

Recast of the Urban Wastewater Treatment Directive brings new challenges not only in the water management sector

DANIELA MERTOŮVÁ

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ABSTRACT

This article presents the main elements of the recast of Council Directive 91/271/EEC concerning urban wastewater treatment, which lays down rules for the collection, treatment, and discharge of urban wastewater in order to protect the environment and human health. In addition to strengthening existing requirements, the text of the new Directive, as provisionally agreed, introduces a significant number of new obligations to be achieved within ambitious deadlines.

INTRODUCTION

On 26th October 2022, during the Czech Presidency of the Council of the EU, the European Commission published a proposal for a revised wording of Council Directive No. 91/271/EEC of 21st May 1991 on urban wastewater treatment (together with an impact assessment of the proposal) [1]. The legislative process [2] in the EU Council for the Environment was complicated due to the need to take into account the different positions of individual Member States and was concluded after more than a year with the adoption of a 'general approach' on 16th October 2023. Simultaneously, the proposal was discussed in the European Parliament, which adopted a total of 252 amendments to the original proposal of the European Commission. Only two political trilogues were needed to reach an agreement between the EU Council, the European Parliament, and the European Commission. There was a fairly broad consensus on the proposal and it was only necessary to address some problematic areas of the proposal. The first trialogue took place on 21st November 2023, and the second, final one on 29th January 2024.

The political agreement reached in this way was provisionally approved by the Member States at the level of the EU Committee of Permanent Representatives (so-called Coreper) on 1st March 2024, and subsequently approved by the Committee on the Environment, Public Health and Food Safety of the European Parliament on 11th March 2024. On 10th April 2024, the agreement was also approved by the plenary session of the European Parliament [3]. The text must subsequently undergo a legal-linguistic revision, during which the content will not change and only certain language adjustments will be made. The final text will then be submitted to the new European Parliament for formal approval. After that, the new Directive will be adopted by the Council of the EU, subsequently signed by the representatives of the Council of the EU and the European Parliament and published in the Official Journal of the EU

during the autumn of 2024, thereby formally entering into force. Member States will then have to start transposition into national legislation within 30 months of entry into force.

It is an extensive revision of the current wording of the Directive, which has not been amended since its publication in 1991. The revision of the Directive aims to fulfil the partial goal of the Zero Pollution Action Plan [4], which, among other things, defines the need to better integrate the sector of urban wastewater treatment and the circular economy. It also sets rules for the collection, treatment, and discharge of urban wastewater in particular, with the aim of protecting the environment and human health in accordance with the approach based on the "One Health" principle, which aims at a sustainable balance and optimization of human health, animal health, and ecosystems. In addition, the implementation of the Directive should contribute to:

- gradual reduction of greenhouse gas emissions to a sustainable level,
- support of energy self-sufficiency and energy production from renewable sources,
- transition to the circular economy,
- improvement of the governance and transparency of the sector,
- regular supervision of certain parameters of public health,
- access to sanitary facilities.

Last but not least, it also introduces the "polluter pays" principle in the field of water management. This principle imposes on subjects, or polluters, the obligation to participate financially in environmental protection.

In addition to the tightening of existing requirements, the Directive also introduces a significant number of new obligations, which will need to be achieved within ambitious deadlines.

Extending the scope of the Directive

The key change is the extension of the material scope of the Directive to all agglomerations producing pollution corresponding to the amount of 1,000 population equivalent (PE) and more in the case of a requirement to ensure centralized wastewater collection and treatment. The current limit is set at 2,000 PE. Within the framework of the current Directive, the Czech Republic registers a total of 648 agglomerations with a load of approximately 9.3 million PE. The revision of the Directive will mean an increase in the number of agglomerations falling within its scope by about another 750, which will represent an increase in the covered pollution by another 1 million PE. The deadline

for compliance with this change (i.e., ensuring that all agglomerations from 1,000 EO are equipped with sewage systems and have all sources of sewage connected to a sewage system) is set for the end of 2035. For some Member States, there is the possibility to use an extension of this deadline due to the specific local conditions.

In agglomerations where it will not be possible to build a sewage system for technical or economic reasons, or where it would not bring any benefit to the environment or human health, the possibility of using individual wastewater treatment systems will be maintained. However, stricter requirements will be placed on these systems, not only from the point of view of wastewater treatment. Minimum requirements will be defined for the construction, operation, and maintenance of these systems, as well as for their regular inspections. In addition, individual systems should be entered in a new register.

In the case of the so-called secondary treatment of municipal wastewater, it will be necessary to fulfil the already existing concentration requirements, especially in the case of indicators of biochemical oxygen demand (BOD₅) and chemical oxygen demand (COD; alternatively, it can be replaced by the total organic carbon indicator; the decision rests with the Member State). An optional limit is also set for the concentration of total content of undissolved substances. In addition to concentration limits, values for the minimum percentage of loss are also determined for individual indicators.

Tab. 1. Requirements for discharges from municipal wastewater treatment plants (secondary treatment)

Indicator	Concentration	Minimum percentage of loss
BOD₅	25 mg/l O ₂	70–90
COD	125 mg/l O ₂	75
Total organic C	37 mg/l	75
Undissolved substances	35 mg/l	90

Tightening of emission standards

Another key factor will be the tightening of emission standards for total nitrogen and total phosphorus, which are mandatorily collected as part of the so-called tertiary wastewater treatment. This requirement is relevant for all agglomerations exceeding the threshold of 10,000 PE. The requirements

for collection of the mentioned indicators are not determined according to the size of the agglomeration, as was the case until now, but directly according to the size of the load on the individual wastewater treatment plant (WWTP). The new requirements for tertiary treatment should be gradually fulfilled by the end of 2045, when all affected agglomerations should meet the newly established standards. Large WWTPs (i.e., those with a load of more than 150,000 PE) must, in addition to the concentration values, meet the value of the minimum percentage of loss in relation to the load on the influent. *Tab. 2* reflects the requirements of the existing and revised Directive on discharges from urban WWTPs. The term “areas at risk of eutrophication” is newly introduced here instead of the previously used term “sensitive areas”. This change will not have an impact on the Czech Republic as it follows from the wording of the draft Directive that the whole country will have to be defined as an area at risk of eutrophication; at present, the whole of the Czech Republic is defined as a sensitive area.

Introduction of the quaternary stage of treatment

Furthermore, the Directive introduces a completely new obligation of the so-called quaternary stage of treatment. The stated requirement applies to large WWTPs over 10,000 PE and its goal is to ensure a reduction in the amount of micropollutants, in particular medicines and personal care products (or their residues) and microplastics in treated municipal wastewater. The requirement for the efficiency of specific micropollutant collection, especially pharmaceuticals, is set to a minimum reduction of 80 % and refers to a defined range of substances whose reduction will have to be monitored. At the end of 2045, all agglomerations above 10,000 PE should fulfil the obligations arising from quaternary treatment.

As this degree of treatment requires significant financial costs (investment and operational), this mechanism is to be helped by the newly introduced system of so-called “extended producer responsibility” (in accordance with the “polluter pays” principle), which is intended to apply to selected industries, namely the pharmaceutical and cosmetic industry. Manufacturers will have to contribute at least 80 % of the total costs to the scheme, leaving flexibility to Member States to share the remaining costs. Furthermore, it will be within the responsibility of the individual Member States to set up the system for the introduction and organization of this mechanism, including its monitoring. The obligation will not apply to manufacturers who place on the EU market the number of substances contained in products which do not exceed 1 tonne per year, or in cases where the substances in the products they place on the market are rapidly biodegradable in wastewater, or they are not present in wastewater at the end of their useful life. Member States should introduce obligations arising

Tab. 2. Requirements for discharges from municipal wastewater treatment plants (tertiary treatment)

Indicator	Concentration	Concentration (revision)	Minimum percentage of loss (existing)	Minimum percentage of loss (revision)
Total phosphorus	2 mg/l (10,000–100,000 EO)	0.7 mg/l (10,000–150,000 EO)	80	87.5 (10,000–150,000 EO)
	1 mg/l (> 100,000 EO)	0.5 mg/l (> 150,000 EO)	80	90 (> 150,000 EO)
Total nitrogen	15 mg/l (10,000–100,000 EO)	10 mg/l (10,000–150,000 EO)	70–80	80
	10 mg/l (10,000–100,000 EO)	8 mg/l (> 150,000 EO)	70–80	80

from extended producer responsibility within three years of the entry into force of the Directive, i.e. probably in 2027.

Energy neutrality of wastewater treatment plants

The revised wording of the Directive also introduces obligations related to the energy neutrality of urban WWTPs; this requirement will apply to treatment plants with a produced load of more than 10,000 PE. The requirement to meet this goal should be gradually achieved by 2045. The Directive further imposes the obligation to carry out energy audits, which will include identification of the potential for cost-effective measures to reduce energy consumption and increase the use and production of energy from renewable sources, with a particular focus on the identification and use of the potential for biogas production or the recovery and use of waste heat while simultaneously reducing greenhouse gas emissions. For WWTPs, it is possible to produce energy from renewable sources directly on the site or outside it, and partially purchase energy from external non-fossil sources. The maximum allowed rate of energy purchased from external sources is set at 35 % and only applies to the final goal under certain conditions.

Other obligations resulting from the revised text

Another obligation will be to monitor and significantly reduce precipitation runoff from urbanized areas, or pollution caused by rainwater relief (storm water overflow). Each Member State will have to prepare integrated urban wastewater management plans for agglomerations exceeding a load of 100,000 PE by 2033. The obligation to prepare these plans will also be necessary for agglomerations in the 10,000–100,000 PE category, where rainwater overflow poses a risk to the environment and human health or represent more than 2 % of the annual load of discharged wastewater in the dry season, or when overflow will prevent the fulfilment of the relevant EU water policy directives, by 2039. Plans should prioritize green and blue infrastructure solutions. They must be reviewed at least once every six years and updated if necessary.

Member States will also have to monitor a number of new parameters at WWTPs, for example the amount and composition of sludge, produced greenhouse gases, the share of reused treated wastewater, produced and consumed energy, pollutants, and the presence of microplastics. Monitoring and identification of public health parameters (e.g. influenza virus, poliovirus, SARS-CoV-2 virus and its variants, newly emerging pathogens) in urban wastewater will be voluntary, at least at the inflow to the WWTP, with the exception of declaring the status threat to public health (i.e. pandemic). In all agglomerations above the threshold of 100,000 PE, Member States will also have to regularly monitor the indicators of so-called antimicrobial resistance in the influent and outflow from urban WWTPs.

It will be necessary to handle the sludge in accordance with the waste management hierarchy. Disposal methods must maximize prevention, preparation for reuse, recycling, and other resource utilization, as well as minimize adverse effects on the environment and human health. A minimum rate of reuse and recycling of phosphorus from sludge will be determined, taking into account available technologies.

Consideration will also need to be given to the possibility of reusing treated wastewater from all municipal WWTPs, where appropriate. This option is primarily targeted at water-scarce areas for all uses. In addition, a review provision was added to analyze the added value of mandatory national water reuse plans.

The new Directive also introduces recommendatory provisions on access to sanitary facilities for all, free of charge or for a low fee. This requirement applies to agglomerations exceeding the threshold of 5,000 PE, for both public

buildings (mainly administrative) and private spaces accessible to the public. In the case of agglomerations over 10,000 PE, it is expedient to set up facilities in public spaces. The deadline imposed by the Directive for the fulfilment of this requirement is 2029.

In a number of the mentioned obligations, the Member States have the possibility to deviate from the deadlines specified above or their fulfilment, but always under conditions precisely defined by the Directive. Many provisions will be further specified through individual implementing acts of the European Commission.

Tab. 3. Implementation deadlines by individual areas and final goals

Obligation	Agglomeration	Deadline for fulfilment
Scope	Over 1,000 PE	2035
Secondary treatment	Over 1,000 PE	2035
Tertiary treatment	10,000–150,000 PE	2045
	Over 150,000 PE	2039
Quaternary treatment	10,000–150,000 PE	2045
	Over 150,000 PE	2045
Extended producer responsibility		2027
Integrated management plans	10,000–100,000 PE	2039
	Over 100,000 PE	2033
Energy neutrality	Over 10,000 PE	2045
Energy audits	10,000–100,000 PE	2032
	Over 100,000 PE	2028
Risk assessment and management		2027
Access to sanitation facilities	Over 5,000 PE	2029
Reporting activity		2030

CONCLUSION

The objectives of the revised Directive can be seen as a significant opportunity to determine more effective protection of the environment, especially aquatic and water-related ecosystems, or as one of the ways to permanently improve the status of water bodies. At the same time, it is necessary to mention that a large part of the draft is quite ambitious and the fulfilment of some

new requirements will require high financial costs. The cost estimate provided by the European Commission in the impact study appears to be greatly underestimated and we can assume a significant impact on the state budget. The new version of the Directive is expected to be officially adopted and signed at the end of 2024 (autumn/winter) and then published in the Official Journal of the EU, thus formally entering into force. The Czech Republic will then have to start implementing it into national legislation within a period of 30 months.

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Author

Ing. Daniela Mertová

✉ daniela.mertova.st@vsb.cz

VSB – Technical University of Ostrava

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