

Case story | ROCONSERVICES

## Low energy and maintenance costs key to success at plant in Bermuda



# 15,000 hours

without any major  
service.

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ROCONSERVICES chose a Danfoss APP pump and two iSave energy recovery devices to form the heart of each of its two 180,000 gallon per day seawater RO units in Dockyard, on the west end of Bermuda. The new RO plant was established in 2009 on a build-own-operate contract, so predictable reliability and market-leading energy efficiency have been vital to ensure project success.

### **The challenge:** Specifying the parts that provide overall project profitability

Even before ROCONSERVICES began to prepare its bid for a new build-own-operate RO plant in Dockyard, outside of Hamilton on Bermuda, executives knew that two main variables would make the difference between profit and loss. First, on an island where almost all electricity is generated from diesel fuel, energy efficiency is crucial. Second, since near-constant uptime is required for extended periods – and the project is a 45-minute drive from ROCONSERVICES' offices – maintenance had to be minimal.

"The Dockyard plant basically has to run 24/7 from April to November," says Derek Woolley from ROCONSERVICES. "During these months the plant serves a lot of the cruise ships that call

on Bermuda, and each ship takes on 200,000 – 300,000 gallons of fresh water while in port. We just can't afford to be running out there at all hours of the day, and wanted to design a system that we could pretty much turn on and visit on a planned schedule."

Water sold from the Dockyard plant also serves local domestic and industrial customers for whom water supplies are equally critical.

### **The solution:** A system built around Danfoss APP 30 and a pair of iSave 21s for robust reliability – and Danfoss variable frequency drives to fine-tune performance

Woolley was in no doubt that a positive displacement pump was the way to go. "The fewer the parts, the lower the installation costs – and less maintenance," he says. "It's just more simple to build a system without pulsation dampeners, temperature monitors and nitrogen for the accumulator. And oily water, replacing seals and crank case oil are all things we need to spend less time worrying about."



Derek Woolley, General manager  
ROCONSERVICES Ltd.

Along with the APP 30, two iSave 21s were installed in parallel for extra energy efficiency. Each RO unit fits inside an air-conditioned 40 ft. container, so the simple configuration and relatively small footprint of the Danfoss pump and ERD combination were added benefits.



Installation was simple, according to Woolley. "Everything that you need is in the box. The labeling is clear, and instructions are good. Danfoss talked us through setting up the VFDs, which is basically a copy-paste procedure – they're really not difficult to program."

#### The results:

**Energy costs 50% lower than in the old centrifugal system and surprisingly low maintenance**

With local electricity costing USD 0.43 per kWh, the single most important cost driver for RO plants on the Bermudian market is energy. And the new Danfoss components have halved energy consumption from 22 kWh to 11 kWh per 1,000 US gallons.

"An efficient positive displacement pump like the APP 30 and double iSaves are definitely the main reason for these good results," explains Woolley. "But we have continued to fine tune our VFDs to adapt to demand, and tweak even more savings out of the system."

By replacing constant flow with variable flow, and making use of default soft-start settings, ROCONSERVICES has not only trimmed electricity bills – it has also reduced wear and tear on moving parts, further contributing to low maintenance.

Extended service intervals were part of the plan, but ROCONSERVICES had not expected them to be this long. "The recommended service interval for our Danfoss equipment is 8,000 hours. We've been running for 15,000 hours without any major service – so we're pretty happy about that. In addition to being one of the lowest price water providers on the island, we'd also like to be one of the most successful."



*ROCONSERVICES, located in Paget, Bermuda, provides a wide range of engineering services within the water and wastewater sectors. ROCONSERVICES has specialist knowledge and many years experience in the Desalination and Reverse Osmosis industry.*

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