

EFFICIENCY

Improving agricultural efficiency and sustainability

WaterForce – Napier, New Zealand

How cloud industrial IoT solution, powered by EcoStruxure™ Industry, enables irrigation monitoring and control from mobile devices to improve operational agility, efficiency, and sustainability.

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Innovative solution looks to cloud for more than just rain

Agriculture accounts for nearly 70 percent of the world's water consumption. By 2050, it is predicted that water demand will need to increase by 55 percent to support the food requirements of our growing global population. Water is a finite resource so optimizing its usage is essential.

Governments and associated bodies are responding to this increasing demand by implementing new and rigorous regulatory requirements across the food chain. In New Zealand, farmers must adhere to strict compliance codes to retain their "consent to farm." This means monitoring and reporting on everything from stock levels and fertilizer application, through to water application, uptake, and runoff. The administrative cost of compliance is high, but with the threat of fees, or loss of consent, it is one that farmers must address.

Actionable solutions for sustainable farming

Recognizing that the need for effective irrigation and water management solutions has never been greater, WaterForce developed a cloud-based, Industrial Internet of Things (IIoT) solution to help farmers control, monitor, and record complete farm irrigation and wastewater performance. WaterForce has been providing industry-leading, smart, sustainable irrigation and water management solutions to the agricultural community of New Zealand for over 15 years.

The solution was required to automate the irrigation system, provide visibility of system status and performance, and help reduce the burden of compliance. In addition, it needed to be simple to set up and easy to use, without the need for heavy IT overheads or large capital expenditure (CAPEX).

Goal

To build a complete water management portal that would allow farmers to remotely monitor and control critical irrigation systems for increased operational efficiency, improved water and energy efficiency, and better compliance with regulatory requirements.

Story

WaterForce, a leader in sustainable water solutions, wanted to address the growing demand for water with a sophisticated but easy-to-use, cloud-based water management solution that leveraged the Industrial Internet of Things (IIoT) to monitor and control geographically isolated assets.

Solution

Powered by EcoStruxure™ Industry, SCADAfarm is an integrated automation and information management platform that delivers farmers real-time visibility into system status and performance — anywhere, anytime, and on any device — for better, faster decisions and more effective irrigation.

Results

- Increased visibility of irrigation system performance and status — for both farmers and WaterForce
- More efficient and effective water use
- Farmers report up to 50% reduction in energy costs in first season
- Remote monitoring means farmers save significant time driving to inspect assets
- As the solution builder (OEM), WaterForce can now offer additional value-add services such as fault diagnosis and performance benchmarking

Building such a sophisticated system while maintaining a simple to set up and easy-to-use philosophy required a unique approach and a trusted partner. WaterForce demanded deep industrial domain experience; an open, interoperable, IoT-enabled system with support for edge control and industrial analytics; plus, a shared commitment to energy management and sustainability. The ability to provide connected products and new cost-effective consumption models, such as subscription services, was a bonus. The obvious choice was Schneider Electric.

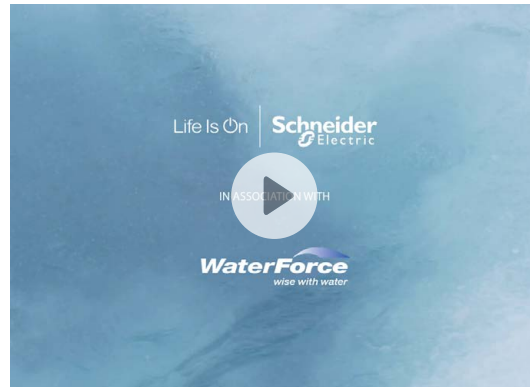
Together with local system integrator McKay (www.mckay.co.nz), WaterForce built SCADAfarm — a complete water management portal for agriculture that incorporates hardware and software from Schneider Electric.

SCADAfarm helps farmers monitor and control irrigation systems spread over a wide geographical area and multiple properties. It gives complete access to irrigation and wastewater systems from anywhere in the world via smartphone, tablet, or PC. Farmers can turn water on and off, set pivot speed and direction, check water pressure and soil moisture levels, change watering depth, and more — all at the touch of a button.

Schneider Electric's IoT-enabled, open and interoperable system architecture and platform, EcoStruxure™, delivers Innovation At Every Level across connected products, edge control, and apps, analytics, and services. The EcoStruxure architecture enables scalable design and operation of connected systems for increased operational efficiency. For industrial companies, these efficiency gains are achieved through the ability of the operation to react more dynamically to changing business conditions for better business results.

Partnering for Sustainable Success

By partnering with Schneider Electric, WaterForce has enabled farmers to reap all the benefits of industrial hardware and software without the need for specific technological expertise in-house.



WaterForce improves agricultural efficiency and sustainability with Schneider Electric cloud-based IoT solution, built on Microsoft Azure. This innovative solution enables farmers to operate irrigation pivots with greater agility, efficiency, and sustainability.

The solution is infinitely scalable to adapt to their ever-changing requirements and system updates are handled seamlessly through the cloud so there is no IT burden for farmers.

“The beauty of the solution lies in its simplicity and scalability,” said Rob McGreevy, Vice President of Information, Operations and Asset Management, Schneider Electric. “In today’s digital economy with fast-evolving requirements, improving the visibility of business variables with simple but powerful technology solutions is allowing our customers to achieve quantifiable business improvements for only an incremental investment. EcoStruxure makes this transformation possible.

“Unique to the system’s design is the ability to work with the farm’s existing equipment, such as irrigation and pump controllers. It means no significant capital investment is required to start seeing benefits. EcoStruxure simplifies the integration between the connected products, edge control, and apps and analytics to provide an innovative solution that responds to the specific needs of these farmers.”

“Most farms are not built to handle large software installations,” said Ron McFetridge, Director of WaterForce. “Using a lightweight, cloud solution with mobile capabilities has been key to expanding IoT capabilities to these farms. Our partnership

Up to

50%

Reduction in energy costs

with Schneider Electric has made our vision for SCADAfarm a reality.”

Greater than the sum of its parts: the real value of open connectivity

Farmers operate in an extremely cost sensitive and labour intensive environment. Taking advantage of new technology is critical to remain competitive and keep operating costs to a minimum.

The SCADAfarm solution truly demonstrates Innovation At Every Level by combining industrial automation, process control, information management, analytics, and alarms and alerts into one easy to use package. This is overlaid with specific information about the farm itself — land topology, soil type, and crop plantings — to ensure that the water supplied matches the irrigation requirements.

Visibility and control of critical irrigation equipment in real-time

SCADAfarm uses secure cellular connections and cloud technology to enable farmers to remotely control and operate their pivots from anywhere in the world via their laptops, tablets or smart phones – if you can access the Internet you can access SCADAfarm. The IIoT-ready solution enables users to connect to, and collect data from, their array of disparate devices without having to invest in any additional hardware to be able to make the time-series data available in the cloud.

Schneider Electric's [ClearSCADA](#) telemetry and remote SCADA software provides real-time control and monitoring functionality, optimized for geographically dispersed infrastructure. So, if the network drops out, or data replication is delayed, ClearSCADA will backfill using its inbuilt historian. By providing location-based alarming, overlaid with real-time weather data and GPS mapping, ClearSCADA provides valuable insight into asset status, environmental factors, and system performance.

Knowing the current state of their pivots, i.e. water on/off, running/stopped, direction of travel, pressure, speed/application depth, and position, provides farmers with the

peace of mind that should they need to leave the farm, they can still log in and see how their irrigation system is performing.

“Rather than being tied to the farm we can operate our pivots from anywhere. I've pre-loaded into SCADAfarm all the safe wind positions on our farm. That way if we're out for tea and the wind picks up, I can park them at 'stop in slot' and not have to worry,” says Craig Blackburn, Blackhills farm.

“I probably check SCADAfarm 15 times a day, just making sure all the pivots are going and adjusting things depending on how the Rakaia River is flowing and what our pond level is.”

Adding value with software automation and analytics

In addition to valuable real-time insight, the SCADAfarm solution also provides farmers with a complete historical picture of performance over time. Powered by Wonderware Online, high fidelity real-time data is collected, stored, and visualized in the cloud. The consolidation of data from multiple, disparate sensors, devices, and systems — including Schneider Electric's ClearSCADA, [SCADAPack RTUs](#), [Trio™ Q Data Radio](#) and [Altivar variable speed drives](#) — means that the SCADAfarm solution provides complete visibility into irrigation performance.

The secure, multi-tenant Wonderware Online solution ensures that farmers data is protected, as they are the ones who determine access permissions. Safe, secure, and reliable connections, developed by Schneider Electric's security experts, with Microsoft Azure's proven cloud management technology ensure information can be quickly and conveniently shared with interested parties such as staff, contractors, agronomists, regulatory bodies, and WaterForce. Data is transformed into easy-to-digest charts, dashboards, newsfeeds, and alerts that authorized users can access via any connected device (PC, mobile, or tablet) through the [Wonderware Online InSight](#) and [SmartGlance](#) clients. Effectively becoming a live information feed for team collaboration, actionable intelligence, and better decision-making on the fly.

“Our partnership with Schneider Electric has made our vision for SCADAfarm a reality.”

— Ron McFetridge
Director
WaterForce

For instance, in New Zealand farmers are often limited to how much water they can draw from the river networks each day. The SCADAfarm solution allows them to check the system vitals: river level, pond capacity, pump speed, weather forecast, etc., before making decisions to start or stop the irrigator pumps. System status is continually monitored and recorded, so farmers have an always up-to-date account of water intake and use.

For example, if the daily application rate is 5 millimetres of irrigated water then farmers can demonstrate that the water is used by the plants and not running off into the environment (drainage or runoff) – this proof is a key regulatory requirement for retaining their consent.

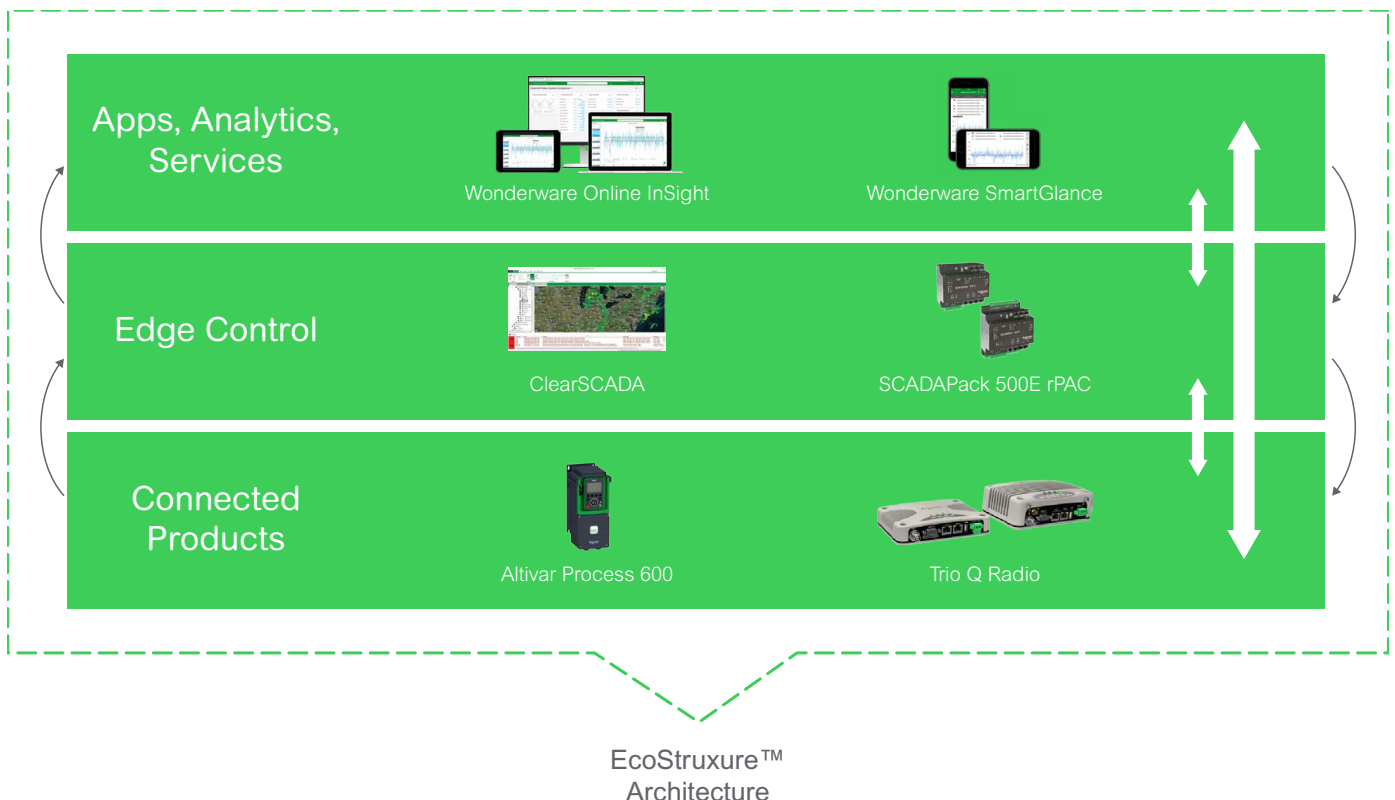
In another example, a pivot irrigator may have a period where there is no water flowing, or a tyre is flat, and the anomaly detection capabilities of Wonderware Online automatically spot the changed behavior and notify the farmer via the automatic newsfeed. The farmer can then act on this intelligence and elect to reduce the water flow, or even stop the pivot. This early intervention helps prevent a small issue turning into a major catastrophe.

Increased visibility into data is not just a benefit for farmers but for WaterForce too. As the solution builder, WaterForce are now able to offer a range of new value-added services such as remote monitoring, troubleshooting and fault diagnosis, and even benchmarking studies. And, the Wonderware Online managed solution approach means that neither WaterForce, or their farmers, need to worry about system maintenance, migration, or upgrades, as all of this is handled seamlessly in the cloud by Schneider Electric. With the ability to handle millions of tags and unlimited users, WaterForce can scale the Wonderware Online solution to fit its business requirements.

The input of data from Weather Sentry Online rounds out the solution by assisting farmers with:

- Precipitation and irrigation decisions
- Soil leeching
- Heat/cold and humidity patterns
- Significant weather events, e.g., wind damage to irrigation equipment
- Improved decision-making, leading to increased yield production

Early intervention helps prevent a small issue turning into a major catastrophe.



Farmers realizing up to 50% reduction in costs

WaterForce has already installed the plug-and-play SCADAfarm remote monitoring and control technology on dozens of Valley Center Pivots, provided by Valmont Irrigation, the leader in precision irrigation. Providing a “virtual control panel” from office and mobile devices, it is empowering farmers to make quality, informed business decisions. Farmers are using SCADAfarm for various farm management operations, including:

- Water ordering for farmers on scheme systems
- Managing flow demands/water consents and EPA regulatory compliance
- Effluent pump control/effluent management and proof of placement
- Loading and selecting Variable Rate Irrigation (VRI) prescriptions (plans)
- Day-to-day operations such as remote stop/start and forward/reverse control of pivots
- ‘Stop in slot’ functionality to help farmers plan field works, ensuring safe parking positions when on-farm works need to occur, and adding to wind safety planning



“With information at my fingertips, my farm is more productive, water and energy costs are lower and crop yields higher.”

— Craig Blackburn
Director Farm Manager
Blackhills Farm

- Monitoring pivot operation, fault finding, and scheduling
- Analyzing farm performance against different time periods (day, month, season) and indicators (water uptake and consumption, energy usage, crop yields, weather patterns)

“Every day I adjust my pivots and pumps for a variety of reasons – shifts in the wind, rain levels, crop requirements or local regulations,” said Craig Blackburn, Director Farm Manager Blackhills Farm. “Now I can monitor and control my irrigation system easily from my mobile phone, saving me hours of time not spent driving around the farm. With information at my fingertips, my farm is more productive, water and energy costs are lower and crop yields higher. I’d struggle now to live without it.”



This innovative cloud-based IoT solution enables farmers to operate irrigation pivots with greater agility, efficiency and sustainability.

Recorded benefits to date include:

- Improved operational performance and crop yields
- Saved time by allowing farmers to view equipment status from anywhere, anytime, and on any device, instead of driving for hours to check on valuable irrigation equipment
- Enhanced safety procedures by pre-setting safe stop locations for pivots in case of high winds and providing the ability to stop equipment remotely should someone need to enter the irrigation field
- Significant energy savings – for example, one farm recorded a 50% reduction in energy costs in the first season, by shifting irrigation behaviour and taking advantage of off-peak energy rates

- Better management of water and wastewater across the farm, and easier compliance with regulatory requirements

“Ground-breaking technologies such as SCADAfarm have become increasingly popular with our clients,” says WaterForce director Ron McFetridge. “The addition of wireless field remote controls (SCADAfarm), especially those that leverage the IIoT and remote telemetry, have been welcomed as popular additions to farm management.

“By leveraging our relationship with Schneider Electric, we can focus on our core business — effective water management — knowing that the information management, analytics, and automation side is covered.”

EcoStruxure™

Innovation At Every Level

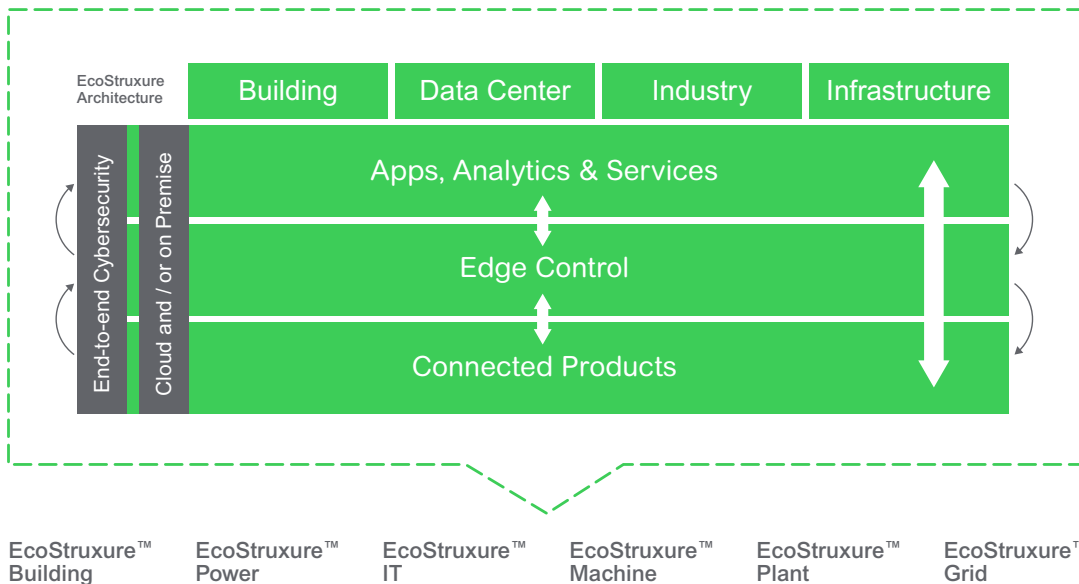
IoT-enabled solutions that drive operational and energy efficiency

EcoStruxure is Schneider Electric’s open, interoperable, IoT-enabled system architecture and platform.

EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers.

EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level including Connected Products, Edge Control, and Apps, Analytics & Services. EcoStruxure™ has been deployed in 480,000+ sites, with the support of 20,000+ system integrators and developers, connecting over 1.6 million assets under management through 40+ digital services.

One EcoStruxure architecture, serving 4 End Markets with 6 Domains of Expertise



Connected Products

The Internet of Things starts with the best things. Our IoT-enabled best-in-class connected products include breakers, drives, UPSs, relays, sensors, and more. Devices with embedded intelligence drive better decision-making throughout operations.

Edge Control

Mission-critical scenarios can be unpredictable, so control of devices at the edge of the IoT network is a must. This essential capability provides real-time solutions that enable local control at the edge, protecting safety and uptime.

Apps, Analytics & Services

Interoperability is imperative to supporting the diverse hardware and systems in building, data center, industry, and grid environments. EcoStruxure enables a breadth of agnostic Applications, Analytics, & Services for seamless enterprise integration.

Find out more about EcoStruxure

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