruptions in supply, pressure drops, and degraded service quality. However, thanks to emergency generation systems installed by many water operators, the impact was partially mitigated.

The incident underscored the urgent need for resilient systems, decentralised energy solutions, and greater integration of renewable energy to safeguard water services against future energy disruptions. It would be equally important to ensure that, in the event of widespread power supply disruptions there is sufficient backup power, either owned by the water utilities themselves or specifically earmarked for their use, along with the necessary fuel supply arrangements. Without backup power, water services would fail entirely during large-scale power outages. Furthermore, the energy supply for the water sector should be prioritised in emergency situations (as is already the case for the supply of gas in Germany, where the water sector is considered a "protected consumer" according to the security of gas supply regulation; 994/2010/EU).

The April 2025 blackout should be used as a call for competent authorities to invest in the planning and implementation of risk management that includes preparedness and mitigation measures that ensure energy security for water utilities.

While **energy security (understood as ensuring access to reliable, secure and economically affordable energy) is a key aspect for water service providers, and should prevail over energy self-supply (meaning water services producing the energy needed to cover their energy demand) or energy neutrality** (as defined in the recast UWWTD, and applying only to UWWTPs), becoming less dependent on external sources by increasing their own-production of energy, on- or off-site, will certainly contribute to achieving energy security. This will, in the long term, make the sector less exposed not only to supply risks but also to volatility in energy pricing, which directly impacts operational costs and financial sustainability. However, it constitutes a long-term effort that requires realistic timelines and goals to achieve.

Nevertheless, it is important to underline that energy security for water services also depends on external factors, out of the remit of water service providers, such as the functioning of the energy market itself. Even though this paper does not intend to include an analysis of the relationship between water services and the energy market, and in particular, of aspects such as the reliance on energy markets or risks stemming from them that could hamper energy security for water services, it is something the water sector should further explore in order to plan long-term strategies to secure a sustainable energy supply.

2.2. Status of energy self-supply in the water sector

As already mentioned, **energy self-supply in the water sector will contribute to its energy security**, the latter taking precedence over the former. Water service providers are well aware of the strategic importance of reducing their dependence on external energy sources. However, energy self-supply in the water sector is not an easy goal to achieve, because the technical possibilities for generating renewable energies are heavily dependent on the framework conditions, e.g., topography, available elevation, and availability of the different raw water sources.

In addition, it is important to stress that the possibility of achieving or improving energy self-supply for drinking water operators is extremely challenging, and certainly lower in the drinking water processes than in wastewater treatment. Where energy is generated in drinking water facilities, it often involves the installation of solar panels within the water treatment facility area. In addition, the elevation drop between the water source and the treatment plant can also be utilised.

Those operators who provide drinking and wastewater services in an integrated model, or those who only provide wastewater services, have a bigger potential to advance in energy self-supply. Regarding wastewater treatment, the cases where energy self-supply is achieved, are still rather limited, and even many of the larger UWWTPs (above 150 000 population equivalent (p.e.) according to the recast UWWTD) are still far from producing all the energy they need. Furthermore, it is often unfeasible to produce sufficient amounts of renewable energy on-site at UWWTPs to cover all their needs due to a variety of non-technological factors, such as lack of space, local power grid capacity, spatial planning constraints, etc.

Despite the challenges, **the sector has embarked itself in a sustained effort to improve its energy self-supply through the production of renewable energy**. As a result, many water operators are actively investing in renewable energy production, energy efficiency measures, and resilient infrastructure. These efforts reflect a growing commitment to reduce reliance on external energy sources, become less vulnerable to supply shocks or price fluctuations, and enhance the sector’s ability to meet the challenges of the future.

Figure 7 shows how energy self-supply differs among water service providers across Europe, considering self-supply for water services as a whole, including drinking water and wastewater.

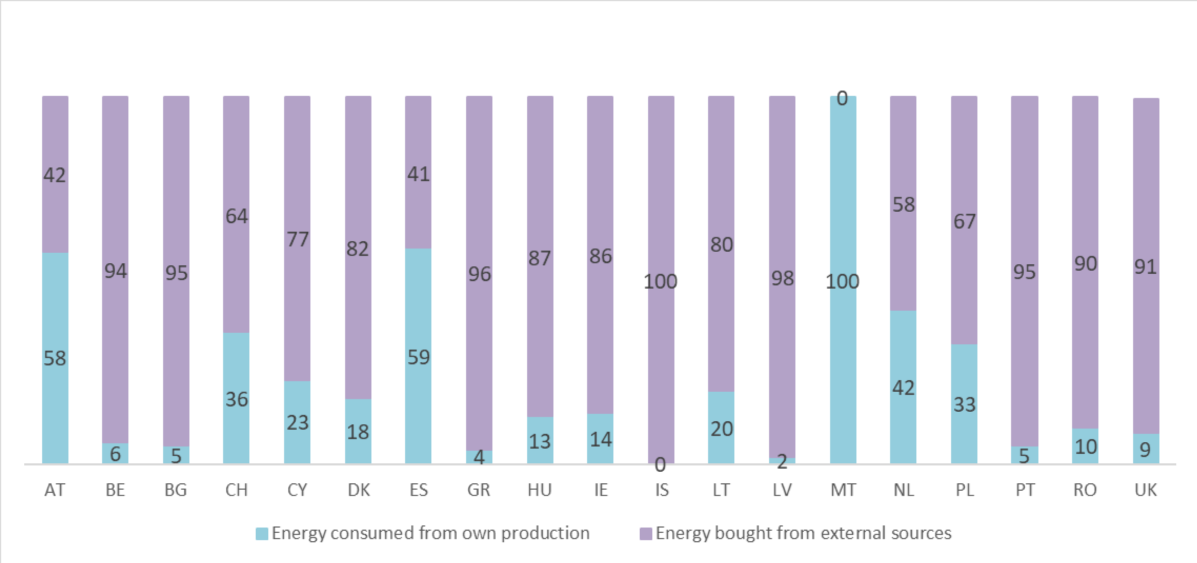


Figure 7. Sources of energy consumed by water services (%)[10]

The article on energy neutrality in the European Commission's proposal for a recast UWWTD (launched in October 2022) triggered several surveys and studies among EurEau members during 2023 and 2024, which allowed drawing relevant conclusions in relation to energy self-supply for waste water services:

- In the examples where self-supply has been achieved, or that are close to achieving it, the whole water cycle has been considered (not just wastewater services).
- Achieving energy self-supply at UWWTP level is extremely challenging, and only a few cases where identified.
- Most interestingly, in the cases where energy self-supply was achieved at UWWTP level, co-generation was implemented. It's important to highlight that co-generation is a rare practice in quite some many of EurEau's members, mainly due to being forbidden by law.
- Based on current wastewater treatment requirements, the energy need that can be covered through biogas from sludge would be around 40% (as shown in the examples from Flanders, Poland or Ireland).
- Installation of photovoltaic panels, if covering every UWWTP's available surface, would cover 15% of the energy needs of those plants (Poland, Wallonia and Spain).
- Solar panels require very large surfaces to become a meaningful part of the energy pool, which are not always available in wastewater facilities.
- Different types of renewable energy can be produced by water services: solar/photovoltaic, wind, heat from wastewater, heat/electricity from biogas, biogas, greengas/biomethane, hydraulic.

[10] Source: Europe's Water in Figures report, due to be published in Spring 2026.

Annex 1 gathers specific examples of energy self-supply in the water sector.

The potential of the water sector to advance in its energy self-supply is evident. However, it should not be seen as the ultimate goal of the sector in itself, but rather as a means to energy security, which will enable the sector to ensure water security and to protect human health and the environment.

3. Ways forward for the water sector

The water sector has significant potential to generate renewable energy and further implement energy efficiency solutions to tackle the major challenges we face today, notably in wastewater treatment. Some specific examples are included in Annex 2.

On the one hand, by supplying the renewable energy it can produce to external uses (such as biogas for public transport, heat for district heating or biomethane that can be injected in the gas grid) the water sector can contribute to reducing the dependence on external energy sources. On the other hand, by incorporating renewable energy sources (such as solar, wind, and biogas) to cover the energy demand of drinking water and wastewater treatment and distribution processes, water utilities can effectively reduce their carbon footprint and dependence on fossil fuels, thus contributing to achieve climate neutrality in the EU. A net-zero future in Europe will demand an integrated energy system that encompasses a diverse range of technologies and sustainable solutions. Besides, enhancing energy efficiency conserves this vital resource, as less energy is required for pumping, treatment, and distribution.

Additionally, saving water is crucial for conserving energy; reducing water usage directly lowers energy consumption in drinking water and wastewater processes. Therefore, strengthening water conservation efforts is essential for achieving broader energy efficiency goals, positioning the water sector as a key player in the transition to a more sustainable future.

3.1. Renewable energy generation in the urban water cycle

The water sector is already contributing to the generation of renewable energy, but it has significant untapped potential to further contribute to this generation.

Drawing on findings from the EurEau paper "Reducing the Energy Footprint of the Water Sector"[11] and a survey conducted among EurEau members in relation to the impact of Article 11 of the recast UWWTD (2023), water utilities are contributing to the generation of renewable energy by different means:

- **Hydropower**: Hydropower plants, which are ordinarily owned/operated by energy utilities and not by water utilities, convert the kinetic energy of flowing water into

[11] Reducing the Energy Footprint of the Water Sector. EurEau, 2019.

electricity, typically using turbines and generators. In recent years, installations for small-scale electricity generation, known as "microhydro", have been developed to harness pressure differences and water flows in water distribution or treatment systems.

- **Photovoltaic**: Solar photovoltaic energy is becoming increasingly popular in urban water cycle installations. Solar panels can be installed in open spaces at facilities, generating clean energy for the operation of pumps, control systems, and other equipment.
- **Biogas**: In wastewater treatment plants, biogas, derived from the anaerobic digestion of sludge, can be used to generate energy in the form of both heat and electricity, and has the potential to cover a significant portion of the plant's energy needs. The biogas can be used in gas engines to create electricity (however with a low conversion efficiency) or in heat boilers to create heat.
- **Biomethane**: Biogas can be refined (upgraded) to a higher percentage of methane (reducing the CO_2-content) to be injected into a natural gas network, thus replacing natural gas.
- **Dried sludge**: Dried sludge can be used as fuel in industrial processes, promoting the recovery of both thermal and electrical energy while avoiding the use of fossil fuels.
- **Wind energy**: Traditionally used for lifting water from wells, nowadays wind is almost exclusively used for generating electricity through wind turbines.
- **Thermal energy from the wastewater**: Heat from wastewater, which is typically warmer than the surrounding environment, can be recovered from a city's sewer system using heat pumps. This process involves installing heat exchangers within the sewer network to extract thermal energy from the wastewater. The captured heat is then boosted by heat pumps to a higher temperature, making it suitable for use in district heating systems or for supplying hot water to buildings.

3.2. Potential to increase energy self-supply

According to the questionnaire on the impact of Article 11 of the recast UWWTD referred to earlier, a vast majority of respondents (15 out of 16) foresee the need to increase energy production to comply with the energy neutrality goals set in the recast UWWTD. In this regard, the main possibilities identified are listed below:

- **Biogas production**: Many members highlight the potential to increase the implementation of anaerobic digestion of sewage sludge to produce biogas (Germany, France, Spain, Sweden, Greece, Portugal, Latvia, Slovenia, Czechia) and connected optimisation of the process technology, including co-digestion in some cases (such as Spain and Czechia).

Example - Latvia

SIA Rīgas Ūdens (Riga, Latvia) is planning to double the production of biogas, by construction of two extra digesters, and consequently double on-site electricity and heat generation. In addition, SIA Rīgas Ūdens is planning to build 0.5 MW on-site solar PV generation in 2025 and extend it by 2.7 MW until 2040.

Example – Spain

Anaerobic digestion is a key process in biogas production, and its expansion in plants serving populations larger than 50 000 p.e. could have a significant impact on increasing renewable energy production. According to the latest statistics, there are 269 plants with this potential, capable of generating 1 574 GWh/year. This represents a promising strategy to boost biogas production and contribute to the renewable energy mix.

~ **Heat pumps for the effluent wastewater**: Some EurEau members have identified this as a future potential (Sweden, Ireland, Belgium, Czech Republic, Lithuania, Slovenia, Norway, Germany).

Example - Sweden

In Stockholm, the treated outgoing wastewater is routed through heat pumps. These heat pumps extract thermal energy from the wastewater before it reaches the recipient body of water. In 2024, this process recovered 1 274 GWh of heat, which was reintegrated into residential buildings via the district heating network.

~ **Solar power**: Several members (Norway, Germany, Greece, Portugal, Lithuania, Ireland, Latvia, Slovenia, Czechia) have identified the installation of solar panels as a possibility to increase renewable energy production.

Example - Latvia

SIA Rīgas Ūdens is planning to build 0,5 MW on-site solar PV generation in 2025 and extend it by 2,7 MW until 2040.

~ **Wind power**: some EurEau members identified the potential to increase the production of wind power (Norway, Germany, Spain, Belgium).

3.3. Energy Efficiency

Energy Efficiency is not only an economic gain, as highlighted by the International Energy Agency (IEA)[12]; it has a central role in reducing greenhouse gas emissions. Energy efficiency measures are among the most cost-effective actions that can be deployed to reduce emissions in the short, medium and long term, contributing the largest share of total emissions reductions toward limiting global temperature increase to 2°C, surpassing even the role of renewables and revealing the importance of demand-side interventions. For these reasons, many utilities in the water sector have already employed extensive energy efficiency measures and continue to do so, in line with the Energy Efficiency First Principle and as a means to reduce their environmental impact and contribute to climate neutrality.

Improving efficiency is essential to reduce operational costs, lower greenhouse gas emissions, and enhance energy security. Therefore, water utilities must elevate energy efficiency to a top-tier priority within their capital investment strategies. Addressing the link between water and energy is crucial to build resilient infrastructure that can withstand volatile energy markets and meet decarbonisation goals. To achieve this, water utilities are implementing a range of measures, including optimising pumping systems, upgrading treatment technologies, recovering energy from wastewater, and improving network management.

One of the most impactful tools are **energy audits**. The Energy Efficiency Directive ((EU) 2023/1791) sets the requirement for large energy consumers (companies with an average annual energy consumption of more than 10 terajoules (TJ) over the preceding three years) to conduct energy audits, unless they have an energy management system in place. Both large and small companies benefit from conducting energy audits by identifying cost-saving opportunities and improving energy efficiency. By systematically assessing energy use and performance, audits provide a roadmap for continuous improvement and are key to aligning the sector with the EU’s climate and energy goals.

The Directive (EU) 2024/3019 (recast UWWTD) introduces a crucial requirement to enhance energy sustainability in wastewater management: all wastewater treatment facilities treating a load of 10 000 p.e. and above, and their connected collecting systems, must conduct regular energy audits, starting by 31 December 2032. This obligation addresses the need to reduce energy consumption in the sector and will further facilitate the discovery of energy efficiency potentials. Once the audits are completed, treatment plants and collecting systems are required to implement the energy efficiency measures identified in their assessments. This includes upgrading pumping systems, integrating digital monitoring technologies (such as sensors and artificial intelligence), and utilising renewable energy sources in the wastewater treatment process. Additionally, the reuse of biogas generated during treatment as an internal energy source is encouraged in order to lessen dependence on external energy supplies.

[12] Energy, Climate Change and Environment: 2016 Insights. IEA, 2016.

Mainstreaming energy efficiency in the water sector requires improvements in several key areas, some of which are:

- Including energy efficiency in the decision-making process (for example, when selecting treatment methods).
- Upgrading infrastructure: Modernising equipment and processes in drinking water and wastewater networks and treatment facilities should minimise energy losses and reduce energy demand.
- Operational optimisation: Utilising advanced monitoring systems and digital tools to improve energy demand in water utilities performance.
- Systematic financing of Capex to allow for long-term planning of energy infrastructure operations.
- Regulatory flexibility to enable the deployment of photovoltaics: in some regions of Spain, the installation of solar panels in infrastructures related to water services remains difficult or very limited. A more flexible regulatory framework would allow for a greater use of this renewable source within the sector.
- Innovative technologies: Exploring cutting-edge solutions such as AI-driven automation to enhance efficiency.
- Use of nature based solutions (NBS): NBS can contribute to reduce the energy needs of urban wastewater treatment, since they can retain rainwater and consequently reduce the storm water volume rate of run off entering the drainage system and UWWTPs.
- Market-based energy-savings instruments: Implementation of mechanisms such as Energy Savings Certificates (ESCs), which monetise verified energy-efficiency improvements, and currently implemented in several European countries regulated under the EU Energy Efficiency Directive (Directive (EU) 2023/1791), should be further explored and promoted.

It is worth noting that, ultimately, the potential of improving energy efficiency depends on the local and regional characteristics of water utilities (location, geography, water sources…). This may limit the potential of further improvement of those water utilities that are already very energy efficient.

3.4. Other solutions that can contribute to energy security for water services

There are some innovative solutions that could contribute to water services' energy security that can be further explored and considered where possible (according to national water governance and legislative frameworks).

The water sector has a potential to become a player in **PtX strategies** (technologies that convert energy into other forms of energy or energy carriers), using biogas from UWWTP or other renewable energy to produce green hydrogen, methane, heat, or chemicals (such as ammonia or fertilisers) and allowing synergies with wastewater treatment processes. In this way, energy can be stored for the future and symbiotic relationships with industry can be built, strengthening energy security.

Another possible solution to consider are **Power/Capacity Purchase Agreements (PPAs)**, which are long-term contracts between electricity producers and consumers that guarantee a fixed price for renewable power. These represent an important opportunity to strengthen the energy security of the water sector. Water operators still remain physically dependent on the electrical grid, but the financial stability provided by PPAs significantly reduces exposure to price volatility and market uncertainty. This long-term price predictability is particularly valuable in a sector where energy represents a large share of operational costs, allowing water utilities to improve financial planning, mitigate procurement risks, and contribute to their broader sustainability and decarbonisation strategies.

3.5. Other contributions of water services to energy grids

In addition to the generation of renewable energy, **where appropriate and when decided by competent authorities, owners or operators**, water utilities and their assets could be used to buffer/balance the local electricity grid, serving as **grid congestion service providers and actively balancing the local grid** (some examples are included in Annex 2). This could contribute to address a problem that can be found throughout Europe: the capacity of the electricity grids and peak demands in effect. For instance, if the electricity grid congestion is high, water pumps can be restricted to pull full capacity. Besides, energy storage (biogas/biomethane) can be implemented.

Example – Sweden

Markets for increased energy resilience have been created, where the purpose is to cut the highest peaks of effect demand and contribute to increased energy security. The owner of the grid pays the energy provider to reduce the energy usage temporarily. As an example, there is a local energy capacity market in the Gothenburg region where all types of energy resources can be connected to the market in order to optimise the energy usage, for example, electric vehicle charges, car batteries or heat pumps. In 2024 approximately 170 MWh had been traded in this local market and helped stabilise the grid. Water service provider should consider assessing the influent pumps at the UWWTPs, as they often require a lot of electricity. By being flexible and planning well-ahead the pumping could be reduced when there is a high demand in energy in the region and vice versa at low demand.

Example –FlexWATTer (Flanders)

FlexWATTer is a project aiming at the development of a FLEXibility system for producers and distributors of drinking WATer to ensure balance on the electricity transmission network.

The objective of the project is to propose an aggregation solution of the numerous flexible loads coming from the producers and distributors of drinking water. It explores the possibility to add, at local level, complementary units of energy storage, whose choice will be based mainly on the needs of the network, to the existing renewable energies and storage systems such as pumping-turbining units. The operation of these facilities would be based on an intelligent management system, which aims to provide a win-win situation for both the water companies and the network. In other words, allowing profits for water companies and solving the problems of imbalances encountered on their network and ensuring security of supply.

Example – Flanders

At the Merksem wastewater treatment plant, Aquafin is piloting a new approach to emergency power supply with the installation of a renewable Battery Energy Storage System (BESS). Traditionally, such critical infrastructure would rely on diesel generators to safeguard operations during power outages, but Aquafin deliberately chose a fossil-free alternative in line with its sustainability strategy. Beyond its emergency role, the battery is also integrated into the wider energy system through smart algorithms that continuously evaluate when to store energy and when to release it. This means it charges at times of low demand or surplus renewable production, and discharges when the grid requires support, helping to balance fluctuations from solar and wind. By turning a backup facility into a dynamic, grid-connected resource, the Merksem pilot demonstrates how utilities can simultaneously guarantee resilience, reduce fossil dependency, and enable a more flexible, renewable-based energy system for society.

Example – Flanders

Aquafin's flexibility project at the wastewater treatment plants in Harelbeke and Hoogstraten illustrates how critical public utilities can play in supporting energy security beyond their core mission of water treatment. The biological process at these plants produces excess sludge, which is digested to generate biogas. This renewable gas is stored in biogas balloons and used in combined heat and power (CHP) units of 200 kW each. Traditionally, these engines were run with limited consideration of the dynamics of the electricity system. Through the project, Aquafin developed in-house smart control algorithms that align the operation of CHP engines and large-scale heat pumps (200–500 kW) with day-ahead market signals. This means that electricity is produced when society most benefits from it - educing strain on the grid during peaks, avoiding inefficient injection at negative prices, and supporting the integration of variable renewable sources such as wind and solar.

4. Challenges for the water sector

Section 3 has shown ways forward for the sector in terms of enhancing energy efficiency, further developing the potential of renewable energy generation within the sector, and other possible solutions to increase energy security.

However, there are different challenges facing the water sector. Beyond the challenges discussed in previous sections, other challenges facing the sector in its efforts to ensure energy security are the obligations regarding energy neutrality set out within the recast UWWTD; the contribution of the sector to the EU long term climate neutrality demands; improving water savings; and the growing threat and investment needs regarding climate adaptation. Achieving this balance requires not only technological innovation, significant funding (discussed in section 5) and regulatory adaptation, but also an integrated and flexible approach that considers local contexts and strategic cross-sector partnerships, for example between water and energy operators. By addressing these challenges holistically, the sector can align its efforts with broader sustainability and climate goals while continuing to provide essential services to society, protecting human health and the environment.

4.1. Recast UWWTD energy neutrality challenge

The recast UWWTD (Directive 2024/3019) includes new provisions in Article 11 setting the obligation for the wastewater sector to become energy neutral by 2045 at a national level, while requiring more stringent and new treatment requirements that may bring a higher energy demand. It is of paramount importance to consider this increase in energy demand when considering energy neutrality, efficiency and security and greenhouse gas emissions.

Energy demand of tertiary and quaternary treatment in the recast UWWTD

The recast UWWTD introduces new treatment processes to remove micropollutants from urban wastewater (the so-called quaternary treatment).

The main process technologies that will be implemented to comply with the new requirements are ozonation and activated carbon (granular or powdered). Ozonation is an oxidative process which requires a lot of energy. It will be challenging for many UWWTPs and Member States to increase the energy production enough to counterbalance the increased energy demand from further and new treatment processes.

For example, introducing ozonation at Rya UWWTP in Gothenburg (800 000 p.e.), Sweden, will increase the energy demand by 50% and require construction of a new high voltage works.

Additionally, more energy will be used for aeration, pumping etc. to fulfil stricter requirements for phosphorus and nitrogen removal (the tertiary treatment).

The adopted text of the recast UWWTD reflects, to a certain extent, the current situation and the reality of the wastewater sector in terms of energy neutrality (as defined in the Directive). It includes the generation of renewable energy on-site or off-site by or on behalf of the owners or the operators of UWWTPs treating a load of 10 000 p.e. and above, and the use of such energy on-site or off-site by the owners or operators of those plants.

However, a literal and too rigid interpretation of Article 11.2 may miss the bigger picture of how the wastewater sector is already contributing to energy neutrality and security at the municipal, regional, national and, even, European levels, through supply of power (in different forms) to district heating, public transport or power grids, among others. In addition, the prescriptive nature of Article 11 may limit flexibility for water utilities to adapt solutions to their local contexts.

As mentioned before, energy production is becoming increasingly important but remains a secondary priority for wastewater operators (and for drinking water operators)[13]. Developing and implementing energy projects requires substantial amounts of funding, time and expertise. While the funding of these projects represents a clear challenge (discussed further in section 5), the general skills shortage can also have a negative impact on the roll out of further projects. This is both true for the conceptual development as well as the civil construction availabilities. Both can create bottlenecks that either delay further energy generation projects or discourage operators of the water sector to plan such endeavours.

Further external factors can become challenges to increase the production of energy. Among European countries, permit granting times can vary immensely. While the EU is already seeking to fasten permit granting through the Renewable Energy Directive (RED III - (EU) 2023/2413), wastewater operators can still experience significant delays. The wastewater sector and its competent authorities should explore the possibilities to use the measures in the Clean Industrial Deal to accelerate energy project permitting (this is further developed in Section 5.2).

Furthermore, renewable energy projects have at times led to resistance or complaints from neighbours. This is particularly true for larger installations such as wind power. While the wastewater operator might be the owner of the required land, such installations can, nevertheless, have consequences beyond the remit of water operators. This requires careful and active communication with the affected communities and can, in the worst case, become a bottleneck for affected projects.

Wastewater operators will face further challenges in maintenance and upkeep of their renewable energy installations. In this context, damage from climate change (discussed further in Section 4.3) such as extreme hailing events, storms, etc. can pose additional challenges and create a higher price tag for energy production.

[13] Even though this section focuses on wastewater operators (as the ones who have to implement the needed measures to comply with energy neutrality goals in the recast UWWTD) the challenges and solutions addressed can also apply to drinking water operators when they deploy energy generation projects.

Many wastewater facilities operate within limited physical space, which complicates the installation of on-site renewable energy infrastructure such as solar panels, biogas plants, and microturbines. For smaller UWWTPs or those located in densely populated areas, available space may be insufficient to meet all energy needs, thus increasing implementation costs and limiting energy options. These spatial limitations and added expenses necessitate that some operators consider generating renewable energy off-site, effectively transforming these facilities from energy consumers into renewable energy promoters - an expansion of role that lies outside their traditional operations.

Several possible solutions to the recast UWWTD energy neutrality challenge have been identified:

~ **Off-Site Renewable Generation: A Solution to Space Limitations**

The recast UWWTD addresses spatial limitations by permitting "off-site" renewable energy generation, as long as this energy is produced by or on behalf of UWWTPs owners or operators. This flexibility provides a practical solution, enabling renewable energy to be generated off-site and delivered to treatment facilities through distribution networks. By leveraging off-site generation, wastewater sector can satisfy the Directive's requirements despite the physical constraints of the UWWTPs locations.

~ **Leveraging Alternative Energy Agreements**

Another viable path to energy neutrality is through mechanisms similar to Power Purchase Agreements (PPAs). The recent European electricity market reform enacted in July 2024 (Directive (EU) 2024/1711 and Regulation (EU) 2024/1747), encourages PPAs as a tool for stabilising electricity prices and advancing renewable energy use. However, the recast UWWTD prohibits wastewater treatment facilities from counting externally purchased renewable energy toward their energy neutrality goals. Therefore, these contracts must be structured not as purchases (kWh), but as co-ownership agreements or installed capacity (kW) reservations, allowing wastewater treatment facilities to participate actively in renewable energy generation. This approach aligns with the Directive’s objectives, as it ensures that facilities have a stake in energy production rather than merely sourcing energy from external providers.

~ **Supportive Regulatory Framework**

The potential of the wastewater sector to contribute to Europe’s energy transition requires a comprehensive foundation of regulatory support, operational flexibility, and financial and technical assistance. Such an integrated approach not only enables the wastewater sector to meet energy neutrality goals but also drives its contribution to Europe’s climate objectives.

A regulatory framework that promotes energy generation and export is essential for water companies to thrive in the renewable energy landscape. Policies that clearly define guidelines for renewable production, grid access, and incentives will encourage wastewater treatment facilities to generate and share surplus energy. Regulations that permit the export of renewable energy, such as biogas or solar-generated electricity, back to the grid, alongside credits or incentives, would offset operational costs and support a circular economy within the sector.

4.2. Climate neutrality in the water sector

Following the commitments made by the European Union and its Member States on signing the Paris Agreement in 2015, the EU leaders endorsed the objective of achieving a climate-neutral European Union by 2050. This objective is at the heart of the European Green Deal, and is a legally binding target through to the European Climate Law. As stated in this Law, climate neutrality by 2050 means achieving net zero greenhouse gas emissions for EU countries as a whole, mainly by cutting emissions, investing in green technologies and protecting the natural environment. The law aims to ensure that all EU policies contribute to this goal and that all sectors of the economy and society play their part.

Becoming 'climate neutral' means reducing greenhouse gas emissions as much as possible, but it also means compensating for any remaining emissions (for example, through carbon sequestration, i.e., by removing carbon from the atmosphere, or through offsetting measures, which typically involve supporting climate-oriented projects). This is how a net-zero emissions balance can be achieved.

Carbon footprint is measured through three scopes:

- Scope 1 (direct emissions from owned sources),
- Scope 2 (indirect emissions from purchased energy), and
- Scope 3 (all other indirect emissions across the value chain).

In the water sector, the carbon footprint originates primarily from process-related emissions inherent to water treatment and purification and the use of fossil fuels (scope 1); electricity consumption (scope 2); and indirect emissions throughout the value chain (scope 3), such as those from procurement of chemicals and materials, embedded carbon in infrastructure (construction, maintenance, decommissioning), waste disposal (including agricultural application of sludge), transport and distribution outside the organisation's direct control, and emissions associated with customers' use of water services.

Electricity is used extensively for pumping, aeration, and disinfection, while process emissions - such as nitrous oxide (N_2O) and methane (CH_4) - are released during biological treatment stages, especially in UWWTPs. While process optimisation can reduce some of these emissions, **the most impactful and scalable strategies for decarbonisation lie in increasing energy efficiency and integrating renewable energy throughout operations**. This can be achieved through advanced, energy-efficient technologies, smart control systems, and on-site or purchased renewable electricity.

Scope 3 emissions, which arise from activities outside the direct control of water utilities, remain challenging to reduce and measure. In the water sector, scope 3 emissions mainly come from the value chain:

- in water supply, they are associated with the production and transport of materials (pipes, pumps, reservoirs), infrastructure construction, chemicals for water treatment, logistics, and the management of construction and maintenance waste;
- in wastewater treatment, in addition to materials, chemicals, and transport, emissions related to the management and disposal of sludge and other treatment by-products are particularly significant.

Due to the inherent nature of biological treatment processes (scope 1) and the fact that many emissions arise from activities beyond direct control - triggered by suppliers and customers - reducing scope 3 emissions is particularly challenging to measure and achieve. While efforts can be made to minimise the use of fossil fuels and indirect emissions (scope 2), the most effective and scalable strategies for decarbonisation remain improving energy efficiency and increasing the use of renewable energy across operations. Additionally, where reductions are difficult to achieve directly, emissions can be partially mitigated through verified carbon offsetting programs, helping to balance the sector's overall carbon footprint.

4.3. Climate adaptation challenge

Climate breakdown is placing unprecedented pressure on Europe's water services, with rising temperatures and extreme weather events threatening water availability and quality. Adapting the water sector is essential to ensure long-term resilience, particularly in urban areas where demand is high and infrastructure is aging.

As identified in EurEau's paper "Climate change and water services: adapting to the consequences"[14] there are different direct and indirect impacts of climate change on water services, addressing both quantitative and qualitative aspect of changed water availability and of raising air and water temperatures.

Increasing water availability in the urban water cycle requires water operators to act on two main fronts:

- Increasing water availability through alternative sources and operational efficiency.
- Reducing water demand through consumption-saving strategies, public awareness, and appropriate pricing mechanisms.

Efforts to increase water availability in response to climate change often rely on technologies with high-energy demands, such as desalination and deep groundwater extraction. While these solutions are vital in water-scarce regions - particularly in Southern Europe - they significantly increase the sector's energy footprint and must be paired with renewable energy sources to remain sustainable.

On the other hand, **saving water means saving energy**. Measures aimed at reducing water consumption - such as minimising water losses in distribution networks, promoting efficient appliances, and encouraging behavioural change, thus lowering overall water

[14] Briefing Note - Climate change and water services: adapting to the consequences. EurEau, 2020.

demand - have a direct impact on energy savings. When less water is lost through leaks or consumed unnecessarily, less energy is needed to extract, treat, and distribute that water. In this context, improving water efficiency becomes a key lever for enhancing the energy sustainability of the sector.

In this way, balancing supply and demand strategies is essential not only for water security but also for managing energy use and emissions in a climate-resilient water sector.

In addition, the increasing frequency of extreme weather events, such as heatwaves and storms leading to floods, will require substantial investments to adapt energy infrastructure within the water sector. Ensuring the resilience of pumping stations, treatment plants, and distribution networks, both in drinking and wastewater services, against climate-related disruptions will be a major financial and technical challenge.

Adapting Europe's water sector to climate change is urgent and multifaceted. It demands technical innovation, political commitment, sustained investment, and informed citizen participation. As climate impacts grow, water becomes a strategic resource for social cohesion, public health, and economic competitiveness. Investing in resilient infrastructure, promoting efficiency, digitalising networks, while protecting the vulnerable, are core pillars of this transformation. Europe must lead by example and accelerate its shift towards a sustainable and adaptive water management model fit for a changing climate and a just future.

However, this will require substantial and sustained investment for many decades far beyond current investment levels. Even today, a significant funding gap exists within the water sector across most of Europe. These economic and financial aspects are outlined in Section 5.

5. Economic and financial aspects

Previous sections have highlighted the criticality of energy security for water services. Furthermore, additional challenges facing the water sector have also been laid out: energy neutrality obligations within the recast UWWTD, the abatement or offsetting of process emissions from wastewater treatment as a contribution to climate neutrality, and the accelerating need of climate adaptation measures to mitigate impacts of flooding, droughts and water scarcity. All these challenges will bring significant funding and investment needs.

5.1. Investment needs of the water sector

The recently published Water Resilience Strategy identifies an investment gap of €23 billion per year to implement existing water legislation. This figure is aligned with the OECD 2020[15] estimates on the total cumulative additional expenditures for water supply and

[15] OECD. 2020. Report on Financing Water Supply, Sanitation and Flood Protection.

sanitation, which amounts to €289 billion (EU28) by 2030, and that translates into €255 billion for the EU27, as shown in Figure 8.

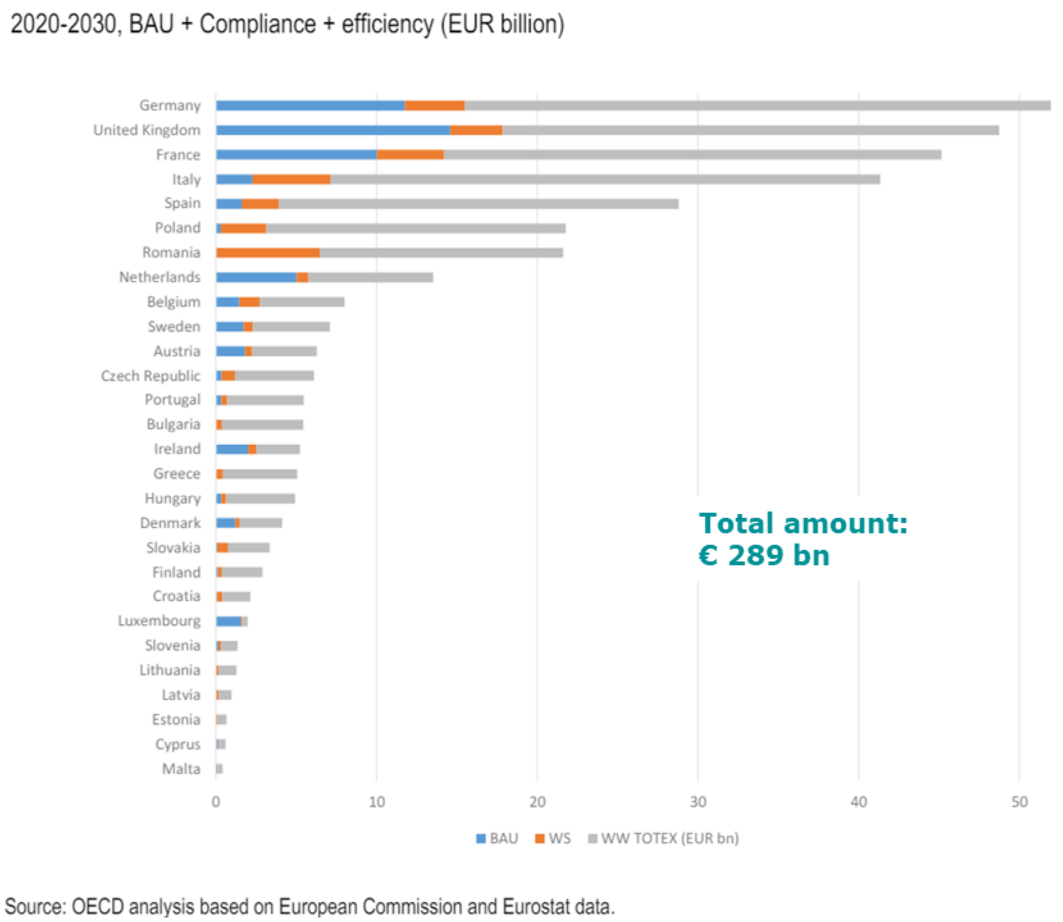


Figure 8. Total cumulative additional expenditures by 2030 for water supply and sanitation

It should be noted, however, that these figures are only including compliance with the 1998 Drinking Water Directive (98/83/EC) and the 1991 UWWTD (91/271/EEC), and do not consider investments needed to renew existing infrastructure or meet the objectives of the recast DWD and the recast UWWTD. There are some estimates in relation to the implementation costs of these pieces of legislation:

- recast DWD ((EU) 2020/2184): the impact assessment accompanying the European Commission's proposal for the recast DWD estimated that the implementation costs would be of around €1.6 billion/year (by 2050)
- recast UWWTD ((EU) 2024/3019): the impact assessment accompanying the European Commission's proposal for the recast UWWTD estimated that the implementation costs would be of around €3.8 billion/year (by 2040).

At the same time, water services providers must adapt to new security challenges, strengthening their resilience against both physical and cyber threats, in line with obligations under the Critical Entities Resilience Directive (CERD) and the Cybersecurity Directive (NIS2D), amid growing geopolitical tensions. Protecting critical infrastructure and ensuring cybersecurity have become urgent priorities aligned with the EU's strategic agenda.

In addition, and as already mentioned in Section 2, European countries have seen significant increases in energy costs over the past few years, due to several reasons, which turns into an increase in costs of the provision of water services.

Significant investment will be needed not only to provide effective and efficient water services, but also to achieve the required level of energy security and to address the climate mitigation and climate adaptation challenges the sector is facing.

The current European funding framework offers several possibilities for the water sector. Under the 2021–2027 Multiannual Financial Framework (MFF), the EU is allocating financial resources to support water-related projects, with an estimated total funding of between €24 billion and €30 billion. This funding is channelled through several key EU programmes, each contributing to different aspects of water management, innovation, infrastructure, and environmental protection (more details can be seen in Annex 3). However, and if considering the investment needs highlighted earlier, this amount is far from being sufficient to achieve the level of investment and funding necessary to meet the needs of the sector. If the water sector is to achieve energy security and address the climate mitigation and adaptation challenges it is facing, in addition to complying with its core activities, the true value of water must be fully appreciated and supported, and innovative economic and financing mechanisms and tools should be implemented.

5.2. Economic and financial solutions to achieve energy secure water services

Water services are critical and essential services that support vital sectors including food, energy, information technology, or housing, and contribute to the realisation of the human rights to safe drinking water and sanitation. However, their true value is often underappreciated and water services are taken for granted[16]. The significant economic impacts are often overlooked, and this tends to translate into under investment and insufficient funding. In addition, the sector is facing accelerating threats from climate breakdown such as flooding, droughts and water scarcity, or more powerful and destructive storms. Investments required to mitigate these threats, including investment in energy security and energy self-supply, are far not to be the priority they should be.

The true value of water services needs to be understood and acknowledged if the significant funding gap referred to above is to be bridged. Policy makers, the public and investors need to understand the value of the water sector and the criticality of being energy secure.

[16] The value of water services. EurEau, May 2021.

This should help improve the willingness to pay more for water services and also lead to increased investment and funding.

The risks for the sector will still exist until energy security is in place. Therefore, it becomes crucial that policy makers support water services even during the implementation of measures to ensure energy security, given that energy price shocks may happen while such measures are being implemented.

The climate mitigation investments in renewable energy technologies and energy efficiency measures highlighted in Section 2 have a threefold return:

- Economic: energy security becomes cheaper in the long run,
- Environmental: energy security leads to reduced CO_2 emissions, as well as generation and use of non-fossil energy, and
- Societal: the potential of the sector to produce renewable energy contributes not only to its energy self-supply but also to reduce the dependence on external sources of energy at local, regional, national and European levels, contributing to European competitiveness.

This win-win opportunity must be promoted and prioritised, and the required investment and funding must be mobilised.

The funding framework is unlikely to be a one size fits all approach. Country specifics, depending on many social and economic considerations, will vary. In some European countries, the scope and capacity to increase water tariffs will be more than in other countries. In other countries, the limitation may be the borrowing capacity of the water service providers. In others, the willingness to provide State funding support is also likely to vary. Regardless, the necessity for increased funding and investment must be made clear, along with the economic and environmental returns.

Some European countries already struggle to cover the costs of water services through tariffs, some of them not even covering the operation and maintenance of these. Increasing water tariffs to cover those costs, and even more so to finance the energy and climate related challenges water service providers are facing, requires political willingness. Hence, not all water service providers can rely on water tariffs to fully cover the needed investments. The water sector needs context-adapted and innovative economic and financial instruments and further cooperation with the private sector to address such investment needs, particularly in relation to energy security.

The list below provides some examples of possible instruments, which could be further explored where appropriate and according to Member States water governance models and legislative frameworks:

- <u>Temporary "adjust mechanism" to diminish wholesalers electricity price</u>

Case study: Spain

The Royal Legislative Decree RDL 10/2022 sets a temporary "adjustment mechanism" to diminish wholesale electricity prices. It was called "the gas cap" for the gas used by combined cycle power plants in Spain. This cap had the objective to adjust electricity prices from an initial cap of 40 €/MWh to 65 €/MWh for the last month in which this measure was in force.

Additionally, the electricity production tax of 7% was temporarily suspended and the electricity sales tax diminished from 5.1% to 0.5%. Both measures were in force up to December 2023.

~ EU bonds

Access to EU (green, blue, hydro…) bonds requires compliance with the EU Taxonomy Regulation ((EU) 2020/852). Water services have the opportunity to access EU bonds through at least two possibilities in the Taxonomy Regulation:

- According to the Climate Change Delegated Regulation (Commission Delegated Regulation (EU) 2021/2139 – Chapter 5 of Annex I) to the EU Taxonomy Regulation, water supply systems and wastewater collection and treatment can make a substantial contribution to climate change mitigation if they comply with the technical screening criteria related to net average energy consumption.
- Water utilities should explore the possibility of qualifying as an economic activity that substantially contributes to climate change mitigation through the activities generating electricity from different renewable energy sources (Chapter 4 of Annex I).

~ Private finance

The water sector could explore further cooperation with the private sector (for example, through public-private partnerships of other forms of ventures) to finance the investments needs to achieve energy security.

~ Clean Industrial Deal and Affordable Energy Action Plan

The Commission launched the Clean Industrial Deal in February 2025, mobilising over €100 billion to boost competitiveness and accelerate renewable energy adoption and energy system sustainability through updated investment rules and simplified State aid processes. The Clean Industrial Deal also promotes long-term supply contracts, accelerates energy project permitting and strengthens grid infrastructure, all of which aims to bring down electricity prices and enhance system efficiency. The Affordable Energy Action Plan, which is part of the Deal, includes measures to reduce electricity bills and lower supply costs across the EU, encouraging EU countries to cut network charges and taxes, helping to reduce overall energy costs.

If water services can contribute to a resilient EU energy system, the possibilities of using the measures in the Clean Industrial Deal and the Affordable Energy Action Plan should be explored.

~ <u>Group tenders</u>

In many countries, there are numerous small public utilities that must purchase energy through public procurement. Each utility selects its supplier individually, based on tender prices. However, consolidating tenders can reduce costs by taking advantage of economies of scale. These utilities should therefore be supported in organising regional or even national tenders, enabling them to secure lower prices through collective purchasing power.

6. Conclusions

Over the last years, energy security has become an increasingly critical concern for the European water sector. The entire water cycle - from abstraction and treatment to distribution of drinking water and wastewater management - relies heavily on a stable and secure energy supply. Water services will not be able to achieve their primary goal, i.e. protect human health and the environment, if the sector cannot have a reliable, secure and affordable energy supply.

Thus, energy security (understood as ensuring access to reliable, secure and affordable energy) is a key aspect for water service providers, and should prevail over energy self-supply (meaning water services producing the energy they need to cover their energy demand) or energy neutrality (as defined in the recast UWWTD, and applying only to UWWTPs.

Becoming less dependent on external sources by increasing the own-production of energy will certainly contribute to energy security. The paper shows the potential for water services to improve their generation of renewable energy. Nevertheless, it also shows that for drinking water services the own-generation of energy to cover their energy demand is rather limited. Regarding wastewater services or integrated water services (those where drinking water and wastewater are provided by the same operator), they do have a bigger opportunities within their processes to increase the generation of energy for self-consumption.

Picture 3. Energy production in the water sector

Despite the sustained effort of water services to improve their energy self-sufficiency, increasing the energy generation constitutes a long-term effort that requires considerable investment (to be added to the already significant investment gap in the water sector) and realistic timelines and goals to achieve. Technical possibilities for generating renewable energies are heavily dependent on the framework conditions, e.g., topography, available elevation, and availability of the different raw water sources. Hence, a one-size-fits-all approach will not fit the sector, and flexibility and local considerations should prevail in any solution.

Energy self-supply and energy neutrality are among the possible means to energy security for water services. However, energy security also depends on external factors, out of the remit of water service providers, such as the functioning of the energy market itself. Setting energy self-supply or energy neutrality as the goals to achieve, can prevent water services from contributing to Europe's energy pool, which hinders reducing Europe's dependence on external.

Water services are facing several and diverse challenges in relation to energy security, such as:

- How to balance energy efficiency with the increased need of energy to comply with new and more stringent treatment requirements.
- How to comply with the recast UWWTD energy neutrality target and the new and more demanding treatment requirements.
- How can the sector improve renewable energy adoption and energy efficiency, considering these are the only truly effective levers for meaningful emissions reduction in the water sector.
- How to adapt the sector to climate change.

In addition to these challenges, the high fluctuation of energy prices in the last years or events like the April 2025 Iberian blackout , show that the water sector should further explore innovative solutions that allow long-term strategies to secure a sustainable energy supply. Nevertheless, such solutions should be accompanied by a supportive and enabling regulatory framework.

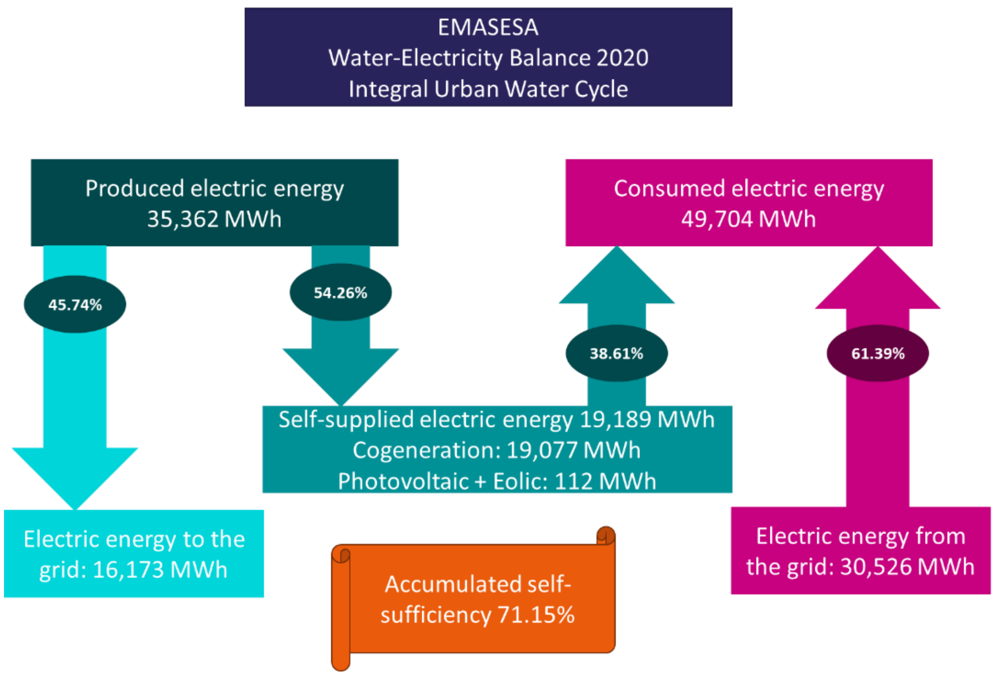
All these challenges will bring significant funding and investment needs, added to the current investment gap of water services (the Water Resilience Strategy identifies an investment gap of €23 billion per year to implement existing water legislation, not including the recast DWD nor the recast UWWTD). The sector should explore innovative economic and financial solutions to ensure energy security.

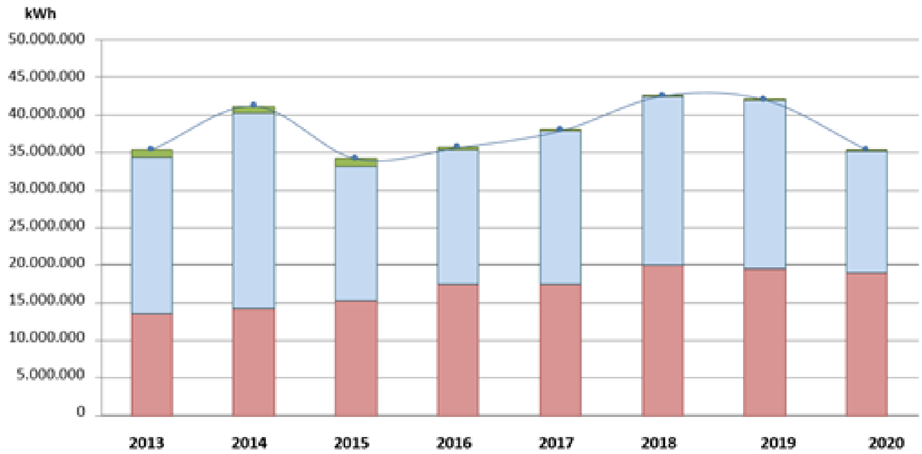
Investing in energy security for water services is not just investing in water services. It means investing in Europe's competiveness, as it requires securing water for all economic activities, and in Europe's circular economy. The security of Europe relies on water security and resilient water services. However, water services will not be resilient if the sector cannot achieve a reliable, secure and affordable energy supply.

Annex 1. Examples of energy self-supply

EMASESA (Water utility Seville Metropolitan area)

- Integral water cycle
- Drinking water:
  - 6 dams, 97 hm^3 abstracted, 1 000 000 inhabitants supplied
  - 3 drinking water treatment plants (DWTP): 72 hm^3 drinking water (treated and supplied)
  - 3 778 km water supply network
- Wastewater:
  - 6 UWWTPs + 1 sewage sludge plant: treating 76 hm^3 of wastewater/year
  - 3 009 km sewage network
- Accumulated level of self-supply (electric energy production/use) 71.15% for the whole water utility and considering the integral urban water cycle (2020)





PHV + Eolic	1.031.051	989.569	1.022.459	290.651	15.397	12.633	16.440	112.368
Hydraulic	20.912.195	26.032.785	17.923.055	17.868.367	20.425.671	22.581.301	22.605.897	16.172.896
Cogeneration	13.487.054	14.209.882	15.189.558	17.508.727	17.475.576	20.005.178	19.456.928	19.076.633
Total	35.430.300	41.232.236	34.135.072	35.667.745	37.916.644	42.599.112	42.079.265	35.361.897

HAMBURG WASSER

- Population supplied with drinking water: 2.2 million
- Wastewater treated 450 000 m3/day
- Energy self-supply 2021: 77.3% (Energy neutrality target by 2030: Hamburg Wasser built an incineration plant to provide heat for the UWWTP, three wind turbines and solar panels. It also launched biogas production and purchased green electricity).

EMASAGRA (water utility for Granada, Spain - integral urban water cycle)

- Water supply to 390 000 inhabitants
- 2 wastewater treatment plant: UWWTP west (223 000 p.e.) + UWWTP South (425 000 p.e.)
- Biofactory South Granada: reached 100% energy self-supply: cogeneration + 2 mini-hydraulic plant (to use hydraulic energy from water supply network)
- 2025 achieved neutrality, same electricity sold than purchased along the year.

RINGSEND UWWTP DUBLIN

- Ringsend UWWTP (Dublin) accepts more than 40% of national urban wastewater (around 2 million p.e.)
- Current electrical generation from biogas on site is 30% of on-site electrical energy usage
- With process and efficiency improvements and changes to sludge processes, we expect

that we might get to about 40% generation from biogas.

- Site has no space to allow for installation of any other renewable generation.
- Potential for expansion of site is very limited due to environmental and heritage designations, and increasing commercial development

GOTHENBURG, SWEDEN

Drinking water

- Serves approx. 600 000 people in the municipality of Gothenburg.
- Approx. 52 GWh purchased each year.
- Production on-site is approximately 0.5 GWh with a potential to increase to 3.1 GWh per year, 1.8 GWh from turbines between water treatment plants and the lakes from where the drinking water is extracted. By setting up solar panels on the treatment facilities another 1.3 GWh per year can be produced. The water management system in Gothenburg is continuously evolving to meet regulatory requirements and enhance efficiency. To comply with the Drinking Water Directive, one of the two existing water treatment plants will need to be supplemented with ultrafilters. This upgrade will result in an increased energy demand.

Wastewater

- Serves approx. 900 000 p.e. in the regional Gothenburg area.
- Approx. 40 GWh electricity and 14 GWh heat is purchased each year.
- Production on-site is approx. 70 GWh biogas per year. The biogas is upgraded (to be able to put on the gas grid) by another company, Gothenburg Energy.
- Level of energy sufficiency on wastewater is 130%.
- On top of that, the heat in the treated wastewater is used by Gothenburg Energy in heat pumps, producing approx. 300 GWh/year. The electricity (in kWh) used for the heat pumps is always 3-4 times lower than the recovered heat (in kWh) transferred to the district heating system.

BELGIUM

There are not many sludge digesters; those existing produce 20-30% of the electricity consumed.

There is one example of a big UWWTP (> 100 000 p.e.) nearly entirely covered by solar panels, which represent around 5% of the energy need of this plant. Recent assessments show that a hypothetical coverage of all the land available in the existing wastewater treatment plants in Wallonia by solar panels will only be able to cover 13% of the total energy needs. The completion of the five wind turbines (in 2030) will bring this coverage to 17%. Energy recovery from sewage sludge, after centralisation on two dedicated sites, will make it possible to achieve a maximum coverage of 45%.

POLAND

Treatment plants where the primary sludge and surplus activated sludge are digested, and the biogas is used to produce electricity, can cover up to 35% of the electricity demand. This is confirmed by design calculations. If there is free space at the treatment plant, it is possible to build a photovoltaic farm for own use and to obtain 10 to 15% percent of the demand. Heat pumps can further improve the balance during periods of low temperatures. Only if there is an external heat consumer, then all year round.

LATVIA

There is only one biogas plant in Latvia for sludge digestion and seems that there will not be any more in future since the amount of sludge is inconvenient to build digestion plants (<100 000 PE in all other UWWTP). In the existing UWWTP (only one with digestion) it can reach max to 40% of energy production that is needed for UWWTP.

HELSINKI REGION, FINLAND

The electricity self-supply of Viikinmäki UWWTP as a yearly average, has increased from 50-70% in the period 2009-2016 to as high as 85-97 % in the period 2017-2022. This increase was possible due to several long-term optimisation projects both to increase electricity production and decrease electricity consumption. For example, renewal of gas engines, sludge centrifuges and energy monitoring per process unit.

At the new Blominmäki UWWTP, which started its operation in late 2022, the estimated level of electricity self-supply is only 70% even though the UWWTP is more advanced than Viikinmäki UWWTP. This is due to a less beneficial ratio of organic matter to nitrogen in the influent wastewater compared to the Viikinmäki UWWTP. The main source of energy is biogas, produced from the organic matter, while the conversion of the influent wastewater’s ammonia-nitrogen into nitrate-nitrogen consumes a significant portion of the electricity.

SOFIA, BULGARIA

Sofia UWWTP operated by Sofiyska voda, provides water and wastewater services to 1.4 million people in the capital city of Sofia (+32 villages in its suburbs).

Sofia UWWTP produces green heat and electricity from sludge through co-generation since 2010 and managed to achieve full energy self-supply in 2015.

Since 2016 it produces more energy than it consumes. In 2022 the UWWTP produced 117% green electricity which was achievable by implementing a rigorous energy efficiency programme to optimise the water company’s energy consumption.

BIOGAS PRODUCTION IN TYCHY, POLAND

The Tychy-Urbanowice Wastewater Treatment Plant has been operating co-fermentation of sewage sludge with biodegradable waste since 2009, which significantly increased biogas yields. Production rose from around 2.5 million m^3 in 2009 to about 6.5 million m^3 in 2018

Energy Output and Self-supply.

- May–December 2018:
  - CHP units at both facilities (wastewater treatment plant + aquapark) produced 20 500 MWh of energy (electricity + heat), fully covering their own needs
  - A surplus of 1 800 MWh of electricity was sold to the grid - more than the demand of Tychy's trolleybuses during the same period.
  - This avoided about 8 355 tons of CO_2 emissions and reduced particulate matter and other pollutants.
- 2019:
  - The Tychy Water Park alone generated 6 500 MWh of energy, of which 3 000 MWh were sold to the grid; the rest met internal demand.
  - The combined production of the wastewater treatment plant and aquapark was about 14 000 MWh.
- Current Data (2025)
  - The system continues to operate - the utility (RCGW S.A.) has achieved over 200% energy self-supply for the wastewater plant and 100% coverage of its heat demand.
- Current annual outputs:
  - ~15 000 MWh of electricity
  - 62 000 GJ of heat
  - Surplus: 3 000–5 000 MWh of electricity sold to the market.
  - The surplus biogas allows heating of the nearby water park.

Year / Period	Biogas (m^3/year)	Energy Production	Surplus Energy	CO_2 Emissions Avoided
2009	~2.5 million	-	-	-
2018 (end of year)	~6.5 million	20 500 MWh	1 800 MWh sold	8 355 tons
2019	-	~14 000 MWh	-	-
2025 (current)	-	15 000 MWh (electric) 62 000 GJ (heat)	3–5 000 MWh sold	-

Annex 2. Water operators as partners in the energy system

Case study: The Netherlands

The Dutch water authorities can play a modest role in local energy systems. Assets such as pumping stations, and especially wastewater treatment plants, hold significant potential. Wastewater treatment plants can serve as smart energy hubs - locations where energy consumption, generation, conversion, and storage can take place.

1. Green Gas Production

The production of green gas from biogas by the Dutch water authorities currently amounts to 20 million Nm^3 of green gas per year. Based on currently planned projects, this is expected to increase to 33 million Nm^3 of green gas per year by 2030 ("low-hanging fruit"). In terms of permits, the production of green gas at UWWTPs does not present obstacles but offers advantages. Upgrading biogas to green gas releases less NOx than burning biogas in combined heat and power (CHP) plants, reducing the pressure on nature reserves. By implementing additional incentives, green gas production at UWWTPs could increase. To get an idea of the potential green gas production, various scenarios have been developed. Scenario A is the reference scenario, which includes current plans and developments of the water authorities. Scenarios B through E represent increasing ambition (and costs), with scenario E achieving the maximum potential for biogas and green gas by 2030:

- Reference scenario: already defined digestion and green gas measures by the water boards.
- Already defined digestion measures, 75% of biogas converted into green gas.
- 100% digestion, 75% of biogas converted into green gas.
- 100% digestion, 75% of biogas converted into green gas, heating mesophilic or thermophilic sludge digestion with ambient heat.
- 100% digestion and 100% of biogas converted into green gas, heating all UWWTPs with sludge digestion using ambient heat.

Sources:

Waternet green gas

Union of Water Boards

2. Wind Energy Generation

Water authorities either own wind turbines or participate financially in wind farms. A notable example is the wind turbine project of the Rijn and IJssel water board. On September 15, 2023, this water authority opened two 200-meter-high wind turbines from German company Enercon at the Duiven UWWTP on the InnoFase business park. Together, the turbines generate 24 million kWh of green electricity per year, enough to power 9 000 households. By the end of October 2023, they are expected to be fully operational.

The two new wind turbines are exclusively intended for energy production. The water authority aims to slow down climate change by using wind energy, in addition to solar power and biogas generation. More than half of the energy will be used by the nearby wastewater treatment plant for bio-digestion of sewage sludge. This specific water authority aims to be energy-neutral by 2025.

Residents as shareholders

Residents receive a share of the profits: each year, the water board distributes 20% of the profits to people living near the turbines, with the largest share going to those closest to the turbines.

Source: [Rijn and IJssel Water Board Wind Turbines]

3. Solar Energy Generation

The Vallei en Veluwe water board has installed 18 000 solar panels on wastewater treatment facilities. This includes over 18 000 panels on the roofs and fields of 13 treatment plants, covering about 7 hectares of solar panels. These panels are installed at treatment plants in Bennekom, Amersfoort, Apeldoorn, Heerde, Nijkerk, Veenendaal, Brummen, Elburg, Epe, Harderwijk, Renkum, Soest, and Woudenberg. Annually, the 7 hectares of solar panels generate approximately 5.8 million kWh, which is nearly 10% of the water board's total electricity consumption. This results in a reduction of 3 764 tons of CO_2 based on emission factors for conventional electricity, equivalent to the average annual energy consumption of 1 650 households.

4. Hydrogen Production

Drents Overijsselse Delta, a water authority from the east of the Netherlands, and a company called H2-GO produce and sell green hydrogen, making them the first to do so on a large scale. This hydrogen is produced locally for the region, contributing to the development of the Smart Energy Hub in Overijssel, specifically in Hessenpoort near Zwolle. A Smart Energy Hub is a local energy system that reduces the strain on the grid and operates independently by smartly balancing energy supply and demand. The project involves large-scale production, storage, and conversion of sustainable electricity in collaboration with other partners.

A 1.0 MW electrolyser is being built, powered by renewable electricity, to split water into hydrogen and oxygen at the UWWTP site. The oxygen will be used efficiently in the treatment process, reducing energy consumption. There is also a strong indication that using oxygen in this way will reduce nitrous oxide emissions, a more harmful greenhouse gas.

The Ministry of Economic Affairs and Climate recently announced €12 million in support for water authorities to implement innovative processes in wastewater treatment and accelerate sustainable energy production, with the Hessenpoort project cited as a notable example.

Green Impact

The positive contribution of hydrogen to energy transition challenges led to a €2 million loan to H2-GO for the construction of the hydrogen production facility. The project is expected to save 555 556 litres of diesel and 218 458 kWh of electricity annually, equivalent to 22.2 TJ of energy and a reduction of 1 841 132 kg of CO_2 emissions per year.

5. Battery Energy Storage

At the Harderwijk UWWTP, an energy storage system by Fudura stores the energy produced by the solar panels and biogas engine, making it available when needed. This is a one-year pilot project to gain experience with energy storage and the accompanying Energy Management System (EMS). The goal is to better utilise the generated energy, especially during grid congestion, and to reduce electricity purchases during peak loads.

6. Aquathermal Energy (Residual Heat from Effluent)

Water authorities are willing to make residual heat from aquathermal energy available for district heating networks in the built environment, where possible. Water authorities also play a role in issuing permits, primarily looking at potential impacts on water quality. Monitoring is essential to gain insights into these effects. In the Netherlands, aquathermal energy can meet over 50% of heating and cooling demand, according to reports by CE Delft/Deltares (2018) and IF Technology (2016). So far, more than 110 aquathermal energy projects have been completed, with another 140 in various stages of development.

Case Study: Madrid Region Renewable Plan

Within the scope of the Solar Plan, whose objective is to obtain renewable energy for electrical self-consumption through the construction of photovoltaic installations in company facilities, it has been completed the works of a floating photovoltaic solar plant. The installation has a total of 3 770 photovoltaic modules on an area of 11 680 square metres and has involved an investment of 2.1 million euros financed with European REACT-EU funds. In addition, it has been awarded contracts for 51.47 million euros for the construction of 25 new photovoltaic plants, with a peak power of 34.8 MW included in this Plan, co-financed by the European Regional Development Fund (ERDF) of the European Union.

Besides, the renewable plan includes the construction of the first green hydrogen plant produced from reclaimed water in Spain, located at the Middle and Upper Basin of Culebro´s Creek UWWTP and to enter service in 2025. This project is financed by the European Development Fund Regional (ERDF) of the European Union and will constitute a milestone in the decarbonisation in Madrid Region.

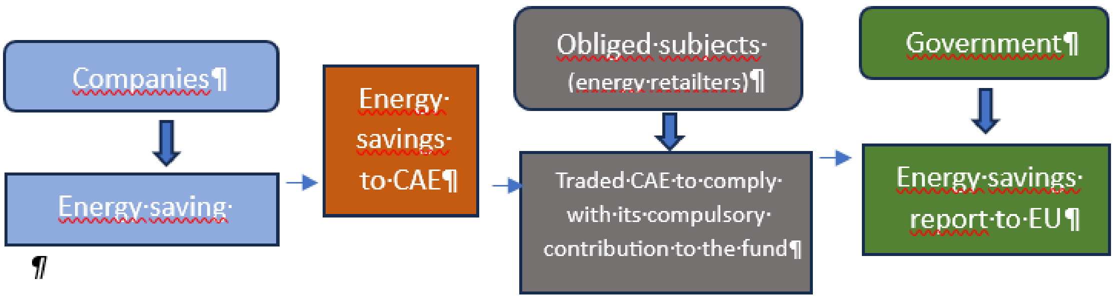
Currently, renewable facilities such as drinking network microturbines, mini-hydraulic plants, electrical generation from biogas, biogas for vehicles, has already been deployed since many years ago.

Picture 3. Floating photovoltaic solar plant in Torrelaguna (Madrid)

Case Study: the Spanish *Energy efficiency obligations national system*

Spain approved the *Energy efficiency obligations national system* (SNOEE) with different legal subjects (obliged subject and delegated subject) for energy savings. Examples of obliged subjects are electricity and gas retailers and petrol products operators. All of them have to allocate money to the National energy efficiency fund. The obliged subjects can develop different actions in order to achieve energy efficiency (Energy efficiency certificates could be traded: 1 CAE = 1 kWh, cap). Initially the amount of money reached €200 million/year, but it will keep on growing (2024: €790 million and savings of 4.400 GWh)

Since 2023, the obliged subjects have to contribute to the National energy efficiency fund, but can minimise them with CAEs. Private companies are economically incentivised to achieve energy savings (26.01.23 onwards)



There are different contract schemes in this process (obliged subject with energy saving owner, delegated subject with energy saving owner, …).

Regarding energy saving actions, we differentiate between two categories. The first one are standard actions (technical specifications/forms), and the second one are specific actions (not standardised).

Case Słupsk, Poland

The Słupsk Bioenergy Island (SBI) is an ambitious pilot for a local bioenergy cluster: a type of energy community based on renewable sources and shared infrastructure. The goal is to create a resilient, low-carbon energy system for the region.

Core Components:

- Distributed renewable energy generation (renewables + CHP)
- Energy storage (thermal, electrical, biogas, hydrogen)
- Smart energy management (balancing, software, and R&D)
- Local energy distribution and production for industrial, public, and residential users.

Słupsk water utility is the Driving Force

Słupsk water utility serves as the leader and coordinator of both the local energy cluster initiative. It leads the formation of the energy community and serving as the lead coordinator of cluster projects. It holds energy generation concessions. SBI has the status of an energy enterprise, which allows it to issue and trade renewable energy certificates.

Storage Infrastructure (Phase 1):

- Battery storage: 6.4 MWh
- Biogas/Biomethane storage with cogeneration: circa 15 MWh
- Thermal energy storage: 25 MWh, with scope to expand seasonally to 500–700 MWh
- Hydrogen storage: in conceptual planning stages.

Strategic Objectives:

- Achieve near-total energy self-supply for the utility within three years and, eventually, power municipal public services too.
- Build a modern energy bank capable of aggregating and distributing energy locally - especially during emergencies or peak demand.
- Serve over 180 energy consumption points across three municipalities.

Annex 3. EU Funding framework

The Cohesion Fund and the **European Regional Development Fund** together represent the largest share of dedicated water funding, with an estimated €16.3 billion available, including national co-financing contributions. These funds are primarily directed towards improving water supply infrastructure, modernising wastewater treatment facilities, enhancing flood prevention systems, and promoting water reuse initiatives across Member States. The recent mid-term review of the cohesion fund has led to a European Commission proposal of additional measures to encourage Member States to invest in Water Resilience. Investment in energy security will play a key role in the sector becoming and needs to be a priority.

Horizon Europe, the EU's main research and innovation programme, dedicates approximately €1.5 billion to water-related research activities.

The EU Recovery and Resilience Facility (RRF) is another substantial source of funding for water projects in some Member States, providing an estimated €6 billion to €8 billion based on national Recovery and Resilience Plans. Investments supported by the RRF focus on critical infrastructure upgrades, building resilience to drought, promoting water reuse technologies, and improving overall water use efficiency, aligning closely with the EU's green and digital transitions.

The LIFE Programme, particularly its Environment and Climate Action strand, allocates approximately €150 million to €250 million for water-related projects. The LIFE programme funds small-to-medium scale initiatives that aim to improve water quality, deploy nature-based solutions, reduce pollution loads, protect against floods, and address microplastic pollution. These projects play a vital role in piloting new approaches and demonstrating innovative solutions that can later be scaled up.

Under the **Common Agricultural Policy** (CAP), although exact figures are not centrally earmarked, several billion euros are expected to support water-related actions through national Strategic Plans. CAP investments target improved irrigation efficiency, sustainable nutrient management practices, and broader water conservation efforts, mainly within the rural development framework of Pillar II

The **European Investment Bank** (EIB) is committed to supporting energy and water projects, focusing on sustainability and climate resilience. This kind of funding goes along with urban water services investments to align the water's long-term infrastructure planning and loan repayment long-term. The proposed EIB Water Programme and Sustainable Water Advisory Facility detailed in the Water Resilience Strategy and to be launched in 2025 are welcome but specific focus on energy security investment is needed.

About EurEau

EurEau represents Europe's drinking and wastewater sector. We encompass 38 national water services associations including public and private operators from 33 countries.

Together we promote the access to safe and reliable water services for Europe's citizens and businesses, the management of water quality and resource efficiency through effective environmental protection.