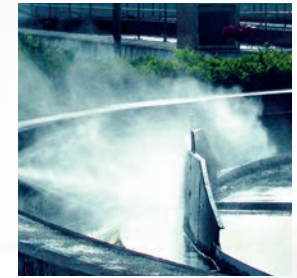


The Connected Water Plant

Immediate Value. Long-Term Flexibility.



LISTEN.
THINK.
SOLVE.®

 Allen-Bradley • Rockwell Software

Rockwell
Automation



The Water Industry is Evolving

Reliable, safe and affordable access to water is not solely on the minds of water and wastewater managers.

Raised consumer awareness and stakeholder operational demands over this most precious resource are guiding utilities to build smarter, more sustainable infrastructure. Many utilities are leveraging advancements in technology to help design, operate, and maintain today's smart water plant.

RELIABLE

Aging infrastructure poses a growing problem for water utilities. Many utilities are choosing to employ digital technologies and data analytics to better monitor existing equipment and overall operations. With the proper sensors and smart equipment in place, water utilities can begin to monitor equipment and predict failure before it even occurs - allowing for targeted infrastructure improvements. Additionally, gaining better control and visibility of operations allows utilities to effectively plan for future market demand and strategically scale up operations accordingly.

SAFE

Providing a continuous supply of safe drinking water is a challenge. SCADA solutions built on secure EtherNet/IP™ infrastructure can increase visibility to real-time information and production metrics – allowing utilities and municipalities to improve and secure data access, optimize system performance, and produce cost-effective compliance reporting.

AFFORDABLE

Better management of water resources, in combination with efforts to develop consumer conservation habits, enables water utilities to manage costs and provide more accurate, affordable billing for customers.



How Does a Connected Water Plant Work?

Gain better operational visibility and control by harnessing the power of data.

Right now, many water plants are a patchwork of equipment from various vendors – based on open specifications and low cost bids. Connecting this disparate equipment will allow you to view information at a plant-wide level, so you can make more informed business decisions.

Moving to a connected water plant approach does not necessitate a complete infrastructure overhaul. Instead, you can maintain use of your current investments – connecting existing automation systems and smart equipment. You can deploy, configure and run a Connected Water Plant environment on-premise, in the cloud, or via a hybrid model that combines the two.

Once in place, the Connected Water Plant environment enables visualization and control of all aspects of your operations. By collecting the right data and contextualizing it into real-time diagnostics, production trends and KPIs, you can better understand equipment performance and make more informed business decisions.

All of this can help you:



Efficiently
keep up with
demand



Improve
plant reliability



Maintain
data security and
regulatory compliance

CONNECTED WATER PLANT BRINGS DATA TO LIFE IN THREE KEY WAYS:



It **connects** your production
equipment, devices and systems.



It **integrates** all of your
data seamlessly.



It **transforms** that data into
useful operational intelligence.

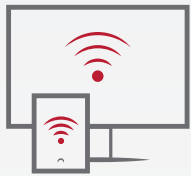




Efficiently Keep Up With Demands

By 2050, 86% of developed countries will be urbanized, increasing the demand for smarter, more sustainable cities.

Increasing demand for water continues to place stress on infrastructure in urban and rural communities alike. As this infrastructure ages, keeping up with demands will require smarter technologies and a more advanced distribution network.



INTELLIGENT ASSETS

A typical water plant is already populated by a vast array of intelligent assets such as flow instrumentation, sensors, controllers, variable speed drives and operator stations. The problem? They're not talking!

Data remains trapped within each asset due to a variety of factors including disparate automation technologies, legacy and proprietary communications systems and insufficient context around data to turn it into useful information.



SMART PRODUCTION

Integrated control and information solutions from Rockwell Automation® – like the PlantPAx™ distributed control system – break down these barriers by bringing secure access to the data contained in intelligent assets and then adding context, which creates actionable information about what is really happening throughout the operation such as: throughput, process quality, asset health and energy efficiency. This information allows utilities to be more strategic when making decisions: leading to increased production, reduced operational costs, and better responsiveness to market demands.

CSWS

INCREASES PRODUCTION AND REDUCES ENERGY USE

College Station Water Services (CSWS) provides clean water to nearly 100,000 people. In 2009, CSWS recognized the existing control hardware at their facility was reaching the end of its life cycle – issues were difficult to troubleshoot and there was no ability to access real-time information.¹

CSWS implemented a single, plant-wide SCADA solution to integrate all operations – process, discrete and motor control – into one system. They also replaced their two-speed pumps with VFDs. The VFDs gradually ramp up (and down) the speed of the motors to help save energy and extend the life of the motors and related equipment.

RESULTS:

- **Increased** production from 8.1M gallons/day to 11.8M gallons/day
- **Reduced** energy costs by \$65,000 annually
- **Eased** troubleshooting and maintenance
- **Decreased** downtime by enabling remote troubleshooting



Improve Plant Reliability

Address your reliability issues without a complete plant overhaul.

A recent study showed that more than half of utilities have not assessed the vulnerability and resilience of their key assets.ⁱⁱ With the age of assets in water plants on the rise, the risk of downtime and associated water quality reliability issues is an increasing concern in the industry.

Identify Issues Faster and Reduce Unplanned Downtime

The Connected Water Plant is built on the PlantPAx – a complete plant-wide solution that collects real-time data and diagnostics, and has audit capabilities. Connecting this plant-wide view to Allen-Bradley® PACs and RTUs on EtherNet/IP enables faster troubleshooting, better decision making, and real-time feedback.

Predict and Address Issues Before They Occur

Utilities must adopt more proactive and sustainable approaches for the management of their critical assets. Process optimization and predictive maintenance are two strategies used to help get more life out of existing assets and infrastructure. To help optimize operations, Model Predictive Control (MPC) uses real-time and historical data to make predictions and adjust operations. Integrated Pump Monitoring (IPM) allows users to monitor critical assets both electrically and mechanically. The IPM system provides early detection and alarming of common problems such as pump cavitation, motor or bearing issues, and imbalance. This enables utilities to address issues before the equipment begins to fail.

3 OUT OF 4 U.S. water plants use equipment
that is more than 20 years old

WINDSOR UTILITIES REDUCES WATER MAIN BREAKS WITH MPC

In utilities without system pressure controls, elevated pressures can stress aging piping systems and lead to a higher incidence of main breaks. Windsor Utilities in Ontario decided to implement Model Predictive Control (MPC) to gain better management of system-wide pressure. They sought to:

- **Control** the header pressure by manipulating control elements to match flow with demand
- **Monitor** multiple metering station pressures and continually drive the header pressure lower while ensuring minimum pressure constraints around the city
- **Adjust** for the pressure fluctuations that occur during pump starts/stops

RESULTS:

- **Decreased** main breaks by **21%**
- **Lessened** stress on aging infrastructure
- **Reduced** average system pressure by **2.8 psi**
- **\$125,000 saved** annually in electricity & system leakage costs

Maintain Data Security and Regulatory Compliance

The stakes are high when cybersecurity threats impact critical infrastructure like water systems.

Embracing the Connected Water Plant Environment means linking plant systems, in-the-field assets, utilities and enterprise IT together to deliver contextualized information where it is needed most. While the proliferation of Internet-enabled devices and the deployment of standard EtherNet/IP across The Connected Water Plant promises **tremendous** benefit, this convergence also brings security concerns to the forefront.

Mitigating Potential Risk

Engaging an automation vendor that understands and engineers solutions with cybersecurity in mind is critical to helping ensure the safety of your data.

Rockwell Automation addresses industrial security systemically through its integrated control and information portfolio, adopting specific design-for-security development practices into its product and system development processes.

Further, Rockwell Automation continues to expand the physical, cyber and intellectual property protection mechanism in its control products. Relationships with network infrastructure vendors like Cisco allow for enhanced active threat monitoring capabilities.

Network & Security Services

Many utilities choose to outsource network and security services to a third-party that is more versed in analyzing security threats as well as diagnosing and remediating any legacy network equipment issues. Rockwell Automation offers these Network & Security services, and in addition, works with utilities to develop standards specific to industrial control systems.

SUCCESS STORY

Regardless of the size or complexity of the existing infrastructure, all utilities can use the same methodology to reduce risk:



Assessment of business needs and specific operational requirements of the process control system



Identification of critical assets and data



Support for asynchronous technology and business change



Recognition that no single product or technology will fully secure industrial networks



Utilization of a "defense-in-depth" strategy based on multiple countermeasures that disseminate risk over an aggregate of security mitigation techniquesⁱⁱⁱ

ⁱⁱⁱ U.S. Department of Homeland Security

Implementation Approach

Understanding your current automation infrastructure will help you make informed decisions on the journey to a Connected Water Plant.

Reshaping your existing operations into a Connected Water Plant environment requires five steps:

- 1 **Conduct** an assessment of your critical assets to identify any technology gaps you may have
- 2 **Implement** state-of-the-art engineering solutions to close those gaps
- 3 **Collect and aggregate** data from multiple sources into a single platform and production model
- 4 **Analyze** your processes to make real-time data-driven decisions
- 5 Continually **optimize** your assets, production environment and workflows

Your assessment should examine your existing automation infrastructure, including:



Production
control and
monitoring systems



Production
planning and
reporting systems



Production
data historians



Network
communication systems
and infrastructure



Network
security



Motor control
systems



Ready to Start Your Journey?

Various utilities are at various stages of smart city adoption.

Whether your plant is just beginning or further along, our solutions are flexible enough to meet your needs today and prepare you for the future.

As you plan, design and move through your journey toward creating a Connected Water Plant, keep some guiding principles in mind:

1

THE BEST APPROACH IS OPEN

Your Connected Water Plant solutions should support not only your main automation vendor's systems, but also the full range of third-party systems that you have in place or may someday use. Using open-architecture technologies is the best way to do this.

2

SECURITY IS NON-NEGOTIABLE

Be sure your entire digital approach – including the hardware and software you use, and the vendors you work with – supports a secure pathway from production data to actionable information.

3

THE RIGHT PARTNER IS PARAMOUNT

Choose a vendor with the right mix of project management, domain expertise and industry experience to fit your needs.

Resources

For more information or help in creating a Connected Water Plant environment, visit:
rockwellautomation.com/en_NA/industries/water-wastewater



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