

From Waste Water to Resource Water



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When the EU Urban Waste Water Directive is up for revision as a result of the ongoing fitness check we must include insights from working with circular economy. We need to move away from solely thinking of waste water as a problem and instead seeing it as a resource.

Alongside the National Danish Water Action Plans, the Urban Waste Water Directive has been a success. Since the introduction of the directive, the Danish environment has been safeguarded from 685 million m³ of untreated waste water per year.

Consequently, we have substantially reduced our emissions of nitrogen, phosphorous and organic materials from cities since the Urban Waste Water Directive was adopted in 1991.

The technological development has resulted in waste water treatment plants (WWTP) able to treat waste water cost-efficiently and more effectively than currently demanded by the Urban Waste Water Directive.

Towards a resource-efficient waste water sector

Basic waste water treatment is already in place in Denmark as well as in many other EU member states. We, the EU member states, must therefore challenge ourselves to improve by developing a new and modern Urban Waste Water Directive.

We should not only focus on treatment efficiency but also seek to utilize the many

resources that can be found in waste water such as energy and phosphorus. We have to ensure that the Urban Waste Water Directive supports the UN Sustainable Development Goals, the Energy Union, and the circular economy – now and in the future.

4 percent of the consumption of electricity in the world is used on water and waste water supply. In the EU, that number is 3 percent according to the IEA. In municipalities, the energy consumption of the water sector is even more prolific. 25-50 percent of the municipal consumption of electricity is spent on the water sector (waste water and drinking water). The water sector is thus a huge energy consumer.

When it comes to energy production from treatment of waste water, Denmark is a leading country. In total, the Danish waste water sector use less than 2 percent of the total Danish electricity consumption. Today, the Danish waste water treatment plants produce 67 percent of their own energy consumption. Several plants produce more energy than they consume. The most innovative water companies produce so much energy that it could cover the energy consumption of the whole water sector if the technology were used on all facilities. The energy produced is even renewable and storable.

The Danish utilities are also at work regarding phosphorus. In Denmark, more than 70 percent of the phosphorus found in waste water is reused as fertilizer. Phosphorus is a scarce resource, and desperately needed for agriculture worldwide. An increasing world population creates a larger demand for phosphorus.

In Denmark, we aim for even higher phosphorus reuse. According to the National Resource Strategy, we expect 80 percent of the phosphorus in waste water to be reused.

In the area of energy, a national benchmarking of the energy performance of both drinking water companies and waste water companies has been introduced. In addition to this, the Danish Ministry of Environment and Food is collaborating with the whole sector – including utilities, advisors and producers of technology – in creating a Water Vision. In realizing a common water vision one of the goals is to develop a single plan for sector innovation that will lead to effective and cost-conscious solutions for Danish water companies to become producers of energy and

CO₂-neutral. All this in a way that positively contributes to a reduction in both the price of water and waste water and of the emission of greenhouse gasses.

Regarding CO₂, we have allocated funding in order for the utilities to experiment with measurement and control of greenhouse gasses. Emissions of nitrous oxide constitute a particular challenge. In addition, Denmark will focus on environmentally hazardous substances and storm water overflows.

Design of a new waste water directive

It might be slightly too ambitious to introduce actual demands for resource utilization in a new directive. In my opinion, a more appropriate first step would be to start learning from one another at EU level in order to ensure implementation of best practice across member states.

In order to enhance resource utilization through shared knowledge, Denmark suggests that the new Urban Waste Water Directive urges for European waste water treatment plants to calculate and benchmark energy consumption, energy production, and the reuse of phosphorus. In that way, the utilities will be able to learn from each other across borders. Subsequently, politicians will be able to put forth relevant demands on a national level.

At the next revision we consider taking another step and put forth specific demands regarding the level of reuse of waste water resources. We might even have to focus on new areas for utilization of the resources in waste water. In Denmark, utilities and producers of technology work towards even better resource utilization, for example utilizing the carbon found in waste water in the production of plastic and proteins.

Obviously we must be sure that every member state lives up to the current directive, but the member states that already fulfill the demands of the directive must also dare to take the next step.

As I see it, transforming waste water treatment plants into resource factories is a win-win situation. Thereby we enhance the economic prospects of waste water treatment in the member states that have a hard time living up to the demands in the current directive.