



Smarter energy use on West Australian dairy farms

Using interval data recording to measure power use

Compiled by Dan Parnell,
Agsure Consulting.

As part of the national energy assessment program *Smarter energy use on Australian dairy farms*, farmers in WA had an on-farm energy assessment undertaken to assess their energy use and to investigate potential energy savings to be made from investment in energy efficient technology. Seventy-five dairy shed energy assessments were conducted in WA as part of a Dairy Australia project funded by the Department of Industry and Science as part of the Energy Efficiency Information Grants Program. This case study describes the benefits of using interval data recording to more effectively measure power use on farm.

Introduction

Interval data recording uses smart meter technology to record electricity use every 30 mins.

Synergy, the only energy provider with this free service at this time, requires the installation of a smart meter. Most dairy farms already have smart meters and other energy suppliers are in the process of providing such tools.

Information about your account can be accessed through the My Account facility on the Synergy website. This is easy to set up and all the information you need is on your power bill.

It is then a simple as clicking on the interval data tab to see your recent power use. Unlike the Auzimax trialled by Western Dairy in 2014, it is not a live feed and updates every day or two. The power consumption shown is for the dairy as a whole, whereas the Auzimax profiles all the different pieces of equipment in the dairy.

Once on the website you can select to see power use on daily, monthly or yearly basis. Energy use is broken into Peak and Off Peak use, which helps ensure farmers are maximising their off peak power use.

Tariff selection is also much easier. Having this data enables farmers to easily benchmark power use on a kWh/l or c/l basis against themselves or other dairy farms.

The smart meter's most valuable feature is accurately recording the daily power use profile. This is useful to determine the back-up power requirement for generators and the like. It is also very useful when designing alternative energy systems like solar, which can really target afternoon milking when both power use and the tariff is highest.

Case study – Paul Ieraci

Paul Ieraci of Brunswick had a Western Dairy/Dairy Australia Energy Assessment performed in 2014. During this process it was identified that some of the power used during the peak period could not be reconciled with any of the known equipment in the dairy.

Western Dairy established a Synergy My Account access to allow observation of the actual power use to check where in the dairy the power was being used.

Figure 1 is a screen capture of electricity use every half hour on March 12, 2015 from the interval data.

You can see in Figure 1 the dark blue off peak use and light blue peak use very clearly. It's also easy to detect the milking times when compressors and vacuum pumps drive power use up to 11kWh every 30 mins. From this data we can determine that there was no extraordinary load during the day. The extra peak-power use is mainly coming from the compressor run times after 8 am. As a result, Paul can rule out equipment failures or the like consuming power during the off-peak period. Also he can decide if the return from finishing milking earlier in the morning is worthwhile. It is also interesting to see his nightly hot water system consumption during the night which, 9 kW every half hour, is exactly what is expected from an 18 kWh hot water unit.

Figure 2 demonstrates the power load in kilowatt-ampere (kVA) and kilowatt (kW) which is useful in back-up power design and when new equipment is installed in the dairy.

Figure 3 is the power use consumption on the dairy for a 6 month period from July 1, 2014. This can be used to assess long term activity in the dairy and to identify any unusual events such as equipment failure or fatigue.

Figure 1: Power use March 15 2015, Ieraci

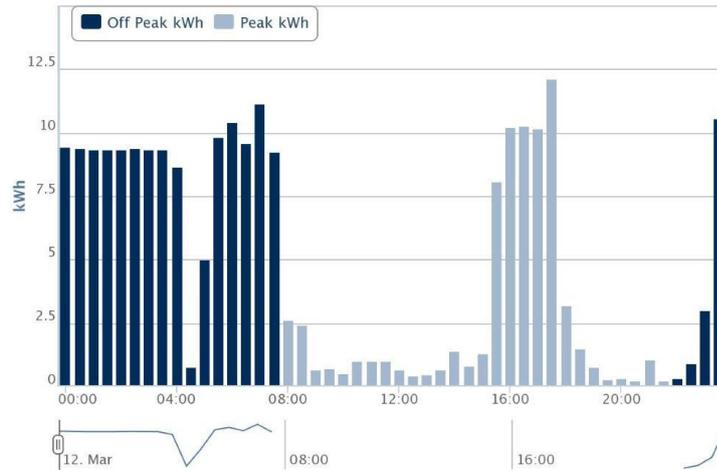
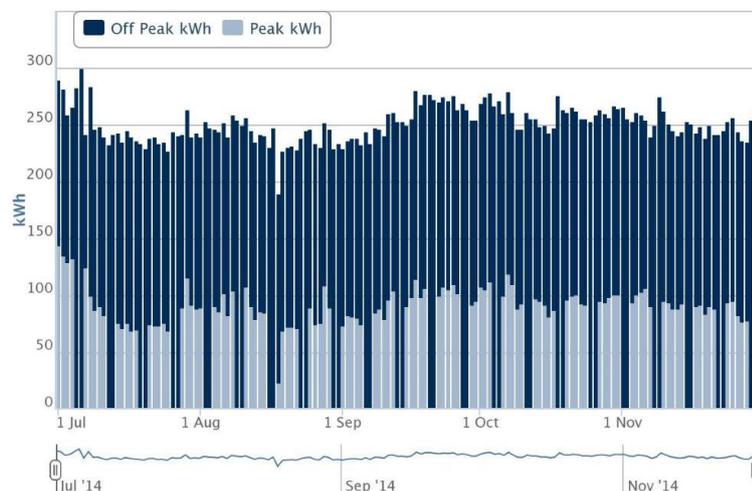


Figure 2: Power load March 12 2015, Ieraci



Figure 3: Power use for 6 months July 1-Dec 31 2014- Ieraci



Summary

This case study demonstrates that interval data recording is easy to access and use. It can provide valuable information for a dairy's energy-use profile to try and achieve savings in power use and the tariff paid. Every dairy should consider the use of this technology. Some of the features and management implications are listed below.

Features

Cost

There is no extra charge for this service.

Easy to use and access

Internet connection and very basic computer skills are all that is required.

Detailed and flexible data

Energy use profiles can be created easily and quickly.

Management implications

Tariff Selection

Most dairies use a Time of Use tariff. Some with more unusual milking times or power use profiles may benefit from a flat or tiered tariff. Having the interval data makes tariff selection accurate and not such a subjective decision.

Milking times

Farmers can accurately see their milking times and equipment run times to maximise their off-peak use.

Equipment upgrade and design

When upgrading milking equipment farmers can assess load so that any equipment can fit within the parameters of supply.

Equipment faults or fatigue

Fluctuations in power use may be a guide to farmers that there is an equipment failure or loss of efficiency. While the exact problem cannot always be identified, it can trigger further investigation.

Back-up power design

When knowing the power use profile farmers can formulate their back-up power plan more accurately.

Alternative energy planning and fit

Having accurate power use profiles can assist with making the right choice and size of alternative energy systems.

Benchmarking

The amount of power used to produce a litre of milk or milk solids can easily be calculated from interval data on a daily, monthly or annual basis.

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