Department of Primary Industries

Climate Change Research Strategy - Energy Efficiency Solutions

Feasibility Case Study – The Pines Dairy, Kiama

The Pines is a micro dairy in Kiama where a study was conducted to assess the feasibility of generating energy on-farm using solar panels, flow batteries and peer to peer energy trading.

The NSW DPI Energy Efficiency Solutions project conducted feasibility studies to assess the technical and commercial feasibility of proposals that would address the cost, reliability and sustainability of energy use on farms. Proposals were sought through public advertisements and more direct engagement with associations and networks. An independent advisory group identified ten priority proposals through a merit selection process, then an independent expert assessor was matched to each priority proposal to undertake a detailed feasibility study. This case study summarises the context, proposal and results of The Pines Kiama feasibility study.

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 primary operations of the 70 hectare site is the

milking of 25 dairy cows, the milk of which is used to produce cheese, gelato, and bottled milk on site.

Proposal

The site is at the end of an electrical distribution line and is subject to unstable energy supply and erratic voltage issues. To address these issues, The Pines plans to install 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. The farm's solar and battery storage system will then be 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 site faces some unique issues as there are multiple small area sheds that would not generate enough electricity for a decent charge in the batteries. Instead, the best solution is a ground mount system on the north facing side of the hill on which the dairy is situated. In addition, an existing 10 kW solar PV system which is currently out of operation will be re-activated exclusively for residential farmhouse use.

Estimated costs and benefits

Project costs	$238,215
Operating cost savings	$25,575 p.a.
Energy use reduction	201 GJ p.a. (44%)
Emissions reduction	38 tCO_2e p.a. (54%)
Simple payback period	12.9 years

The proposed system aligns with the site's goals of producing organic, boutique and environmentally friendly products and is expected to generate the following benefits:

- Improved energy security due to battery backup powering crucial operations equipment during instances of blackouts.
- Creating an environmentally friendly product for a carbon conscious community.
- Reduction in food waste due to battery backup power maintaining cool room temperatures in instances of blackouts.

Acknowledgments

The Climate Change Research Strategy (CCRS) is an initiative of the NSW Department of Primary Industries (DPI), supported by an investment from the NSW Climate Change Fund. The Energy Efficiency Solutions project is one of seven CCRS projects. More information is available online here: https://www.dpi.nsw.gov.au/climate-and-emergencies/climate-change-research-strategy

The objective of the Energy Efficiency Solutions project is to help energy-intensive farms identify options to improve their energy efficiency and reduce costs. The project is led by NSW DPI, advised by a steering committee. NSW DPI contracted the Australian Alliance for Energy Productivity (A2EP) to provide management services for the conduct of ten feasibility studies. This case study summarises the findings of a detailed study that was undertaken by independent expert consultants, Northmore Gordon.

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