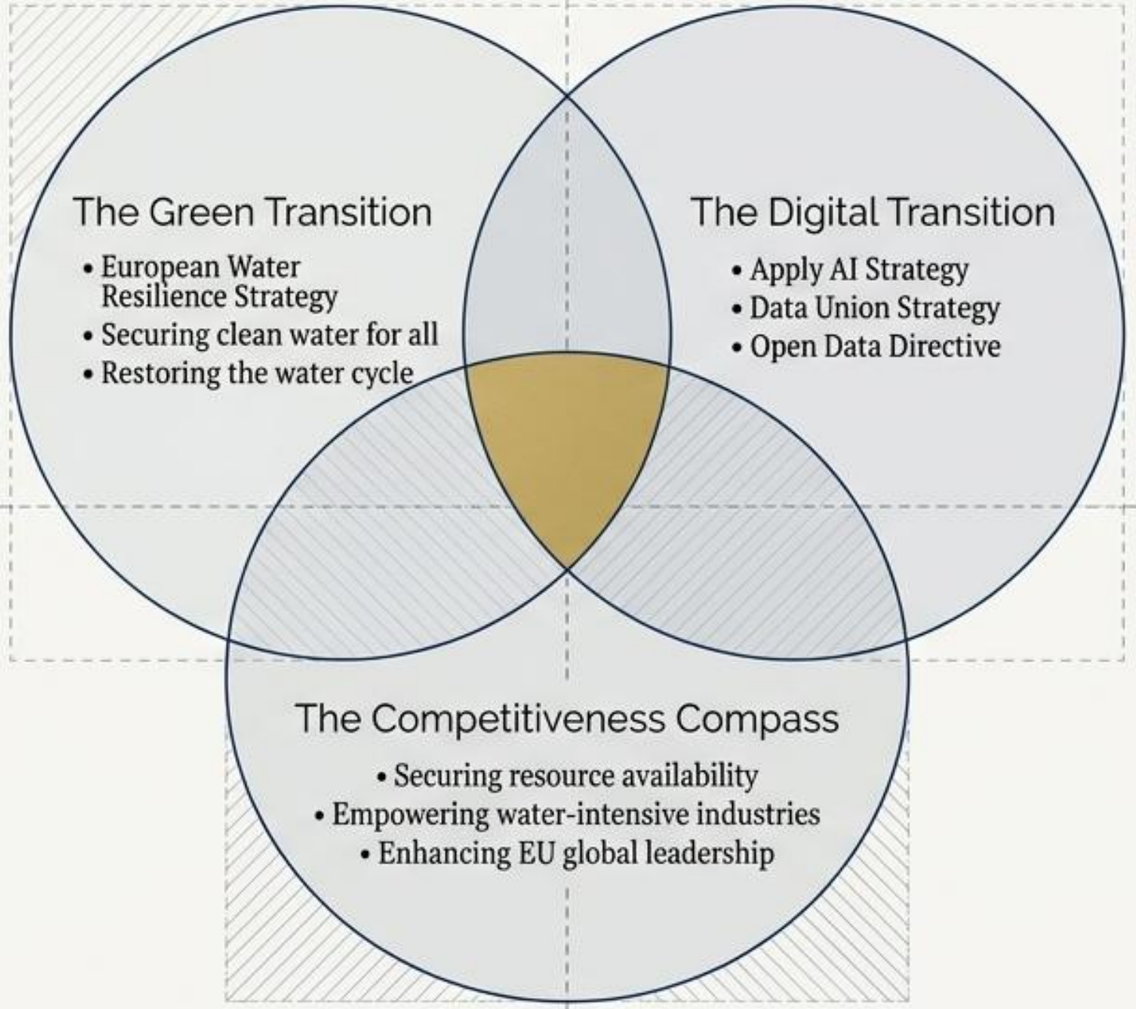
Accelerating Digitalisation for Water Resilience

Building a Water-Smart Economy for Europe

Insights from the Call for Evidence (Initiative for Q4-2026)

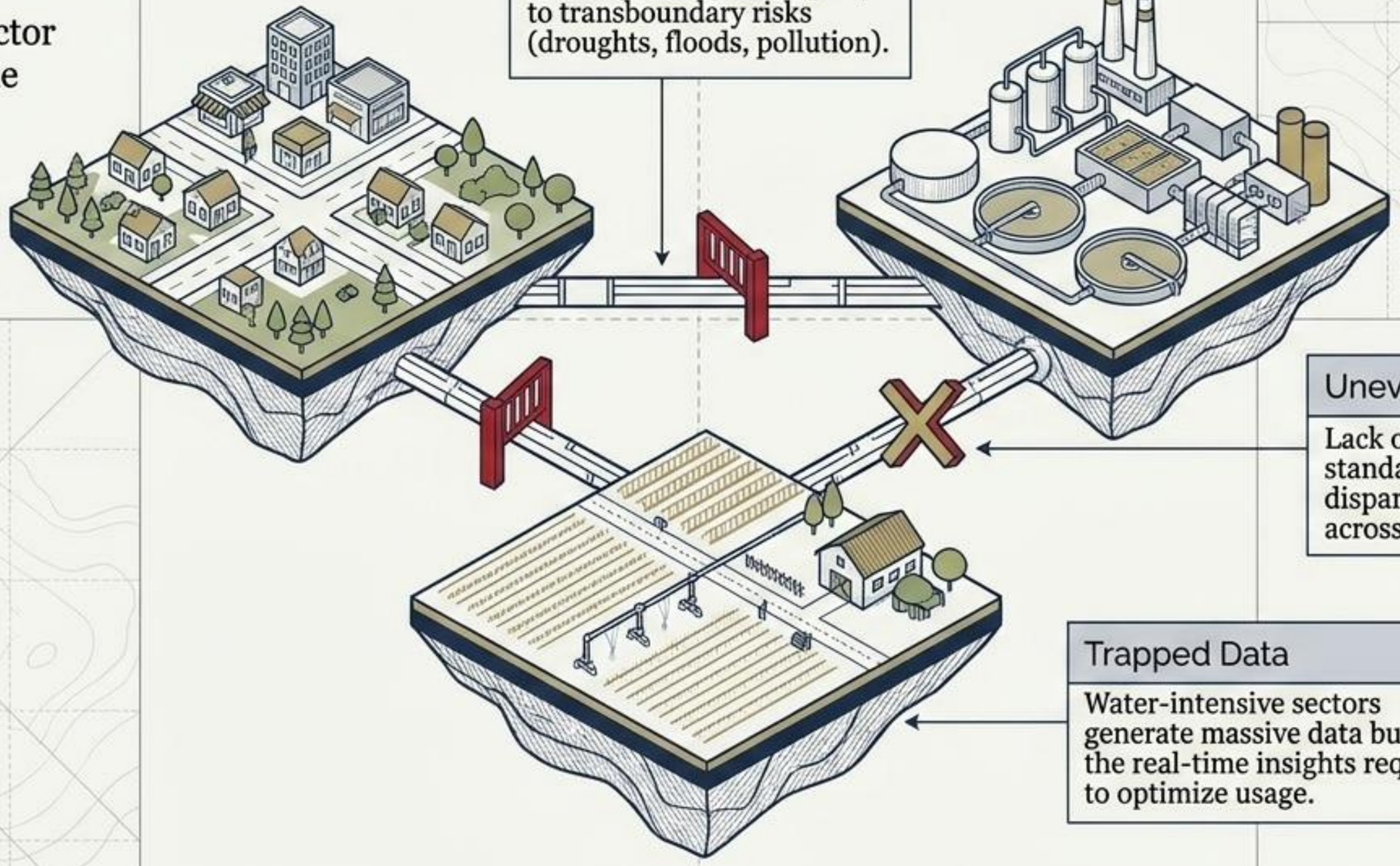
The Macro Context: The Dual Transition



This digital action plan operates at the precise intersection of these three mandates, leveraging enormous data flows to drive innovation, reduce administrative burdens, and empower global EU leadership.

Europe's Disconnected Water Infrastructure

Fragmentation across both the physical water cycle and administrative levels prevents the water sector from fully realizing the benefits of the digital transition.



Inefficient Monitoring

Inability to respond rapidly to transboundary risks (droughts, floods, pollution).

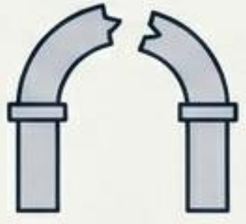
Uneven Development

Lack of harmonised digital standards creates deep disparities in water security across Member States.

Trapped Data

Water-intensive sectors generate massive data but lack the real-time insights required to optimize usage.

Diagnostic Matrix: 6 Barriers to Digital Adoption

Economic Factors	 **Market Failure** Low tariffs do not reflect the true value of water, making it difficult to recover high initial digital investments.	 **Lack of Scale** The sector's modest size and uncoordinated procurement processes prevent essential economies of scale.
Technical Factors	 **Legacy Friction** Older technology physically cannot connect with modern Internet of Things (IoT) systems.	 **Proprietary Lock-In** Absence of common standards keeps critical data trapped in proprietary formats, blocking predictive analysis.
Structural & Human Factors	 **Governance Gaps** Unresolved issues regarding data governance and ownership create paralyzing uncertainty.	 **Skills & Connectivity** Technical staff lack required digital skills, compounded by persistent connectivity issues in remote areas.

The Imperative for EU-Wide Coordination

Economic Stakes

€111.7B

Value of the global water technology market per year.

81,500

Enterprises in the EU water sector (predominantly SMEs).

40%

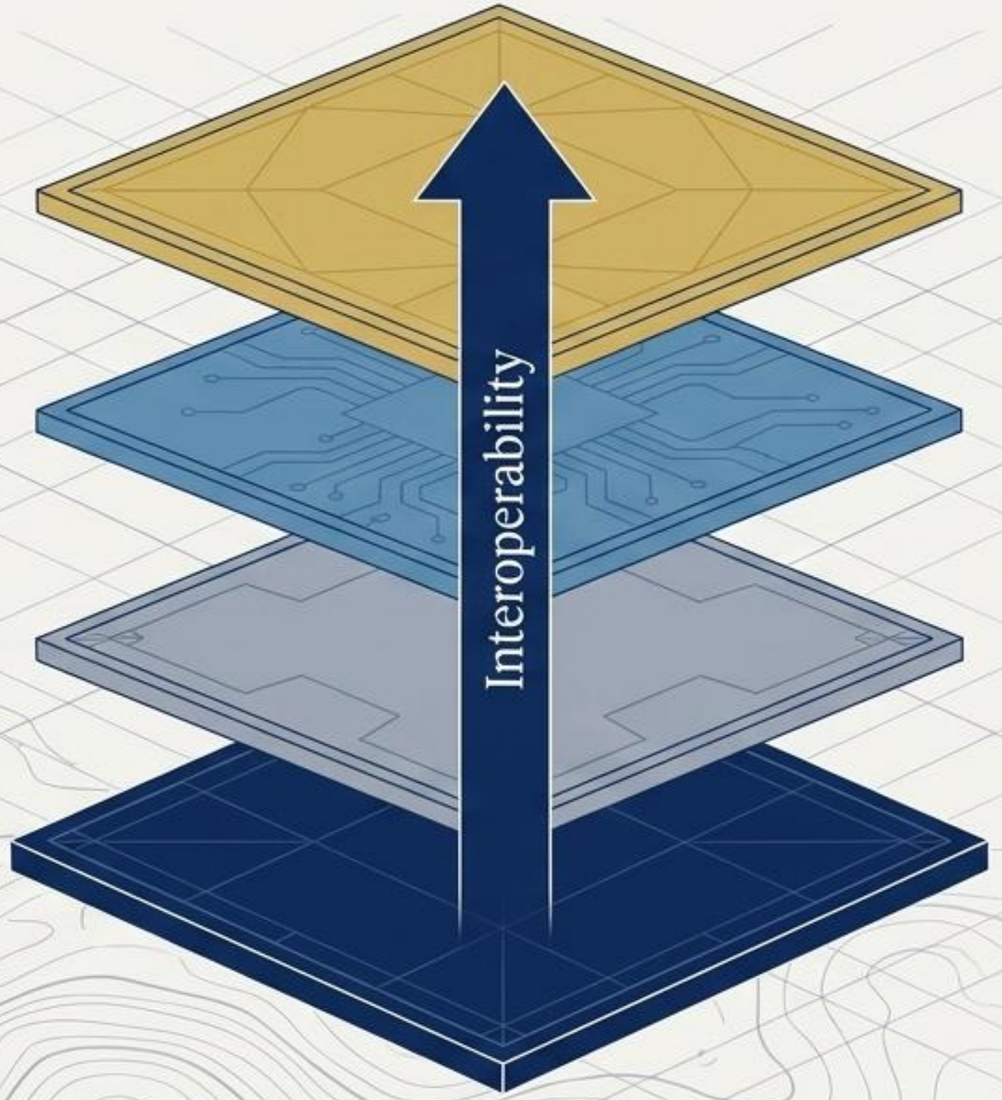
The EU's current share of global water-related patents.

Uncoordinated strategies duplicate R&D efforts and threaten Europe's competitive advantage. EU action is necessary to bridge national data silos, enforce source-to-sea data protocols, and safeguard our global leadership.

The Paradigm Shift in Water Management

	Traditional	**Digital Water-Smart Economy**
Monitoring	Manual, localized sampling.	Real-time IoT sensors combined with Earth Observation.
Operations	Reactive maintenance and crisis response.	Predictive AI modeling for demand forecasting and system stress.
Data Architecture	Proprietary formats and isolated national silos.	FAIR Principles (Findable, Accessible, Interoperable, Reusable).
Expertise	Knowledge concentrated in aging individual experts.	Institutional knowledge preserved within responsive Digital Twins.

The Solution Architecture: Four Strategic Pillars



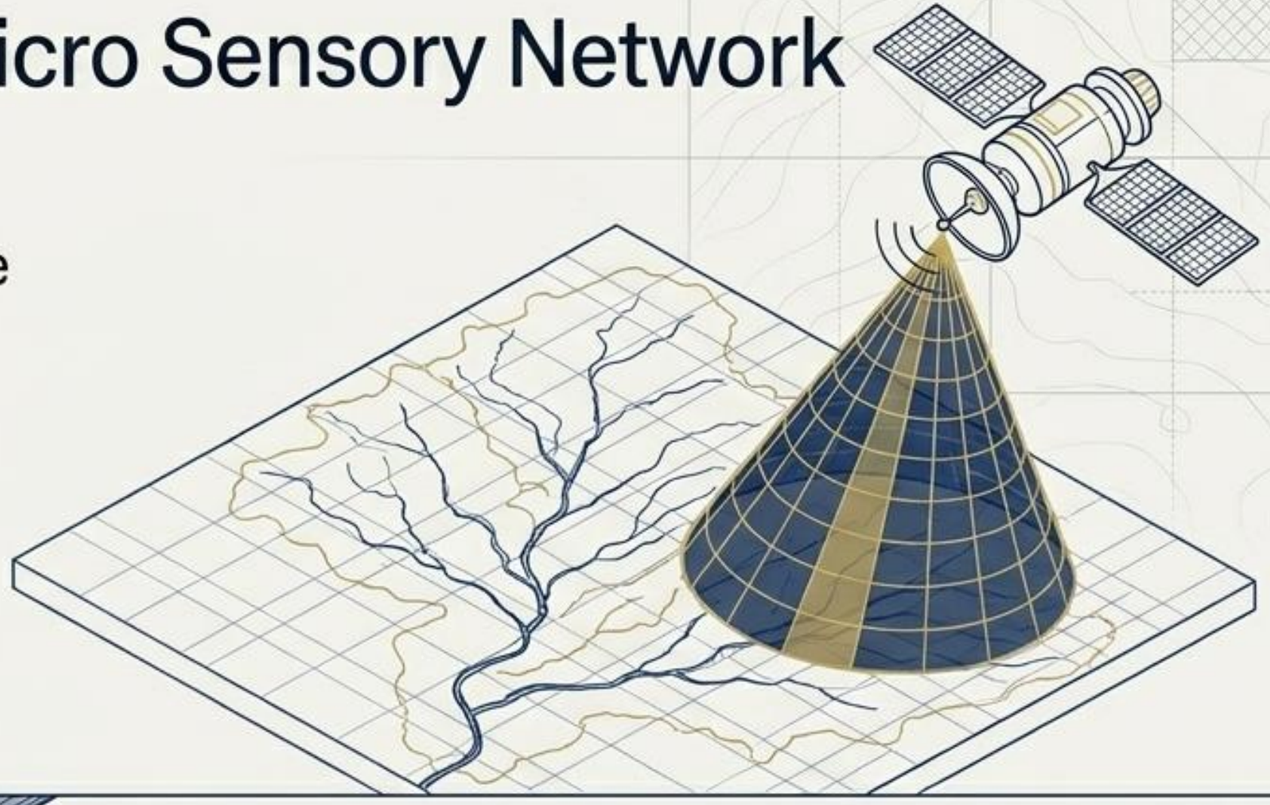
Pillar 4:	**Coherent Framework** Data Union, FAIR governance, NIS2 Cybersecurity, Article 8 WFD
Pillar 3:	**Intelligence & Optimization** AI, Big Data, Digital Twins, predictive analytics
Pillar 2:	**Earth Observation** Copernicus, Destination Earth, spatial/temporal monitoring.
Pillar 1:	**Sensory Network** Large-scale deployment of IoT, smart meters, pipe-level data.

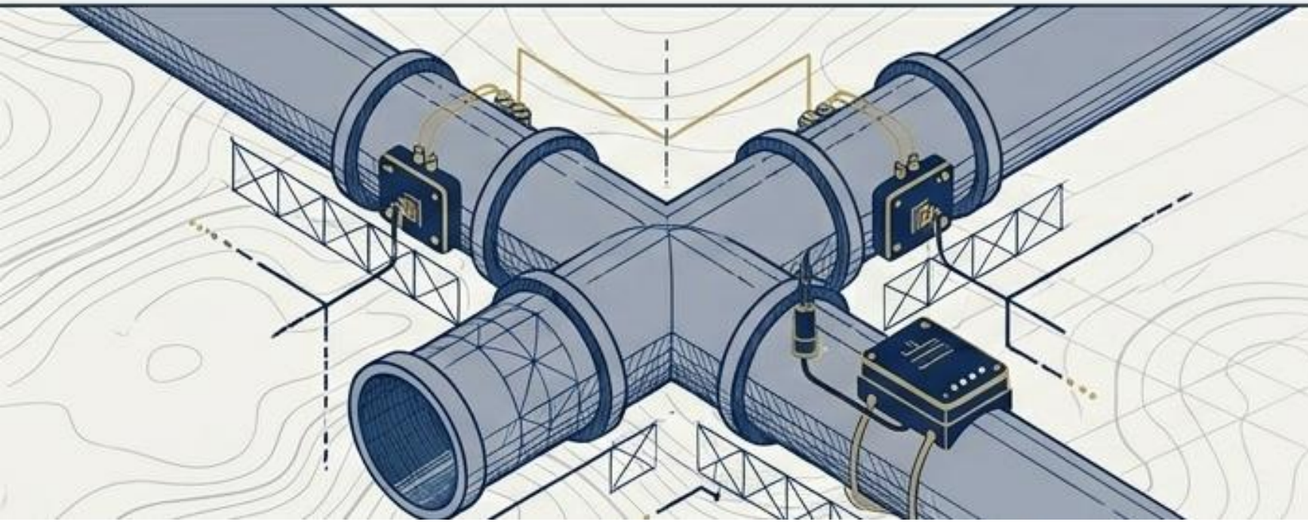
Pillars 1 & 2: The Macro-to-Micro Sensory Network

Routine use of Earth Observation reduces administrative burden and drastically increases the spatial and temporal coverage of monitoring.

Powered by EU Infrastructure:

- Copernicus Emergency Management Service (Drought/Flood Observatories)
- Destination Earth
- Digital Twin of the Ocean





Large-scale deployment of smart sensors and meters to enable agile, pipe-level water management.

- Rapidly identify localized quality issues.
- Pinpoint physical leaks instantly.

Pillar 3: AI-Driven Intelligence and Digital Twins

Processing massive datasets to transition from reactive to predictive water management.

Raw Data Streams from Sensors

Digital Twin of a Water Treatment Plant

System Optimization

Forecasting demand, tracking environmental patterns, and identifying operational inefficiencies from abstraction to wastewater discharge.

Predictive Maintenance

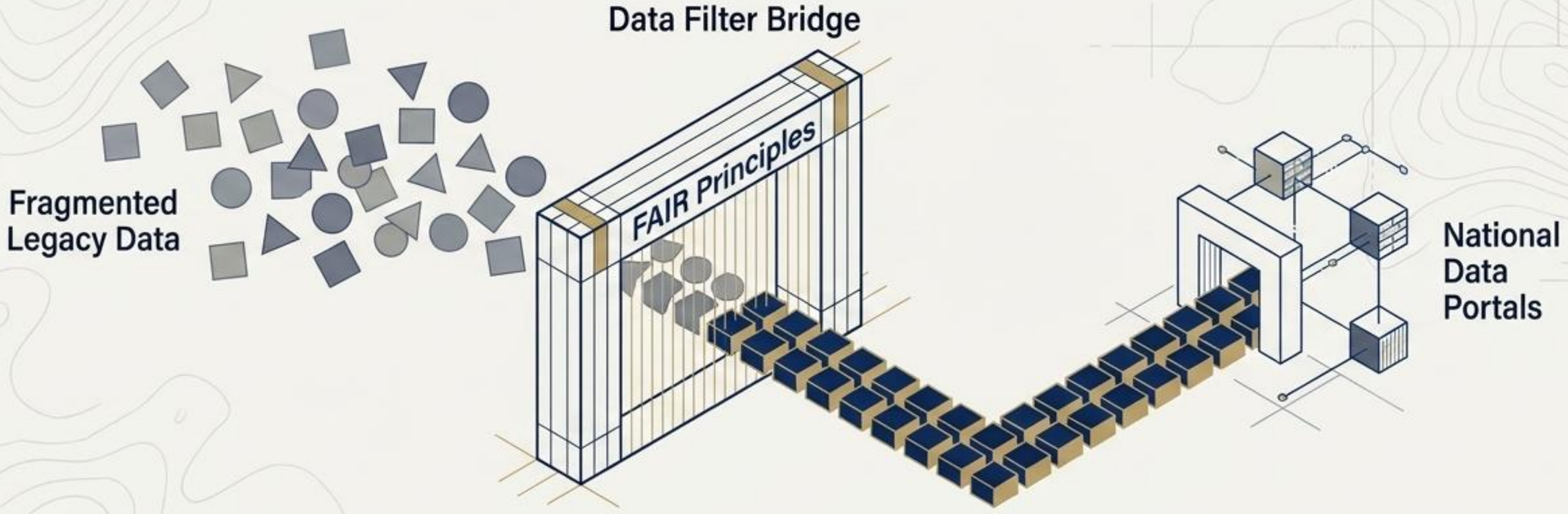
Identifying hidden leaks and system stress before catastrophic failures occur.

Knowledge Preservation

Capturing the specialized knowledge of retiring experts and coding it into Digital Twins to support the next generation of operators.

Pillar 4: The Data Union and Interoperability Bridge

The Goal: Establish a single source of truth for monitoring, planning, and maintenance across the EU water sector.



FAIR Principles	NIS2 Directive	Article 8 WFD
Ensuring all shared data is Findable, Accessible, Interoperable, and Reusable.	Enforcing strong cybersecurity safeguards for critical infrastructure, including municipal water systems.	Enhancing infrastructure governance to ensure streamlined implementation and reporting under the Water Framework Directive.

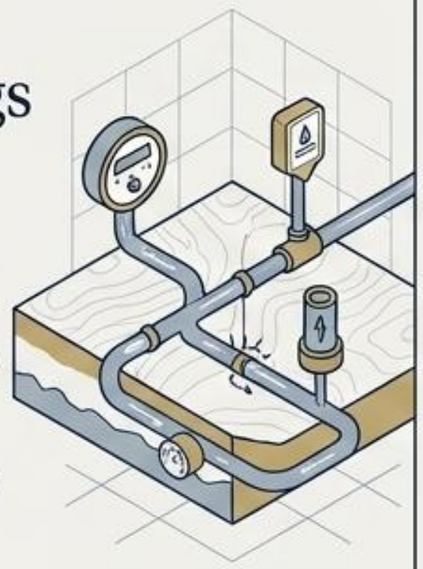
Quantifying the Value: Expected ROI

Maximum Efficiency

47%

Potential Water Savings

- 25% reduction via Smart Metering.
- 5-8% savings via Digital Optimization Systems.
- 7-14% reduction via Advanced Leak Detection.



Economic & Social Growth

1.6M

Jobs Safeguarded

- Creating new high-skilled digital opportunities.
- Securing the EU's share of the €111.7B global water technology market.

Environmental Resilience

SDG 6 & 9

Advanced Global Goals

- Enabling early alert warnings for extreme weather.
- Directly supporting the restoration of the natural water cycle.

Synthesis: The Source-to-Sea Digital Ecosystem

By integrating IoT sensors, AI analytics, Earth Observation, and unified FAIR data governance, the EU is building more than just better pipes—we are creating an enabling environment that reinforces Europe's long-term strategic autonomy, scientific excellence, and climate resilience.

A fully interoperable framework where data flows as seamlessly as water itself.

The Road Ahead: Collaborative Implementation

European Commission