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Leveraging renewable energy solutions for distributed urban water management: The case of sewer mining

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As urban populations swell and infrastructure demands escalate, managing resources sustainably becomes increasingly challenging. This paper focuses on the energy challenges inherent in distributed water management systems, using sewer mining as an example. Sewer mining is a distributed water management solution involving mobile wastewater treatment units that extract and treat wastewater locally. In this context, we examine the integration of renewable energy sources, specifically solar photovoltaics, to reduce reliance on traditional power grids, highlighting a pilot implementation at the Athens Plant Nursery in Greece since 2021. The study evaluates various system configurations, balancing performance with landscape integration, to propose a scalable and robust model for distributed water management. This approach not only addresses the direct energy requirements of water treatment systems but also contributes to the broader agenda of circular economy, by enhancing the sustainability and resilience of urban water infrastructure.

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