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EU4GREEN RECOVERY EAST

NATIONAL BASELINE ASSESSMENT REPORT OF WASTEWATER TREATMENT INFRASTRUCTURE

Republic of Moldova

Source: www.cambi.com/blog/wastewater-treatment

EU4Green Recovery East - Recovery through a Circular Economy and Pollution Reduction in the Eastern Partnership countries

(700002623)

Implementing partners:

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Executive Summary

Moldova's wastewater infrastructure faces significant coverage and performance deficits. Only 10% of localities benefit from centralized sewerage services, with a stark disparity between urban areas (approximately 55% connectivity) and rural communities (3% access). The country operates 272 documented wastewater treatment plants (WWTPs), yet only 31 facilities (11%) achieve normative treatment standards meeting basic discharge limits for biochemical oxygen demand, chemical oxygen demand, and suspended solids. The majority of plants, 161 facilities representing 59%, provide insufficient treatment, while 19 plants offer only partial treatment despite incorporating biological processes.

Infrastructure challenges extend beyond inadequate coverage. Many facilities rely exclusively on biological ponds with inherently limited treatment efficiency, aging collection networks suffer from infiltration and structural deterioration, and industrial pre-treatment remains inconsistent across the country. Sludge management presents particular concern, which is stored on land untreated in most of the WWTP, creating environmental risks and representing unrealized potential for resource recovery.

A critical constraint identified throughout this assessment is the severe limitation in data availability. Most WWTPs demonstrate inconsistent reporting practices, and even national-level data on wastewater generation and treatment volumes are absent from official records. Critical operational parameters including influent and effluent pollutant concentrations, energy consumption profiles, sludge production volumes, and treatment performance indicators are either not monitored or inadequately reported. Among 112 facilities for which basic data were obtained, 21 (19%) lack any performance information, while effluent quality data exists for only 25 of 56 plants classified as providing insufficient treatment. This systemic data deficiency fundamentally constrains infrastructure planning, performance assessment, and evidence-based policy development.

Available compositional data reveal significant variation in wastewater characteristics. Chemical oxygen demand ranges from 560 to 1,110 mg O_2/L across monitored localities, while total nitrogen concentrations (63-109 mg/L) typically exceed EU urban wastewater averages by 2-3 times. These elevated nutrient levels reflect variable industrial contributions, population density differences, and stormwater infiltration in collection systems, underscoring the need for site-specific treatment approaches.

Moldova has demonstrated strong commitment to wastewater sector reform, particularly following its June 2022 designation as an EU candidate country. The November 2023 amendments to Water Law No. 272/2011 represent a significant milestone, strengthening permitting procedures, clarifying institutional responsibilities, and aligning monitoring requirements with Water Framework Directive principles. Second-cycle River Basin Management Plans have been developed for the Danube-Prut-Black Sea District (2023-2028) and Nistru District (2025-2030), providing spatial prioritization frameworks for investment. Governance reforms implemented in 2024-2025 extended the National Agency for Energy Regulation's (ANRE) authority to approve tariffs for water and sanitation operators, established a national water and sanitation information system, and strengthened the Environmental Protection Agency's permitting and enforcement capabilities. The adoption of Law No. 227/2022 on industrial emissions in September 2022 introduced integrated environmental permits and Best Available Techniques requirements, aligning industrial discharge control with EU standards.

However, substantial gaps remain in achieving full compliance with the recast Urban Wastewater Treatment Directive (EU) 2024/3019, which took effect in late 2024. Moldova currently lacks explicit national frameworks for agglomeration mapping and obligations for settlements above 1,000 population equivalents, reclaimed water classification and reuse standards aligned with EU Regulation 2020/741, comprehensive sludge management regulations with end-of-waste criteria and product standards, mandatory household and business connection requirements, quaternary treatment specifications for micropollutants with extended producer responsibility financing mechanisms, and binding energy neutrality pathways with progressive reduction targets.

Strategic Pilot Site Selection

To demonstrate viable pathways for sector improvement, three pilot WWTPs have been selected for feasibility studies of energy efficiency and resource recovery interventions under the EU4Green Recovery East Programme:

Căușeni WWTP offers a unique opportunity for integrated resource management. With the Stockholm Environment Institute currently implementing treated wastewater reuse for agricultural irrigation, EU4Green Recovery East interventions in energy optimization and sludge valorization would create Moldova's first comprehensive demonstration of wastewater as a resource rather than waste. The facility's sufficient treatment performance and strategic location provide a stable foundation for introducing advanced resource recovery technologies.

Ungheni WWTP represents the third-largest municipally-operated facility in Moldova and benefits from substantial treatment capacity ensuring economies of scale for energy recovery technologies. Its location in a city hosting an industrial park connected to the WWTP increases both treatment complexity and potential environmental impact, making process improvements particularly valuable. The facility employs conventional biological treatment processes offering significant opportunities for energy consumption optimization.

Fălești WWTP was selected based on availability of detailed operational data and generates substantial sludge quantities currently stored untreated on plant premises. This practice presents environmental risks including groundwater contamination, odor emissions, and uncontrolled greenhouse gas release, while simultaneously offering viable opportunities for biogas production through anaerobic digestion. The facility received recommendation from the Ministry of Environment.

Comprehensive on-site evaluations by technical experts will be essential to verify operational conditions and identify optimal technology solutions for each pilot site. Potential energy recovery options include anaerobic digestion of sludge for biogas production and combined heat and power generation, heat recovery from treated effluent through heat pump systems, and hydropower recovery using hydrodynamic screws or micro-turbines to capture hydraulic head differences. Energy efficiency improvements may encompass comprehensive energy audits identifying consumption patterns and optimization opportunities, process control enhancements and equipment upgrades including high-efficiency aeration systems and variable speed drives, and operational modifications to reduce unnecessary energy consumption.

Recent legislative reforms, governance improvements, and basin planning frameworks have established a foundation for transformation, while EU candidate status provides both motivation and accountability mechanisms for accelerating progress. Achieving sustainable wastewater management aligned with EU standards requires coordinated action across five priority areas including infrastructure development, regulatory framework completion, monitoring, capacity building and resource recovery integration. The pilot interventions proposed under EU4Green Recovery East will generate practical evidence of achievable improvements, building capacity and

demonstrating replicable approaches for broader application across the country's wastewater infrastructure.