



Industrial Water 4.0 – A Framework for Catchment-based Digitally Integrated Industrial Water Stewardship

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Identifying pressures

Industrial activity is intrinsically linked to the accessibility and availability of water. The increasing global demand for industrial water, alongside an ageing water infrastructure and the impacts of climate change on the frequency and severity of extreme weather events, poses a significant risk management challenge for organisations aiming to decouple the growth of production capacity from unsustainable consumption.

Water-related risks are consistently ranked among the top global environmental and societal risks, and businesses are increasingly experiencing significant associated financial impacts. Industry must adapt its current water management practices to reflect the changing conditions and provide both effective and efficient solutions to global and local challenges to secure the futures of their organisations.

This project was developed to advance research relating to the concept of Industrial Water 4.0, which combines the digitalisation of industrial production with water management to support a more holistic and sustainable approach to industrial water lifecycle management.

Informing policy

The vital role of water in supporting national climate action and broader sustainability strategies is undervalued. The findings from this research highlight that proactive water resource management can contribute to meeting national greenhouse gas and pollution emission reduction targets and mitigate the threat of climate change to water security.

Water sector targets relating to climate action and circularity policy objectives, as outlined in the proposed revision to the Urban Waste Water Treatment Directive and the proposed Corporate Sustainability Reporting Directive's reporting disclosure requirements for water, signal to national policymakers a more holistic approach at the EU level. More emphasis should be given to water in key policy areas such as climate mitigation, circularity and emerging technology

supply routes. At the same time, better guidance and tools are required for industrial sites and national water service providers to engage with and address these top-down policy signals proactively.

Digitalisation action plans may increasingly be integrated into national policymaking relating to water and sustainability issues, to accelerate the uptake of digital solutions and technologies and unlock further resource efficiency and competitiveness gains.

Developing solutions

This report presents a framework for industrial water users to adopt Industrial Water 4.0. The framework was developed in collaboration with industrial sites across Europe in response to the lack of detailed guidance and decision support tools for accelerating organisations' transitions towards digitally enabled industrial water stewardship.

The framework is underpinned by a collection of integrated tools providing industrial sites with guidance to ensure water supply resilience, water resource efficiency, cost savings and water process integration with production through enabling digitalisation technologies and solutions.

The report provides insights from stakeholders across the industrial water lifecycle on the challenges, megatrends and opportunities facing industrial sites playing a proactive role in the transition towards digitally integrated industrial water stewardship. It includes recommendations for improving industrial water catchment data collection and a roadmap for decarbonising the industrial water sector. A key recommendation is to establish a national talent development programme for the application of Industry 4.0 to water stewardship and broader enterprise sustainability practices. Allied to this is the need for greater emphasis on water in national climate action and sustainability policies.

