

Energy Efficiency in Dairy Sheds

Case Study: Improving vacuum pump efficiency at Graejo Trust



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The Graejo Trust farm located west of Invercargill at Thornbury has a herringbone milking shed with 38 sets of milking cups. The vacuum pump is a water ring pump (Alfa Laval Agri Vp240) driven by an 11 kW motor.

Improving vacuum pump efficiency



A rotary vane vacuum pump (RVS model M7000 from Corkill Systems Ltd) was installed to demonstrate the savings achievable by replacing a water ring pump with a more efficient design.

Changing from the water ring pump to the rotary vane pump running at fixed speed

reduced electricity use from 72 kWh per day to 45 kWh per day – a 38% reduction. This change alone is estimated to save 6750 kWh over a full season at Graejo. At a marginal electricity price of 14c/kWh, the saving is worth \$945.

Although this is a significant saving, the cost of replacing an existing water ring pump that is in good working condition is too high to make this an economic investment. Choosing a vacuum pump for best efficiency is best done at the time of building a new milking machine.

Saving electricity by speed control of the vacuum pump

After running the rotary vane pump at fixed speed for a short period, A Varivac speed controller was installed. The Varivac automatically varies the pump speed to provide the correct vacuum level and eliminates the energy that is wasted in a system using a conventional regulating valve to control the vacuum.

The Varivac speed controller at Graejo was installed in November 2006 at a total cost of \$6,200. All of the installation work including mounting the pressure sensor in the vacuum line and commissioning the unit was carried out by an electrician with telephone support from the supplier, Corkill Systems. A

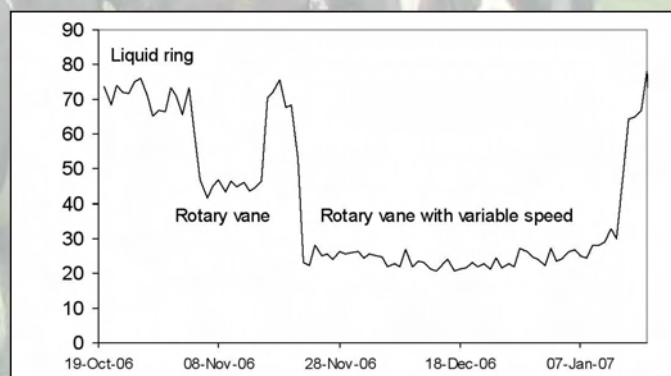


representative from Corkill Systems visited

The Varivac installed at Graejo a few weeks later to check the controller settings.

When using variable speed control the rotary vane pump daily energy use fell from 45 kWh to 25 kWh. This equates to an electricity cost saving of \$750 over a season.

As can be seen in the graph, the combination of an efficient pump and speed control reduced the daily energy use from 72 kWh to 25 kWh – a 65% reduction in total.



Graph showing daily electricity use for vacuum pumping at Graejo