

Climate Change Research Strategy - Energy Efficiency Solutions

## On-farm Energy Pilot Case Study – Farrer Memorial Agricultural High School, Calala

**Farrer Memorial Agricultural High School at Calala, near Tamworth, NSW has installed electric irrigation pumps and a raised single axis solar photovoltaics tracking system at the school's Farrer Farm. The project was conducted as 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 Farrer Memorial Agricultural High School pilot project.

### Farrer Memorial Agricultural High School



## Context

Established in 1939, Farrer Memorial Agricultural High School is a public agricultural secondary school catering for both boarding and day students. The Farrer campus is set on 191 hectares and is located at Calala on the outskirts of Tamworth.

Farrer Farm is part of Farrer Memorial Agricultural High School and assets include a 170 hectare farm, horticultural centre and piggery. Dairy cattle, sheep and an Angus cattle stud are run on the farm. The largest use of energy at Farrer Farm is for powering irrigation pumps to grow hay and silage.

## Operating the irrigation system on a phone app under the shade of the agrivoltaics



## Pilot concept and results

This project involved the electrification of irrigation pumps (diesel to electric) and the installation of a 60 kW raised single axis solar photovoltaic (PV) tracking system to power the irrigation pumps. The raised PV system allows farmland to be used for power generation while supporting agricultural production – a concept commonly referred to as agrivoltaics. The PV framework is structurally reinforced, allowing cattle to be co-located in the same paddock as the PV system.



The total cost of the project was approximately \$380,000 with a payback of about three years. The benefits of the project include:

- Significant reductions in energy costs and carbon emissions.
- The old diesel pumping system was quite old and inefficient, requiring manual labour for filling tanks, operational inspections, and both external and internal labour for maintenance of the diesel engines. Eliminating labour required for diesel pump maintenance has reduced labour costs and freed up farm staff time to work on higher value tasks such as irrigation optimisation, data analysis and teaching students how to optimise irrigation systems.
- Electrification of irrigation pumps has provided Farrer with greater control of their irrigation system through the AgSense irrigation management control system. This enables Farrer to optimise and potentially automate irrigation schedules to manage flow rates and increase water efficiency. The irrigation system is remotely controlled using a phone app.
- Deliveries of diesel are no longer required to be made to the irrigation pumps, avoiding compaction of the soil and the risk of weeds being brought in by tankers.
- Agrivoltaics allows multiple productive uses of land.
- The tracking system for the PV generates 24% more energy than an equivalently sized rooftop mounted system.
- The project has introduced students to new technologies and this knowledge is being disseminated into the wider community via the school and its students.

Andrew Eather, Farm Manager of Farrer, commented, “Not everyone wants to be the guinea pig, the first one up. But it's quite exciting in a way to try to lead the way and go, well, this is potentially the new future”.

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>

## Farrer students learning about the agrivoltaics and irrigation system



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