

## **CIRCULAR ECONOMY APPROACH TO INDUSTRIAL WASTEWATER** **CONTRIBUTION TO THE REVISION OF THE URBAN WASTEWATER TREATMENT DIRECTIVE**

ZERO BRINE demonstrates the technical feasibility, economic and environmental benefits of recovering minerals and water from industrial brine for reuse, and its compatibility with the principles of a Circular Economy, the EU Green Deal, and the Industrial Emissions Directive.

The below recommendations are based on the political options suggested by the European Commission on the revision of the Urban Wastewater Treatment Directive.

### **KEY RECOMMENDATIONS**

- Set up integrated management plans for large agglomerations (prevention and optimal management of the collection/storage network + treatment).
- Reduction of use: obligation to connect when there is a centralised system.
- Impose track and tracing of pollution at source (prevention and optimal management of the collection network + treatment)
- Disconnect all industrial wastewater releasing industrial pollutants not treated in the public treatment facilities from urban wastewater (to ensure that the sludge is not polluted with industrial pollutants.)
- When the disconnection is not possible, the exploitation of the value of water must consider the Circular Economy of minerals in the brine flows, more than just the agricultural flows of phosphorous.
- No action is needed in the case of ZERO BRINE pilot plant - industrial discharges are handled within the industrial permits.
- UWWTPs and their network need to carry out energy efficiency audits. Cover all or only large agglomerations.
- Set EU fixed energy use reduction targets.
- Establish a baseline of methane emissions for large facilities and reduction targets.
- Set emission limits for greenhouse gases for large UWWTPs.
- Include monitoring and reporting requirements for greenhouse gas emissions.
- Impose prevention at source strategies that would ensure that the sludge is not polluted for all agglomerations or only large ones or only those using sludge in agriculture.
- Increase transparency obligations in directive to better inform the public.
- On top of minimum standards in the UWWTD, develop an approach similar to Best Available Techniques Reference Documents (BREFs) (as under the Industrial Emissions Directive).

## • CONTEXT

The **Urban Waste-Water Treatment Directive** (UWWTD) has set an international reference case in the global effort in wastewater management, exemplified in the UN Sustainable Development Goal indicator 6.3.1. Today, 95% of the EU's urban wastewater is collected and over 85% is treated according to the Directive's requirements<sup>1,2</sup>.

ZERO BRINE proposes a circular economy approach to reduce the negative impacts of brine from process industries and to create economic value from the reuse of its mineral salts, containing sodium, magnesium, calcium, sulphates, bicarbonates, and fresh water. ZERO BRINE demonstrates the use of a combination of existing and innovative technologies for recovery and reuse of both the material constituents as well as energy such as waste heat.

Within the context to better coordinate the revision of the Industrial Emissions Directive, and the Urban Wastewater Treatment Directive (UWWTD), the ZERO BRINE approach demonstrates options towards a greener, more circular, and resilient UWWTD in relation with the industrial activities, embracing industrial symbiosis. This policy brief is a complement to the previous briefs on the **Zero Pollution Action Plan** and the **Industrial Emissions Directive**. It is also paired with the **Deliverable 9.2 Report on Policy Review and Assessment Suggestions for BREF Updates**.

## • Recommendations and explanations per identified areas.

In the context of the **public consultation opened by the European Commission on the revision of the Urban wastewater treatment directive**, ZERO BRINE expresses below some recommendations in line with the political options suggested by the European administration.

### **Storm waterflow and urban runoff**

ZERO BRINE considers that it should be mandatory to set up integrated management plans for large agglomerations (prevention and optimal management of the collection/storage network + treatment), particularly in the connection of industrial activities which can have high potential impact on biodiversity through pollution. In line with the **Zero pollution action plan** of the European Union, we consider that pollution prevention is key to achieve a Water-Smart Society.

The concept of industrial symbiosis and circular economy that are key to the ZERO BRINE project are related to this. In ZERO BRINE we will demonstrate what the environmental, social, and economic benefits are of these integrated plans.

### **Individual or other appropriate systems (IAS)**

ZERO BRINE pilot plants are in relatively high densified regions. Therefore, paired with the explanation for storm waterflow and urban runoff, the implementation of industrial symbiosis system can require centralised systems. However, it depends not only on the capacity and the possibility to work with mixed flows of several types of industrial productions and also the geographical location of the industry.

### **Industrial discharges**

In addition to the recommendations in the **policy brief on the Industrial Emissions Directive**, ZERO BRINE supports a smart management of industrial discharges. Being based in highly industrialised areas, the pilot plants enjoy specific conditions such as the good implementation of industrial

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1 <https://ec.europa.eu/environment/water/water-urbanwaste/pdf/UWWTD%20Evaluation%20SWD%20448-701%20web.pdf>

2 [https://ec.europa.eu/environment/water/water-urbanwaste/implementation/pdf/COM\\_2020\\_492-final.pdf](https://ec.europa.eu/environment/water/water-urbanwaste/implementation/pdf/COM_2020_492-final.pdf)

permits and generally a separate network for industrial wastewater collection. In this context, ZERO BRINE can illustrate how the duplication of wastewater collection from industries can be done through environmental technology verification.

Moreover, our [Deliverable 9.2 Report on Policy Review and Assessment Suggestions for BREF Updates](#) also raises in its preliminary conclusions the importance to encourage not only urban wastewater reuse but also industrial wastewater reuse, thus contributing to greenhouse gas emissions reduction and reduced energy use.

ZERO BRINE also considers that it is not needed to have additional actions regarding industrial discharge management and supports the imposition of track and tracing of pollution at source. This is key to the integrated sustainability impact assessment of ZERO BRINE.

### **Energy consumption of the wastewater collection system and UWWTP and renewable energy production**

ZERO BRINE is based on eco-design principles that are monitored and assessed with an integrated sustainability assessment scheme, this also includes the energy consumption and carbon footprint. ZERO BRINE shows how this can be done in four locations throughout the EU as an example to other locations. Therefore, the consortium supports the necessity for UWWTPs and their networks to carry out energy efficiency audits and the need to set European fixed energy use reduction targets.

### **Methane emissions**

In our view, eco-design principles also include energy consumption and methane emissions. Paired with sludge management, ZERO BRINE supports the creation of a baseline of methane emissions for large facilities and reduction targets. However, ZERO BRINE does not support the imposition of only one technology, such as anaerobic digestion.

Moreover, greenhouse gas emissions must be strictly controlled by setting emissions limits for large UWWTPs and by requiring monitoring and reporting processes of these emissions. These political options can contribute to the objectives of the Green Deal and particularly the Zero Pollution Action Plan targets.

### **Circular economy – sludge reuse**

Linked to the principle of tackling pollution at source, ZERO BRINE supports prevention at source strategies that would ensure that the sludge is not polluted for all agglomerations, or only large agglomerations or those using sludge in agriculture. ZERO BRINE is expecting results in September 2021 within the framework of its research activities and technologies in line with the concepts of industrial symbiosis and circular economy.

### **Information to the public**

Improving transparency helps citizens to better understand the infrastructure, the challenges, and solutions. It improves the social acceptance of the solutions implemented and their costs. ZERO BRINE has organised workshops at local levels to match brine producers and mineral users, visits of pilot plants, and online trainings ([see here](#)). We therefore support the inclusion of additional provision in the UWWTD for transparency to the public.

### **Innovation/ adaptation to technological progress**

ZERO BRINE validates the BREFs approach and its extension to the UWWTD. Moreover, in its previous policy briefs, the consortium has already provided advice to improve the BREFs.

