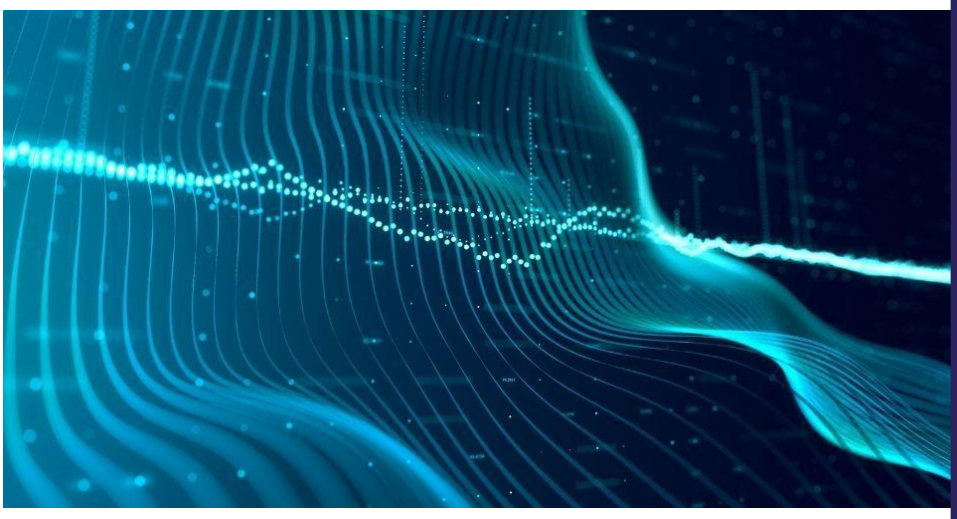
EurEau Recommendations for the Digital Transition of the Water Services Sector



Key messages

EU policy promoting the uptake of digital tools in the water services sector should be approached as an enabling framework rather than as a technology programme in its own right.

Digitalisation cannot be treated as a discretionary IT exercise. In the water services sector, it is part of critical infrastructure stewardship where reliability, safety, security and continuity of water supply and sanitation services remain the primary objectives.

Digitalisation should not be viewed as a substitute for policy action but rather a complementary tool in addressing complex challenges and underlying drivers of issues such as resource scarcity, environmental degradation, or climate vulnerability.

Readiness, governance, data quality and impact discipline matter more than technological ambition alone.

The opportunities of scaling up digitalisation in the water sector are real, but so are the risks, especially for smaller utilities with limited financial and human resources.

1. Context

The Commission has set out an overall ambitious policy direction in its Call for Evidence on the future water sector digitalisation action plan[1]. Digitalisation is set as a means to improve water efficiency, reduce losses, enhance infrastructure management, and enable more agile operations through the deployment of IoT (Internet of Things), smart sensors, and smart meters. The Commission also explicitly refers to AI (Artificial Intelligence) as a technology with the potential to strengthen efficiency and resilience, while recognising existing regulatory bottlenecks and implementation challenges.

The overall spirit of this initiative is consistent with EurEau's long-standing advocacy for safe, secure, and sustainable drinking water supply and wastewater treatment services. It reflects the need to respond to climate pressures, aging infrastructure, population growth, and long-term investment requirements. At the same time, the state of the sector's digital transition differentiates between and within Member States. In many utilities, digital transformation is progressing through asset management systems, SCADA (Supervisory Control and Data Acquisition), decision-support tools, monitoring solutions and optimisation technologies, but the pace and depth of adoption vary widely.

[1] Call for Evidence for an initiative: Water sector – accelerating digitalisation for better management and sustainability.

The Commission has correctly identified several important barriers to digitalisation across the sector, including high upfront investment costs, insufficient economies of scale, fragmented procurement practices, interoperability challenges and shortages of digital skills. However, the specific characteristics of water supply and sanitation services create additional challenges that must also be considered, in particular the diverse needs of water service providers and varying sector's capacity to adopt new technologies. The future Action Plan should therefore address these root causes directly and not focus solely on promoting the uptake of digital technologies, while ensuring that the reliability, safety, security and continuity of water supply and sanitation services remain the primary objectives and overriding priorities guiding all digitalisation efforts.

2. Mapping out the key concerns for the water services sector

Where is the deployment of digital tools most feasible, and desirable for water utility operations?

Most common cases for applying digital tools are those that help utilities identify leaks more quickly, improve customer-side and network-side monitoring, support predictive maintenance and optimise the operation of distribution networks and treatment processes. Smart metering can be useful, particularly where it improves visibility of consumption patterns and supports demand management and user engagement. It can also be useful for reporting requirements, in-time monitoring of water quality and resource management. Data on water availability and water use across key water-depended (emerging) economic sectors should also be prioritised. Such data would enable integrated water resource planning, support sustainable water allocation and allow water service providers to anticipate future demand, optimise infrastructure investments and safeguard resilient drinking water and wastewater services.

However, deployment is most feasible where solutions are proven, scalable and proportionate to the scale of the utility. Digital tools can deliver benefits where the use case is mature, data is fit for improving operational decision-making, and the solution can be integrated into existing operations without disproportionate complexity. While being mindful about the technological ambitions, the sector should avoid overpromising on technological capability, especially where local operating conditions, staffing levels or system maturity do not support complex deployments.

The future framework should also explore the added value of cross-sectoral digital solutions and their relevance for improving water management, like for example in resilience planning, climate-risk assessment, geospatial information, and permit management. In these policy areas, digitalisation can improve the efficiency of administrative procedures that are important enablers of the overall water management processes.

What benefits can the deployment of such tools bring to the water service providers?

Digital tools, including smart meters, can provide high-frequency data and additional functionality that help identify and pinpoint leakage and unusual or excessive consumption more quickly. Predictive maintenance and better asset intelligence can reduce emergency repairs and improve investment efficiency. However, digitalisation alone is not a solution, for example, for water scarcity, although it can be a valuable tool. Primarily, the Commission and Member States should focus on preventing water pollution and optimise water uses (in line with the Water Resilience Strategy), so more water of sufficient quality is available. Climate adaptation could also be valuable in this regard.

The optimisation of the management of all types of facilities can also lead to improved energy use and production – a key factor in a context where prices are highly volatile and decarbonisation is an unavoidable requirement.

At the same time, the cost and maintenance implications of digitalisation are often uncertain. In many cases, digital tools may increase rather than reduce near-term costs, especially where new software, integration, data handling, cybersecurity and staff training are required. Cost claims should therefore be treated carefully and assessed on a lifecycle basis. In addition, the implications associated with the necessary shift in employee profiles should not be overlooked.

The expected benefit is not automatic cost reduction; it is improved operational performance, better resilience and, in some cases, avoided expenditure over time. This is particularly important for smaller utilities, which face tighter resource constraints and cannot absorb additional complexity easily.

What enabling factors or bottlenecks need to be considered when discussing digital transition of water services?

Security

Security is a central concern. Digitalisation can improve visibility and control, but it also increases exposure to cyberattacks, dependence on external service providers and risks linked to broader data sharing. Security requirements must be fit for purpose, proportionate and aligned with the critical-infrastructure nature of the sector. The EU should also provide clearer guidance on how to reconcile the opportunities offered by digitalisation with existing environmental transparency obligations and the specific requirements applicable to critical entities, including operators of essential water management infrastructure.

The growing emphasis on AI, interoperability and broader data sharing raises a strategic issue with regard to the implications of making information about asset performance available for artificial consumption, such as consumption by AI models, analytics engines, digital twins, vendors' optimisation tools and automated decision-support systems. While



we acknowledge the benefits and opportunities of introducing digital tools, we underline that the risks are equally significant. If performance data is provided without context, confidence grading, control boundaries or legal/ethical safeguards, AI systems may produce misleading recommendations, amplify hidden bias, expose commercial sensitivities, or create regulatory and cyber vulnerabilities.

Furthermore, it is difficult to envisage a secure uptake of AI in the water sector without strengthening the availability of European-controlled large language models and AI services that guarantee data sovereignty for critical infrastructure operators in the water sector. Water utilities need assurance that operational and infrastructure-related data remain subject to EU governance and are not exposed to access or control by non-EU actors. Supporting the development and deployment of trusted European AI solutions would increase confidence in digitalisation, reduce strategic dependencies, and enhance the resilience of essential services.

Water utilities already operate under relevant EU frameworks such as NIS2[2], the CERD[3], and GDPR[4]. The future EU policy should complement these frameworks rather than add overlapping or unrealistic requirements. Furthermore, the cybersecurity of OT (Operational Technology) systems, which are critical for utilities, must be strengthened, as current tools and regulatory frameworks in the field of cybersecurity tend to focus primarily on the IT domain.

On systems originating outside EU, a careful case-by-case assessment is needed. Current dependence may be unavoidable in some areas, but in the long run the sector should reduce dependencies where they create security, continuity or sovereignty risks.

EU sectoral water and horizontal legal frameworks

The current sectoral water regulatory framework and horizontal legislation already provide some space for the use of digital tools in monitoring, reporting and compliance. On that basis, there is no clear case for additional binding rules specifically requiring digitalisation uptake.

The more reasonable approach is to provide practical guidance, share best practices and clarify how digital solutions can support existing obligations. EU policy should remain supportive and flexible, rather than proposing new legal requirements or pushing for broader legislative revisions. EU action should also be used to rationalise and streamline existing administrative and reporting obligations, concentrating them on the sector's main priorities rather than adding new reporting layers.

A cautious position is also warranted on proposals to strengthen targets through digitalisation alone. Higher target values do not automatically lead to better digital uptake, and digitalisation should not be treated as a substitute for wider water-policy measures. Where possible, the EU should focus on harmonisation, guidance and enabling conditions,

[2] Directive (EU) 2022/2555 on measures for a high common level of cybersecurity across the Union.
[3] Directive (EU) 2022/2557 on the resilience of critical entities.
[4] Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.



while leaving implementation choices to Member States and utilities. Digitalisation might have more potential in some Member States, and less in others. We therefore plead to keep the principle of subsidiarity in mind with any action with regard to digitalisation.

Data exchange, confidence, and interoperability

Improving data exchange requires technology-neutral solutions that avoid rigid frameworks. Digital technologies evolve quickly, so EU policy should support adaptable guidance rather than prescribe overly detailed technical architectures that may soon become obsolete.

A recurring concern is data quality. If the underlying asset data, connection data or meter data are incomplete, inaccurate or poorly governed, digital investments will not deliver their expected value. Data maturity, data hygiene and trust in the provenance of data are therefore foundational issues. Before aiming to share data widely, each actor must first better master, structure and qualify its own data: value comes from sharing the right data, at the right time, within a defined framework, not from indiscriminate large-scale sharing. The EU could also identify the data of genuine European interest for managing water as the common resource, in particular for transboundary river basins, rather than promoting indiscriminate large-scale data sharing.

Another practical issue is the cost and complexity of moving data through multiple proprietary platforms. This will be reduced by promoting open, stable standards, minimising duplicate data entry and improving data flows between vendors, utilities and customers. Safeguards should be employed to protect against misuse. Interoperability should be prioritised over a single platform.

Given the cross-border nature of water management and data exchange, interoperability is a relevant area where EU action can provide added value. Priority should therefore be given to facilitating common data models, open interfaces and practical guidance that allow different systems to work together without imposing uniform technical solutions.

Standardisation, market fragmentation and barriers to free movement of technology

Standardisation is feasible and desirable where it focuses on common building blocks rather than full system uniformity. The priority should be common data formats, shared indicators and modular interfaces that allow utilities to connect systems without forcing identical technical architectures. Such open standards for data exchange and access should be embedded within a decentralised architecture (e.g. a data mesh): the priority is the ability to interconnect systems within a secure, interoperable and controlled framework, rather than centralising everything into a single European platform.

This is especially important because utilities vary substantially in size, geography, maturity and operating conditions. Standardisation should therefore allow flexibility and differentiation, rather than requiring every operator to adopt the same solution.



Support measures will be essential if standards are to work in practice. Small and medium-sized utilities will need technical assistance, validated solution catalogues (with market-ready and mature solutions to meet high security and practical requirements of the water services sector), shared procurement templates and capacity-building support. Without this, standardisation risks widening the gap between large and small operators.

Market-size constraints can be addressed through dedicated funding, performance-based models and business models that reduce upfront investment, such as data-as-a-service or software-as-a-service, provided that such models do not weaken utilities' control over their data and operations. Public procurement can help drive uptake where it rewards innovation, quality, interoperability and lifecycle value rather than lowest upfront price alone. Existing procurement rules already allow innovation-oriented and performance-based approaches, but in practice these are not used consistently enough in the water sector. A cautious approach is advisable however, on the European preference principle. There are clear advantages in reducing dependence on third-country supply and in strengthening strategic autonomy for critical digital layers, but there are also downsides if preference is applied too broadly or too rigidly. A balanced assessment is needed, with particular attention to security, resilience, supply-chain dependence and the actual availability of competitive European solutions.

Vendor lock-in versus open-source solutions

Vendor lock-in is a real concern, particularly in modelling and data platforms. Open standards have proven effective in some areas of data communication, and they should be used more widely. Where appropriate, reference implementations can help ensure that standards are actually applied in practice.

At the same time, open-source solutions cannot be assumed to provide feature completeness in every field. The realistic aim is to reduce dependency on proprietary systems through open standards and, where viable, by supporting the maturation of open solutions that can fully replace legacy software over time.

The transition away from legacy systems should be pragmatic and gradual. Many utilities cannot replace long-established systems immediately, so the focus should be on interoperability, phased migration and future-proof design rather than abrupt replacement. Forcing unnecessary replacement cycles, for example by requiring the early replacement of functioning smart meters or other equipment, should be avoided. That would raise costs without necessarily improving resilience.

Deployment of key technologies identified by the Commission

The technology areas identified by the Commission[5], such as AI-driven analytics, large-scale IoT deployment, earth observation and coherent digital frameworks for monitoring, planning, maintenance and operation, should be assessed against actual operational

[5] Call for evidence for an initiative: Water sector – accelerating digitalisation for better management and sustainability.

needs. They are not equally relevant for all utilities, and the Commission should avoid assuming that all technologies are universally appropriate.

AI and advanced analytics can be useful where robust data, clear governance and well-defined use cases exist. But they also create risks if data are incomplete, poorly contextualised or insufficiently controlled. In that case, digitalisation can amplify uncertainty rather than reduce it.

For smaller utilities, the most relevant technologies may be simpler and more immediately useful than digital twins or advanced AI. EU policy should therefore support a stepwise approach, starting with practical and low-risk applications and building maturity over time.

Utilities' awareness, human resources and expertise

Smaller utilities often lack the in-house IT and data expertise needed to manage advanced digital systems. The challenge is not only a skills gap but also ageing workforces, limited engineering capacity and heavy reliance on external consultants.

A practical response would combine training, shared support and simpler implementation pathways. Digital skills could be integrated into the European Water Academy, with hybrid training that combines water engineering, data literacy and operational digital tools. Conversely, operators that have already developed in-house expertise should be recognised and supported, notably through facilitated access to the technical specifications and APIs (Application Programming Interface) of future EU standards. AI also offers strong potential to preserve expert knowledge in the face of large-scale retirements. Finally, like any system, digitalisation can be unreliable, so operators should maintain competencies that will allow them to function even in the event of a control system failure or data loss.

Investment costs and funding

Digital investments cannot be treated as self-financing by default. In many Member States, cost recovery for the water sector is already incomplete, and utilities continue to face heavy investment pressure from ageing infrastructure, compliance obligations and security needs[6]. Given these limited financial means, a shift towards an "all-digital" model must not come at the expense of a proactive investment policy in physical infrastructure, whose ageing and the imperative of continuity of essential water services remain paramount. Caution is also warranted regarding explanations based on "low tariffs", since water pricing also responds to affordability and acceptability imperatives. Cybersecurity, in particular, should be treated as a cost to be financed, not merely as an expected benefit.

Digitalisation typically requires significant upfront expenditure, while the benefits are realised over a longer period and often in the form of avoided costs, ability to comply with regulation or better quality of service rather than direct revenue. Recovery therefore depends on scale, deployment density, regulatory design, tariff rules and the ability to

[6] The 2026 EurEau statistical report demonstrates the chronic under-investment in many countries, whereby infrastructure renewal is considered a top challenge the water sector is facing.

retain a share of efficiency gains. A "full-connection" approach is not the right way to follow. Every digital appliance must be cost-effective and useless data collection must be avoided.

A lifecycle or total expenditure (TOTEX) perspective is preferable to a narrow capital expenditure (CAPEX) approach, because it better captures operating savings, asset-life extension and risk reduction. Even so, the sector should be careful not to overstate the financial returns of digitalisation, especially for fragmented or pilot-only deployments.

Additional funding mechanisms are likely to be needed. The next EU Multiannual financial framework for the period 2028–2034 does represent a good opportunity to mainstream funding for water services infrastructure under Union programmes and instruments pertaining to different policy areas such as cohesion, agriculture, security, research, competitiveness. In this regard, funding for digital transition of the water services sector should be enabled under dedicated programmes and tailored appropriately in order for the sector to able to absorb the funds and deliver on the expected outcomes efficiently.

Other barriers and contextual considerations

The fragmented structure of water supply management, shaped by topography, hydrogeology and local supply areas, limits the extent to which digitalisation can simply be scaled in a uniform way. Not every network is comparable, and not every drinking-water system is mixable or managed under the same conditions. Insufficient connectivity in rural and peripheral areas is a further structural challenge that must be addressed for digital solutions to be deployed proportionally and adequately corresponding to local needs and practical requirements of the water utilities.

The sustainability of digitalisation itself should also be considered. Digital systems consume energy and can involve additional water use and materials demand. The environmental footprint of digitalisation should therefore be proportionate to the operational benefit delivered.

3. EurEau recommendations

- Focus on the **practical enablers**: proportional security, interoperability, guidance, skills, financing, and support for implementation. Avoid over-prescriptive interventions: build on existing legal frameworks and avoid new binding requirements, respecting the subsidiarity principle.
- Prioritise **practical use cases** that deliver clear operational value. Do not approach digitalisation as an alternative to necessary policy actions.
- Adopt a **cautious, risk-based approach** to AI, IoT, smart metering and other advanced technologies; deploy them where they are mature, proportionate and demonstrably useful.
- **Strengthen cybersecurity and data governance in a proportionate way**,

aligned with NIS2, CERD and GDPR, with a focus on security in OT systems in addition to IT systems, and avoid imposing security or replacement requirements that exceed the actual risk.

- Recognise that **digitalisation has real costs and uncertain payback**; funding, TOTEX-based assessment and long-term planning are essential if uptake is to be fair and realistic.
- Promote **open and stable standards** and, where feasible, the development of open solutions to reduce vendor lock-in, while allowing phased migration from legacy systems.
- Prioritise **interconnections of services** instead of a single European platform.
- Ensure that **digitalisation serves the core water utilities mission** in providing efficient, resilient, and good quality service, rather than becoming an end in itself.

About EurEau

EurEau represents Europe's water sector, bringing together 70,000 public and private drinking water and wastewater service providers across 33 countries.

We work with EU institutions and international organisations to ensure legislation supports resilient, sustainable and affordable water services by protecting water quality, promoting resource efficiency and safeguarding access to water.