

Telita Dairy

Energy Tariffs & Irrigation Energy Efficiency Case Study

Business Snapshot

- Farm owners: Alan and Rosie Davenport
- 610 cows in total
- 200 head of yearlings (off farm)
- 200 calves on farm for first 8 weeks only, then off farm
- 264 ha of effective farm area
- 90 ha irrigated
- Pivot and long laterals for irrigation
- Water supply is a combination of dam, river and Winnaleah Irrigation scheme water
- 600 kg of supplementary feeding per cow per season
- Pasture is predominantly rye grass and white clover

Irrigation Energy Efficiency – reviewed by James Curran, Agricultural Resource Management

Irrigation of the property comprises three separate systems:-

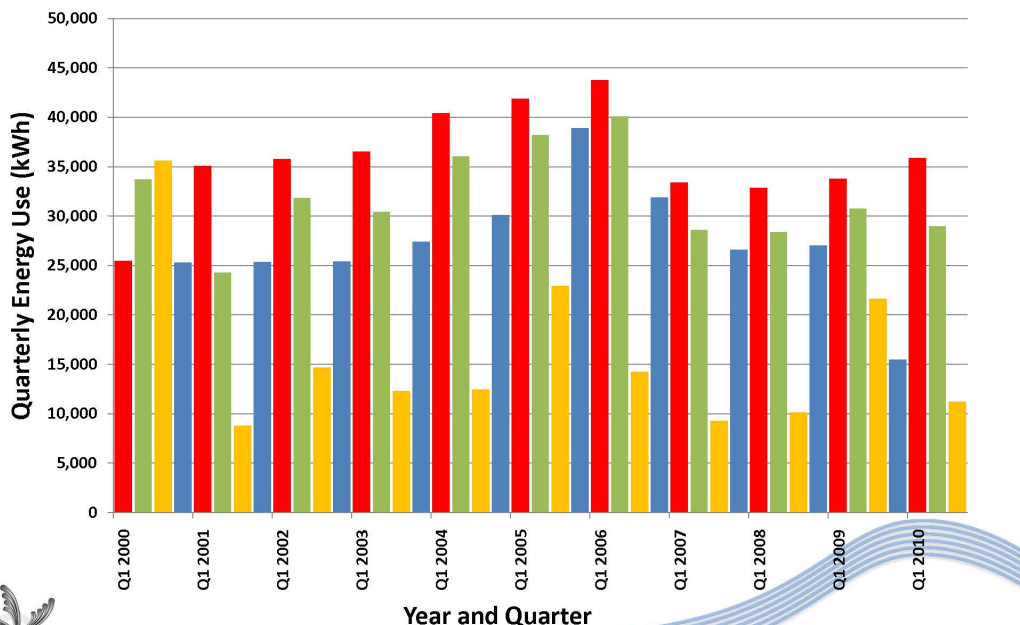
1. A long lateral system supplied direct from the WIS, comprising 12 laterals in total, running 24 hours per day, with two shifts required, irrigating 4 acres (1.62ha) per sprinkler.
 - No comments have been made with regard to this system, as it is supplied via gravity from the WIS.
2. A long lateral system pumping direct from the Ringarooma River. 50 laterals in total, running predominantly off-peak, irrigating 2 acres per sprinkler or 0.8 ha.
 - Estimated pump duty for this system is 50 l/s at around 110 metres head
 - The pump units consist of a Southern Cross 125x100-250 pump unit c/w a 90 kW electric motor. The pump unit is around 78% efficient. Which is very good pump efficiency for this duty.
3. A 424m plus end gun part circle centre pivot, covering around 221 degrees of arc or approximately 39 ha. Additionally 9 long laterals are run in conjunction with the Pivot. Note the Pivot was installed to replace an existing long lateral system.
 - Water supply is from direct pumping from the Ringarooma River.
 - The design system flow rate is 48 litres per second in total, 39 litres per second for the Pivot, the balance for the long laterals. Pivot applies 8.73mm per 24 hrs.
 - Mainline comprises 200mm PVC pipe to the Pivot centre
 - The pump system consists of a Southern Cross 125x100-250 pump coupled to a 75kW electric motor at the river (main pump), and a Southern Cross 150x125-250 pump c/w a 22 kW 4 pole (1450 rpm) motor at the Pivot centre (boost pump).
 - The calculated required pump duty for Centre Pivot is 48 l/s at 91 metres head
 - The estimated required pump duty for the long laterals is 48 l/s at 105 metre head

- The main pump delivers 81 metres head at 74% efficiency
- The Boost pump delivers 24 metres head at 81% efficiency

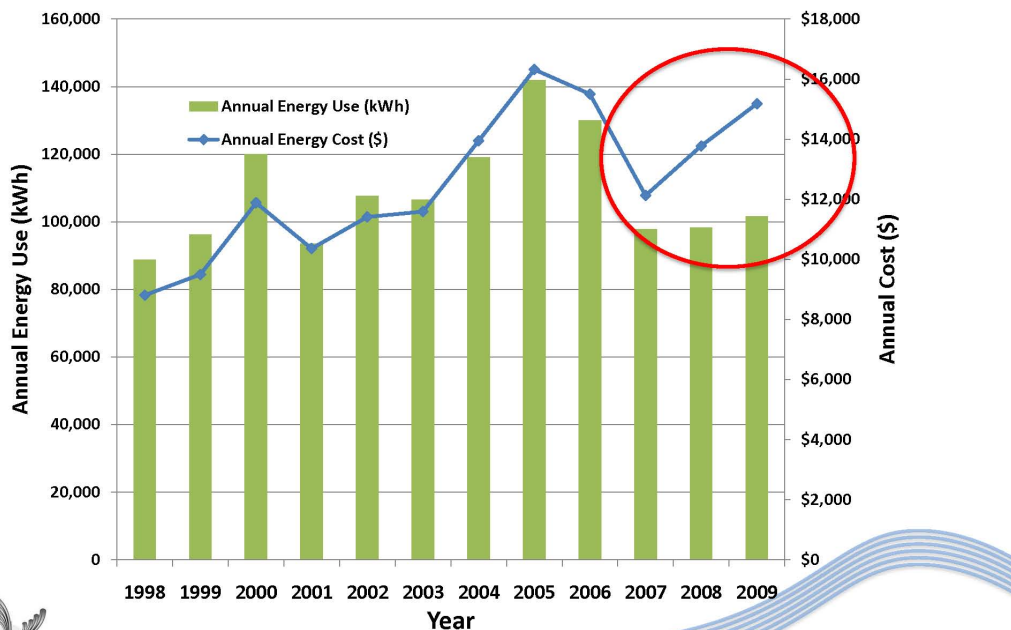
Comments:-

- The system has been designed for low losses throughout, resulting in a relatively low total head requirement, which is very good from an energy efficiency perspective.
- Pump efficiency are very good for the relative duties. Having looked at alternate pump options, there is no significant efficiency advantage.
- The main energy efficiency / conservation issue is the delivery of the entire flow (48 l/s) to the head (pressure) required by the laterals. i.e. we are pumping 48 litres per second to 105 metres head, when we could be pumping 39 litres per second to 91 metres head, and 9 litres per second to 105 metres head. Total usage at present is calculated at around 71.93 kW/hr at present.
- If we had two separate boost pump at the Pivot centre, one for each system, the total usage would be 66.9 kW/hr this is based on selecting actual pumps for the duty and there know efficiencies), therefore the potential saving is 5kW/hr.
- 5kW/hr at an average cost of say 12c per kW/hr is equivalent to \$3.60 per ML
- Assuming an annual usage by the pivot of say 5 ML per ha, around 200 ML , total annual cost saving would be around \$720
- The additional capital to replace the current system with two pumps, associated plumbing and electrical equipment would be around \$1,4000 (estimated), based on the values, it would not be an economic investment
- The original system was installed with simplicity in mind. Two pumps at the centre would be a more complex system from a plumbing, electrical and control perspective.

Typical seasonal energy use variation



Annual Energy Use and Cost - Telita Dairy



Joule Logic

Comments on Telita Dairy

- Telita is currently not a contestable site, but like almost every dairy in Tasmania, it can choose to be as of July 2011 (Tranche 5a contestability).
- Currently supplied on Tariff 22 (General) for everything except hot water, which is on Tariff 43.
- It is *likely* that about half of the energy used on Tariff 22 is used during off-peak times.
- This means that Telita dairy is currently *likely* to be paying higher energy prices, and higher network charges than necessary.



Joule Logic