

Climate Change Research Strategy - Energy Efficiency Solutions

On-farm Energy Pilot Case Study – Pecora Dairy, Robertson

Pecora Dairy is a sheep dairy and boutique cheese producer located in Robertson, NSW. A NSW DPI Energy Efficiency Solutions pilot project at Pecora Dairy demonstrates an on-farm energy system including solar panels, zinc bromine flow batteries and peer to peer energy trading. In addition, the LPG boiler was replaced with an electric heat pump as part of the project.

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 Pecora Dairy pilot project.

Pecora Dairy



Context

Pecora Dairy is a small sheep dairy and boutique cheese producer near Robertson, NSW, with a cheese and wine bar located in Robertson village. It is owned by Cressida and Michael Cains. About ten tonnes of cheese is produced at the dairy each year from about 150 milking ewes. The business is committed to producing environmentally friendly and unique food products and in April 2019 Pecora Dairy was awarded the first raw cheese processor license from NSW Food Authority.

Pecora Dairy photovoltaic array (battery container bottom right of buildings)



Pilot concept and results

The cheesemaking process involves a lot of heating and cooling and therefore uses a lot of energy, and it is critical for food safety and product quality that the energy supply is continuous throughout the day and night. Prior to implementation of the project, Pecora Dairy suffered from energy supply issues such as frequent power outages that could last up to two or three days and sometimes LPG delivery trucks would not deliver the LPG required to produce hot water if the road leading into the farm was wet. To deal with these issues, and to secure a renewable source of energy, the Cains installed a 45 kW solar photovoltaic and 60 kWh flow battery system. Pecora Dairy'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, including their cheese and wine bar in Robertson village.

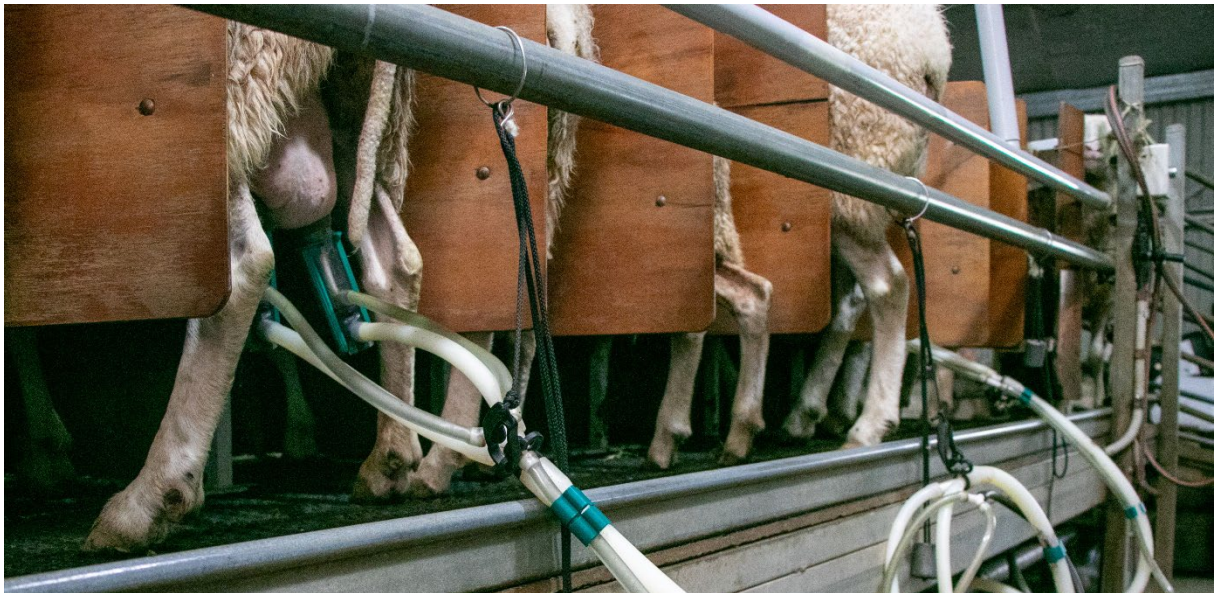
Pecora Dairy has also introduced measures to reduce energy consumption, such as a stronger focus on raw cheese production which does not require intense heating for pasteurisation. The site's LPG boiler has been retired and the site's heat requirements are now met by a new heat pump powered by the solar and battery system.

The total cost of the new energy system was approximately \$230,000. The primary benefits of the new system include:

- Power bills reduced to about a third of what they were previously and elimination of LPG costs.
- The zinc bromine flow batteries provide continuous power even when the sun is not shining and have 100% depth of discharge range, are recyclable at end of life and do not present a fire hazard.
- Reduced stress and food waste due to continuous power supply.
- Smaller carbon footprint from operations and improved ability to market sustainability credentials.
- Ability to offset power usage at the business's cheese and wine bar in town with electricity generated on the farm using the peer to peer trading platform.
- Ability to expand production with confidence there will be adequate energy supply without a significant increase in energy costs.

Cressida Cains, reflecting on the impact of the project said, "Our overarching philosophy at Pecora Dairy right from the beginning has been a gentleness on the land and sustainability. So for us now to be able to say hand on heart that we produce more energy than we use is a huge thing for us". She added, "It's just been completely life changing for our business".

Milking at Pecora Dairy



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>

Farmer Michael Cains and project manager Aidan Moore checking the battery system



Acknowledgments

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