



CASE STUDY / HE AKORANGA AROTAHI:

New high efficiency supply pumps significantly reduce electricity use

Ngā mapu wai hou i whakaiti i te whakapaunga hiko

In 2020, Whakatāne District Council installed new, higher-efficiency pumps at two pump stations. As a result, the Council is on track to reduce electricity use by 157,000 kWh, and carbon emissions by 16,500 kgCO₂e annually, saving \$22,000 per year.

The opportunity *Te whaiwāhitanga*

The Whakatāne District is home to approximately 35,700 people, and Whakatāne District Council (the Council) uses 7.4GWh of electricity annually to meet the district's needs. Water supply and treatment use a significant amount of electricity; two large pump systems owned by the Council use approximately 13 percent of the Council's annual electricity.

- The replacements of the Braemar Road and Murupara pumps with new high-efficiency supply pumps have seen their efficiency improve by 19% and 27% respectively
- Expected savings of 157,000 kWh, 16,500kg CO₂e, \$22,000 each year.
- Further energy savings projects in progress

¹ Source: New Zealand Census 2018

The solution

Te whakataunga

As part of the Whakatāne District Council climate change project and energy management programme, energy specialists Emsol carried out an energy and carbon audit across Council facilities in 2019. Water supply pump systems were identified as large electricity users and a significant source of carbon emissions.

Emsol and the Council's three waters team identified that some of the pumps used in the water supply scheme were aged and operating inefficiently compared to modern pumps and motors.

Two large pumps at Braemar Road, one of which had recently failed, were replaced with four multi-stage variable speed pumps in August 2020. This system

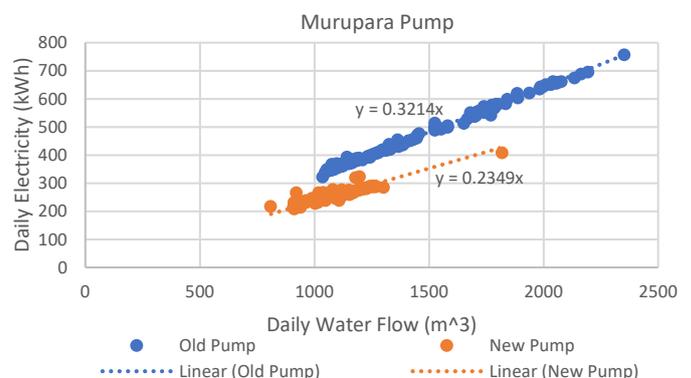


Figure 1 Electricity use versus water supplied for the new high-efficiency pumps compared to the old pumps at the Murupara pump station.

Further information

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supplies water to the Edgcumbe Plains area. At Murupara, two modern variable speed pumps were installed in May 2020.

Modern, high-efficiency motor and pump systems typically operate at 80-90 percent efficiency. The newly-installed pumps at Braemar Road and Murupara operate 19 percent and 27 percent more efficiently than the old pumps systems, respectively.

Pumps were selected carefully to match the requirements of both pump stations. Matching high-efficiency motors with correctly sized pumps and appropriate impellers has resulted in higher overall efficiency. Impellers are the part of the pumps that move water; if the impellers are too small, or too large, the pump will be less efficient. Proper sizing for the pump duty means they operate within a higher efficiency band, meaning the pumps do the same amount of work or more for the same power usage.

The savings

Ngā penapena pūngao

With the support of Emsol, the Council regularly monitors its facilities' energy use to an international protocol (IPMVP). This enables the Council to adjust energy use for factors such as the volume of water supplied. This approach enables true energy and

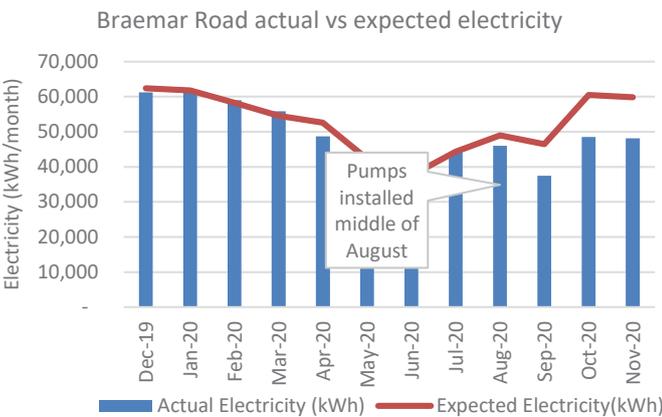


Figure 2 Electricity use before and after high-efficiency pumps were installed at Braemar Road pump station in August 2020.

carbon savings to be calculated. During the energy audit, a baseline which tracks energy use against expected energy use-was set for many of the Council's assets. Since the installation of the high-efficiency pumps, significant savings have been achieved compared to baseline, and the pumps are on track to achieve a combined saving of 157,000 kWh (20 percent) for the year. The impact of the electricity reductions will save the Council \$22,000 annually and reduce carbon emissions by 16,500 kgCO2e each year. This is equivalent to the average annual carbon footprint of two New Zealanders.

The future

Ngā rā anamata

Building on this success, the Council's three waters team is looking at ways to accelerate pump replacements at other facilities that can achieve similar results. The Council has recently expanded its energy monitoring to include the oxidation ponds, which play an important role in wastewater treatment. Hopefully this expansion will highlight further more energy and carbon reduction opportunities.



Figure 3: Whakatāne Team Leader Water Treatment Plant, Three Waters Operations Neal Yeates at the Braemar pump station.

² Estimated based on the Ministry for the Environment report "New Zealand's Greenhouse Gas Inventory 1990-2017" defining the New Zealand gross carbon dioxide emissions in 2016 to be 7.4 tCO2 per capita and assuming an average four person household.

OUR CLIMATE CHANGE PRINCIPLES | NGĀ MĀTĀPONO HURINGA ĀHUARANGI



We will act now
Ka mahi mātou ināiane



We will care for and protect the environment
Ka manaaki, ka tiaki mātou i te taiao



We will acknowledge those most affected
Ka mihi mātou ki a rātou kua pā mārika i ngā take Huringa Āhuarangi



We will think and act long term
Ka whakaaro pae tawhiti, ka mahi pae tawhiti mātou



We will build capacity to recover from difficulties
Ka whakakaha mātou i a tātou



We will be part of the solution
Ka āwhina mātou ki te whakatika i ngā raru



We will learn
Ka ako mātou

For more information on our Climate Change Principles and projects, head to [whakatane.govt.nz/climate-change](https://www.whakatane.govt.nz/climate-change)