

“The Derceto Aquadapt system has never been turned off and has operated faultlessly for ten years – delivering annual energy cost savings of more than ten percent, and a project payback inside three years.”

Murray Kennedy,
General Manager, Utilities and Services,
Greater Wellington Water.



One man with an energy saving vision

The story of Derceto and Aquadapt began with one man and his vision of how New Zealand’s capital city – Wellington – could achieve major energy savings in its water reticulation by applying sophisticated modeling techniques developed for New Zealand’s national hydroelectricity generation system.

Back in the late 1990s, Murray Kennedy, then a senior manager for Wellington’s Regional Council (now known as Greater Wellington Regional Council), drew on his experience gained in the electricity industry when low water levels in the country’s hydro lakes precipitated a national power crisis. In response, an existing modeling system was further developed so storage of hydro water could be more effectively and efficiently managed and accurate forecasts could be made to ensure supply could meet demand.

“Applying these learnings to the water industry I could see that our current practice of using expensive peak electricity during the day to keep reservoirs topped up was not cost-efficient. There had to be a better way,” Murray Kennedy recalls.

Complex requirement

The steep geography of the Wellington region requires a relatively complex network of pumps and reservoirs with 182 kilometers of service pipes moving water up to 50kms. Serving a population base of around 390,000, Greater Wellington Water, a water wholesaler, supplies an average daily volume of around 150 million litres with summer peaks up to just over 200 million litres. Because the water supply comes mainly from rivers, which rely

on rainfall, storage management is critical.

Murray Kennedy could see the immediate opportunity to save power costs by using off peak electricity, but he could also see the potential for sophisticated modeling of the entire water system. This would enable more informed decisions about which pumps should be used at any particular time to pump water to reservoirs – using off-peak power – and making greater use of gravity feed into the reticulation system during periods of peak power cost, balancing water storage and water availability most cost-efficiently across the whole system.

In 1999 a project to develop a prototype ‘optimization’ system was awarded to New Zealand professional services firm, Beca Consultants. Beca engineer Simon Bunn – now Derceto’s Chief Technical Officer – led a Beca team that worked closely with Greater Wellington Regional Council staff to build the mathematical models and specify the telemetry and other control systems required.

The solution that emerged was named Derceto after the Assyrian goddess of water. The new software used mixed integer programming along with a hydraulic model operated via user interface screens to schedule pump and water transfer control

systems ‘over the top’ of existing centralized PLC and telemetry control systems. An easy-to-use graphical user interface made it simple for operators to view pump schedules and allowed manual tuning of pump schedules to facilitate maintenance requirements. An optimization model factored daily demand variations, available supply capacity, system constraints and chemical and power cost information.

Annual savings

The new system went live in 2000 across 60 percent of the Wellington regional water network and has run 24 hours a day since installation, without incident, performing as required to ensure water is supplied from the lowest-cost source, with reservoir levels lowest at midnight and highest at 8am to coincide with lowest energy tariffs. After the first 12 months of operation Greater Wellington Water completed an internal review of cost savings, evaluating the impact of the new system on cost overheads. The results identified annual savings of around 12 percent in energy costs, plus lower network charges. In February 2008 Greater Wellington Water extended the roll-out across the remaining 40 percent of the distribution network. ▶

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◀ Breaking new ground

“This has been a highly successful project. A joint effort between dedicated staff on both sides,” says Murray Kennedy. “We truly broke new ground. Most important, we achieved our original business case objectives of better than ten percent per annum in energy savings, with complete cost recovery of the project costs inside three years.

“We’ve also had benefits we never anticipated at the outset. For example, Derceto Aquadapt is great from a maintenance scheduling viewpoint. We can feed maintenance details into Aquadapt the day before and the system will take into account the outage and move water around the system and top up reservoirs in the right place to take into account the change. We can also take a pump out of the system and the software will compensate by running other pumps for longer. It’s a great operational tool. If we schedule an outage for four hours and it took five hours, then the software will recognize that and bring additional pumps online or re-route water. In the end it’s a tool. It can’t give us more water, but it can ration the water we have most efficiently.

“We were the first Derceto customer and we are firmly committed to adopting enhancements as they become available. The latest in 2010 is using on-line spot electricity prices to further minimize our costs.”

The success of the Greater Wellington Water ‘optimization’ project was recognized in 2002 with the award of a gold medal by the New Zealand Association of Consulting Engineers (ACENZ) for the most outstanding project of 2002. This reflected not only the success of the Greater Wellington Water project, but also the research and development breakthrough

the project achieved in successfully creating a software solution for pump scheduling optimization – a world first.

In 2004, the level of international demand from water utilities for a proven solution to the previously intractable problem of real-time pump optimization, encouraged Beca to establish Derceto as a standalone company. Start up funding was secured from venture capital investment company Endeavour Capital, with private funds matched by the New Zealand Government Venture Investment Fund (NZVIF).

Firmly established

Today, Derceto Aquadapt is firmly established with over 25 staff and a rapidly growing international customer base. Ongoing software development and online support is based at Derceto’s head office in Auckland, New Zealand, with sales and support offices in San Francisco, Atlanta, Toronto and London.

Along the way, Derceto’s Aquadapt has expanded in capability, building on its unique real-time pump optimization credentials to become a richly-featured water utility management tool which not only reduces overall energy bills by 10 to 20 percent, but takes control of the day to day operation of water distribution systems to deliver water where it is needed at minimum cost and the lowest possible carbon footprint. Aquadapt also assists with maintenance planning and scheduling, and it helps train new operators to bring them up to full effectiveness.

As water utilities worldwide strive for maximum sustainability, Aquadapt delivers on the key tenet of sustainability: it saves more than it costs, in money, in time, and in resources.

About Derceto and Aquadapt

Derceto’s Aquadapt software slashes energy costs, lowers carbon emissions and boosts water quality and asset efficiency.

Aquadapt is the proven and industry-leading, real-time operations optimization solution, purpose designed for treated water distribution. Installed at leading water utilities around the world, Aquadapt is delivering measurable energy savings – averaging 15 percent – which amounts to millions of dollars per year for many customers.

Integrating with existing SCADA systems, Aquadapt reads live field data to instantly create the most effective pump valve and water treatment plan schedules, adapting them in real time to changes in demand, energy pricing and unforeseen events in the network – ensuring water is delivered where it is needed at minimum cost and maximum quality.

The user-friendly interface makes it easy for operators to step in at any time to take control, schedule maintenance or brush up on operational skills.

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