EUROPEAN ALLIANCE TO SAVE ENERGY

Creating an Energy-Efficient Europe

UNLEASHING THE ENERGY EFFICIENCY POTENTIALS IN THE EU WATER SECTOR

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ENERGY EFFICIENCY FIRST IN THE WATER SECTOR

The Energy Efficiency First principle is a powerful instrument to meet our climate goals at the least cost possible. According to a recent model scenario, aligned with the Paris Agreement, of the International Energy Agency, 76% of the GHG emissions reductions required in the European Union (EU) will need to be achieved through energy efficiency measures[1]. This means that energy waste shall be stopped in every sector with no exception, and water is certainly one of them.

The drinking and waste water sector is a high energy consumer, yet none of the water related directives – the Water Framework Directive, the Drinking Water Directive and the Urban Waste-Water Treatment Directive – covers energy efficiency. The Energy Efficiency Directive could also help address this potential.

A RESERVOIR FOR ENHANCED ENERGY PRODUCTIVITY

The energy consumption of the EU water sector represents the equivalent of 3.5% of the EU electricity consumption[2]. In municipalities, water and waste water facilities account for the largest consumption of electricity, representing 30-40% of local authorities' total electricity bill[3]. It is realistic to cut the energy use of the wastewater treatment facilities by up to 50%, depending on the starting point. A broad range of services and solutions are available to tap into this potential. They have a high return on investments with varied pay-back-time. A non-exhaustive list of these services and solutions include water piping infrastructures geared to current use, distribution systems, variable speed drives, better process control and more efficient compressors and demand oriented pumps. Furthermore new business models such as Energy Performance Contracting (Energy Service Companies and third party financing) which are incentivized via Article 7 of the Energy Efficiency Directive will facilitate the investments.

WHEN WATER BECOMES A RESOURCE: MAKING THE WHOLE WATER CYCLE ENERGY EFFICIENT

Pioneering efforts, led by some municipalities in the EU and US, have shown that improving energy efficiency in the water sector and harnessing embedded energy can generate significant savings and entirely satisfy energy needs with own generation. Danish authorities, for example, are now no longer referring to wastewater but to "resource water". In fact, utilizing the energy embedded in wastewater alone can meet more than twice the electricity required at a wastewater treatment plant[4].

INTEGRATING WATER IN THE WIDER ENERGY SYSTEM

Drinking and Waste Water infrastructure can also be used to mitigate peak loads in the electricity grid, for example by pumping drinking water when electricity demand is low. The biogas generated on site can also be used for the generation of Combined Heat and Power, feeding self-generated electricity and heat to the nearby electricity and district heating grids, when available. Although the full extent of demand side management remains to be assessed, dynamic electricity pricing will be instrumental to make the business case viable, as well as the reduction of administrative and economic barriers.

REDUCING WATER LEAKAGE

A significant amount of energy could be saved by reducing water leakage. Energy to pump and distribute billions of cubic meters of water, that are lost through leaking pipes, is used in vain every day. According to McKinsey, US$167 billion of waste due to water leakages in cities around the world could be avoided by 2030[5]. The European Commission estimates that in average 23% of treated water in the EU is lost in public water supplies; in some municipalities, leakage rates can rise up to 60%. Yet, leakage can typically be reduced by at least 30-40% replacing pipes and/or using energy efficiency technologies to monitor water distribution.

REDUCING THE NEEDS FOR EXTRA WASTEWATER TREATMENT CAPACITIES

The majority of big EU cities have relatively old water infrastructure systems and many of them do not even have the two-tier systems – one for wastewater and another for storm water. Consequently, storm water and wastewater are combined into a single system, which is treated together in the wastewater treating plants. During big rain events, a massive amount of storm water is instantly entering into wastewater systems and requires extreme efforts from wastewater treatment plants and increased energy consumption. This means that extra capacities need to be utilized at the plants under extreme conditions and additional energy is required during the peak rain events. Municipal and domestic energy use can be significantly reduced by implementing green infrastructure practices, such as green roofs which can retain large amount of rainwater and consequently reduce the storm water volume rate of run off entering the drainage system.

OVERCOMING MARKET FAILURES

The business case for making the water sector energy efficient is clear, yet investments remain sub-optimal due to market failures such as lack of transparency on energy waste and leakage, lack of awareness of the savings potential and lack of know-how. More importantly, the main market failure lies with the current regulatory framework that does not cover energy efficiency at all. This means that water utilities and the entire value chain have no EU legislative incentives to improve energy efficiency and will understandably focus primarily on compliance with existing EU requirements such as water quality. Policy action is urgently needed to overcome these market failures and fix this missing dimension of our regulatory framework.

AN OPPORTUNITY THAT SHALL NOT BE MISSED

Overall, with the right set of policy measures, the IEA World Energy Outlook predicts possible global energy savings of 270 TWh and the generation of an additional 70 TWh of electricity by 2040 – equivalent to around 70 large (800 MW) coal-fired power stations[6]. This is achievable with today technologies and know-how and could free valuable resources for the needed investments in water infrastructure in the short, medium or longer term. The European Court of Auditors reported, for example, an investment gap for water infrastructures of 6 billion euros up to 2020 in three Member States alone.[7]

SEVEN POLICY RECOMMENDATIONS FOR AN ENERGY EFFICIENT WATER SECTOR

1 Securing that the energy efficiency first principle applies to the water sector

As already specified, the energy efficiency of the drinking and waste water sectors are not covered by the current regulatory framework despite their significant energy savings potential. It is important to make sure that the energy efficiency first principle is enshrined systematically across the relevant legislation.

2 Setting transparency requirements to enhance the energy efficiency of the drinking and waste water sectors

The revision of the Drinking Water and Waste Water Directives are a unique opportunity to address the lack of transparency and available data on the energy efficiency of water management. Requirements to have transparent and publicly-available information on the energy performance, i.e. kwh/m3, of utilities operating along the drinking water and waste water chain shall be introduced. This would strongly incentivise benchmarking on best practices and encourage energy efficiency improvements.

3 Incentivising the reduction of leakage rates at local level where economically and environmentally relevant

Member States shall ensure that competent authorities analyse the potential for leakage reduction and draw multi-annual plans to untap that potential where such reduction is found economically and environmentally viable. The implementation of such plans should be streamlined with cohesion policy funds. Ultimately, the reduction of leakages across Europe will lead to energy savings and also reduce health risks. The WHO points out that leakages are also an opportunity for hazardous substances or microbes to enter the pipes, making leakages a health issue.

4 Reducing the amount of storm water being directly released into wastewater treatment infrastructures

Measures, which can reduce the amount of the rainwater being released from public and private surfaces into the water infrastructure systems, should be promoted. These measures do not only help lower the amount of storm water being released, but play a vital role in peek-flow reduction which consequently limits the need to put extra wastewater treatment capacities in place during extreme rain events.

5 Including the water and waste water sector in Member States' energy and climate plans set out in the Governance Regulation

Given its high electricity consumption, the burden on municipalities and high energy saving potential, it makes sense that the Energy and Climate Plans set out in the Governance Regulation include a multi-annual strategy and roadmap targeting energy efficiency in the water sector. The adoption of transparency requirements on the energy performance of water utilities via the ongoing revision of the Drinking Water Directive, and later of the Water Framework and Waste Water Treatment Directives, will give Member States the necessary data to build such roadmaps.

6 Including energy savings in the water and waste water sector in a guidance note on the implementation of Energy Efficiency Obligation Schemes (EEOS) in the Energy Efficiency Directive

Including energy savings in the water and waste water sector among the eligible measures in a guidance note on the implementation of EEOS will facilitate the development of new business models. This increase in transparency is expected to boost investments in energy efficiency in the water cycle.

7 Anticipating the potential revision of the Water Framework Directive and of the Urban Waste Water Treatment Directive to make sure they also include energy efficiency requirements

It will be important to make sure a potential revision of the directives will integrate the EU climate, environment and energy policies and objectives in order to tackle the high energy intensity of the sector, particularly in times of shrinking resources.

FOOTNOTES

[1] IEA.(2016). Energy, Climate Change and Environment: 2016 Insights. Retrieved from http://www.iea.org/publications/freepublications/publication/ECCE2016.pdf

[2] IEA (2016), WEO-2016 Special Report: Water-Energy Nexus

[3] IEA (2016), WEO-2016 Special Report: Water-Energy Nexus

[4] https://www.danfoss.com/en/service-and-support/case-studies/cf/how-to-reach-a-water-wonderland/

[5] http://www.mckinsey.com/insights/energy_resources_materials/resource_revolution

[6] IEA, World Energy Outlook 2016.

[7] http://publications.europa.eu/webpub/eca/special-reports/drinking-water-12-2017/en/

ABOUT THE EUROPEAN ALLIANCE TO SAVE ENERGY

EU-ASE was established in December 2010 by some of Europe's leading multinational companies.

The Alliance creates a platform from which our companies (Danfoss, Ingersoll Rand, Kingspan, Knauf Insulation, Philips Lighting, Schneider Electric, Saint-Gobain, Siemens and Veolia) can join with politicians and thought leaders to ensure the voice of energy efficiency is heard from across the business and political community.

EU-ASE members have operations across the 28 Member States of the European Union, employ over 340.000 people in Europe and have an aggregated annual turnover of €115 billion.

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