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Committee Regional Sustainability
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Hydro generation at Te Marua

1. Purpose

To brief the Committee on progress with the Te Marua hydro generation project.

2. Significance of the decision

The matters for decision in this report do not trigger the significance policy of the Council or otherwise trigger section 76(3)(b) of the *Local Government Act 2002*.

3. Background

One of the objectives for Water Supply is to reduce its carbon emissions by 15 percent by 2012. This is part of the Greater Wellington Regional Council's (GWRC) overall objectives.

The concept for the project was to capture the energy available while filling the Stuart Macaskill Lakes and convert this into useful electrical energy. It was identified that two existing lake pumps could be operated in reverse as turbines, with minimal modifications (known as pump as turbine or PAT).

Testing in 2007/8 proved the concept would work satisfactorily and showed that power generation of up to 240 kW could be achieved. A project was initiated in 2008/9 to automate the lake filling process so that generation could be maximised.

4. Comment

The project involved installation of a pneumatic system, five valve actuators, a rebuild of the starter cubicles, additional monitoring instruments and new control system software. Three of the valve actuators and some of the electrical equipment were refurbished and reused from old stock, thereby reducing costs and maximising the sustainability aspects of the project.

Power generated by the PATs is used on-site by the boost pumps that deliver water from Te Marua Water Treatment Plant to Upper Hutt, Porirua and north Wellington. The expected annual generation is 950 MWh, which is about 5 percent of Water Supply's annual electrical energy usage.

The electricity generated will reduce the pumping station's energy costs by around \$85,000 per annum and result in reduced CO₂ emissions of about 160 tonnes per annum. The expected payback period for the project is 3.3 years.

Commissioning has been completed and final approval from the lines company is now required. The following two photographs show the two lake pumps being used as turbines (figure 1) and a screen shot of the control system software used to automate the generation process (figure 2).



Figure 1 Te Marua lake pumps being used as turbines

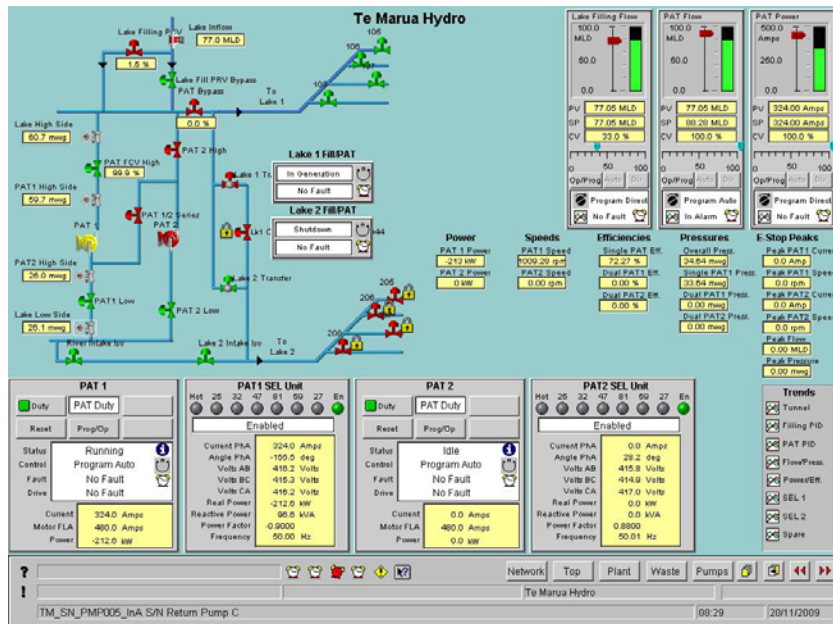


Figure 2 - Te Marua hydro generation SCADA screen

The original concept, hydraulic assessment, control system software and project management was completed by Water Supply staff. Installation was by Water Supply's preferred minor works contractors. The electrical and functional design was by a Wellington based consultant.

Stage 2 investigations will be completed this year to determine if power generation from the system can be further optimised by utilising the available head between Lake 2 and the pumping station.

5. Communications

A media release will be issued and an article will be included in *Our Region*.

6. Recommendations

That the Committee:

- 1. Receives the report.*
- 2. Notes the content of the report.*

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