



Water Digitalization Initiative (WDI)

المؤتمر العالمي
لتحلية المياه
معالجة ندرة المياه
ديسمبر 8 - 12
أبوظبي - الإمارات العربية المتحدة



IDRA WORLD
CONGRESS 2024
ADDRESSING WATER SCARCITY
8 - 12 DECEMBER
ABU DHABI - UNITED ARAB EMIRATES

GeSI WDI Lead:
Nizar Kammourie, SAWACO Water Desalination
Kay Seo, NEC Laboratories America



SAWACO
WATER DESALINATION

NEC

NEC Laboratories America

Copyright © GeSI 2024. All rights reserved.

Executive Summary

The GeSI Water Digitalization Initiative (WDI) was created in response to mounting global water challenges, including scarcity, pollution, and the impact of climate change on water security. This initiative brings together leaders from industry, government, and academia to explore how advanced digital technologies can support sustainable, efficient water management. With a focus on creating real-world, scalable solutions, WDI aims to establish a repository of practical use cases that highlight digital innovation's role in tackling water resource issues.

Vision And Mission

The vision of the WDI is to transform global water management through digital technology, advancing water security and resilience. By enabling data-driven decision-making, predictive modeling, and real-time monitoring, WDI supports the UN Sustainable Development Goal 6: ensuring access to clean water and sanitation for all. The initiative's mission is to demonstrate how digital innovations in AI, IoT, and data analytics can create measurable improvements in water resource management, especially in high-risk sectors like agriculture, utilities, and industrial water use.

Strategic Objectives

To address the diverse challenges facing water systems, WDI focuses on three core objectives:

1. **Scalable Solutions for Water Security:** Developing solutions that can be tailored to local needs while supporting global sustainability goals.
2. **Collaborative Innovation:** Building partnerships across the water sector's value chain to promote shared learning, knowledge exchange, and collective action.
3. **Real-World Impact:** Showcasing practical examples of digital technology in action through real use cases that can inform policy and inspire industry adoption.

Industry Use Case Example: SAWACO and NEC Labs America

Collaborate – “AI Powered Desalination Optimization”



SAWACO
WATER DESALINATION

NEC
NEC Laboratories America

The AI-Powered Desalination Optimization Project serves as a foundational use case developed to improve the efficiency of Seawater Reverse Osmosis (SWRO) desalination systems. As an energy intensive process, SWRO faces challenges related to energy consumption, membrane fouling, and operational maintenance. By leveraging AI-driven insights, this project optimizes energy use, predicts maintenance needs, and improves system performance. It exemplifies how digital technology can make desalination processes more sustainable and efficient, directly aligning with WDI's mission to support data-driven water solutions in critical industries.

The project tackles these challenges through several AI-enabled advancements:

- **Energy Consumption Optimization:** By deploying advanced predictive models, the project forecasts energy use and identifies configurations that minimize consumption while maintaining operational efficiency. Iterative algorithms explore optimal settings, integrating real-time adjustments and expert knowledge to achieve sustainable energy reductions.
- **Membrane Fouling and Scaling Prediction:** Fouling and scaling can significantly impair system performance and increase costs. AI-driven models predict when and where these issues might arise, enabling operators to schedule timely interventions, optimize cleaning cycles, and reduce downtime. This ensures consistent water quality and prolongs membrane lifespan.

- **Proactive Maintenance and Operational Insights:** Predictive tools monitor system health and issue automated alerts to address maintenance needs before issues escalate. By identifying sudden operational changes and providing root-cause analyses, the project enhances decision-making and reduces manual inspections.

This collaboration exemplifies the WDI's mission to showcase practical and scalable solutions for sustainable water management. By integrating cutting-edge digital technology with operational expertise, it not only addresses critical issues in desalination but also serves as a model for applying digital technologies to other water-intensive industries.

Expanding The Use Case Repository

Building on the AI-Powered Desalination Optimization Project, WDI is actively working to bring forward additional use cases from diverse industries with significant water demands. These use cases will capture the adaptability and effectiveness of digital solutions, providing a valuable foundation for best practices in water management. As more cases are developed and refined, WDI will expand its capacity to influence policy, drive industry standards, and showcase the potential of digital technologies to solve pressing water challenges.

Future Directions And Expected Outcomes

With the AI-Powered Desalination Optimization Project as a starting point, WDI is positioned to deepen its impact across various sectors, ensuring the initiative remains adaptable and grounded in real-world applications. The initiative's next phase involves:

- **Use Case Expansion:** Adding diverse examples from other high-risk industries, such as agriculture, urban water management, and data centers.
- **Thought Leadership and Industry Engagement:** Engaging with policymakers, investors, and stakeholders through publications, conferences, and summits to promote awareness of digital water solutions.
- **Partnership Development:** Expanding collaborations with ecosystem partners, including technology providers, telecom companies, and academic researchers, to support the scale and adaptation of solutions.

Through these efforts, WDI is poised to lead the digital transformation in water management, addressing one of today's most critical resource challenges. Each new use case strengthens WDI's foundation and reinforces the role of digital technologies in creating resilient, efficient, and sustainable water systems globally.

Call To Action For The Stakeholders Across Water Sector

To achieve these ambitious goals, as water challenges grow more complex and pressing, the Water Digitalization Initiative (WDI) calls on stakeholders across the water sector, including policymakers, industry leaders, technology solution providers, researchers, practitioners, and investors, to join us in shaping the future of sustainable water management through water digitalization.

Your engagement is vital in accelerating the adoption of innovative digital solutions, expanding the repository of practical use cases, and driving collaborative partnerships that bridge technology and sustainable practices and scale the solutions. Together, we can unlock the transformative potential of digital technologies to create resilient, efficient and secure water systems, and build a comprehensive digital water strategy that meets the demands of today while safeguarding resources for future generations.