

Climate Change Research Strategy - Energy Efficiency Solutions

On-farm Energy Pilot Case Study – The Pines Dairy, Kiama

The Pines, a micro dairy in Kiama, NSW installed an on-farm energy system comprising solar panels, zinc bromine flow batteries and a peer to peer energy trading platform. The project is part of the NSW DPI Energy Efficiency Solutions On-farm Energy Pilot program.

The NSW DPI Energy Efficiency Solutions Project implemented 7 pilot projects across 8 sites to demonstrate innovative technologies and practices to improve on-farm energy efficiency, energy security and productivity while reducing on-farm energy use, costs and emissions. The pilots were implemented at farms located across NSW in intensive sub-sectors including dairy, horticulture and feedlots. A rigorous evaluation process was undertaken to select proponents to participate in the pilot projects, with NSW DPI contributing 50% of total project costs. This case study summarises findings from The Pines pilot project.

The Pines Dairy



Context

The Pines Kiama is a small dairy located in Kiama, NSW, approximately 120 km south of Sydney, just outside of Wollongong. The Pines is owned by Kel and Mahlah Grey, the sixth generation of this family who have been milking at the farm since 1854. Twenty-five dairy cows are milked at the 70 hectare site and for the past 10 years the Greys have been adding value to their milk, bottling it and producing gelato and more recently also producing cheese and yogurt.

Solar photovoltaic array at The Pines



Pilot concept and results

The site is at the end of an electrical distribution line and is subject to unstable grid electricity supply and erratic voltage issues, which have led to costly damage to expensive equipment. To address these issues, The Pines installed a 60 kW solar photovoltaic and 60 kWh flow battery system to ensure uninterrupted operations and electricity supply to the site's production facilities and three cool rooms. Due to roof space limitations at the site, a ground mounted system was installed on the north facing side of the hill on which the dairy is situated. The farm's solar and battery storage system has been combined with a peer-to-peer (P2P) energy trading platform to sell and purchase excess solar electricity with other P2P users on the platform.

The total project cost was approximately \$270,000 and the benefits of the new energy system include:

- Reduced energy costs and emissions, while ensuring energy security
- Ability to reliably run equipment and coolrooms without blackouts and voltage issues interrupting operations, damaging equipment and resulting in loss of stock.
- Visibility of energy use, generation, storage and trading.
- The zinc bromine flow batteries provide energy security and have 100% depth of discharge range, are recyclable at end of life and do not present a fire hazard.
- The P2P trading system allows The Pines excess energy generation to be used by their retail outlet, The Pines Pantry, two kilometres away in Kiama village or sold to other P2P platform users.
- Alignment with Kel and Mahlah Grey's goal of producing organic, boutique and environmentally friendly products.

Mahlah Grey, describing the investment decision process said, "I must admit I was a little dubious at first about the investment, but then when we went through the feasibility process and actually worked out what we'd be investing and what we would be saving long term, and the added benefit of having a continuous supply of power through our processing and farming, it kind of very quickly became something that I couldn't imagine not doing."

Farmers Kel and Mahlah Grey



A short video about this project can be viewed at

<https://www.dpi.nsw.gov.au/dpi/climate/energy/clean-energy/on-farm-energy-pilot-projects>

Cheesemaking at The Pines



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