Department of Primary Industries

Climate Change Research Strategy - Energy Efficient Solutions

Feasibility Case Study – Ingham's Chicken Breeder Farm, Bargo

Ingham's has a chicken breeder farm in Bargo, NSW. A study was conducted to assess the feasibility of generating energy on-farm using solar panels.

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 Ingham's Chickens, Bargo feasibility study.

Context

Ingham's is the largest integrated poultry producer in Australasia, with 345 facilities and farms in operation across Australia and New Zealand. Ingham's specialise in growing chickens and turkeys for meat and have 25 poultry farms in New South Wales, and a turkey processing facility located in the township of Tahmoor. The business has ambitions to improve the sustainability of their operations by reducing energy consumption and emissions.

Ingham's has a chicken breeder farm in Bargo, NSW. The main electricity consumers on the farm are the extraction and ventilation fans inside the 16 chicken sheds. These fans are temperature controlled, so when the temperature increases more fans are turned on. It was found that the daily electrical load profile aligns well with daily solar incidence.

There is increasing uptake of solar photovoltaics (PV) at other poultry farms in the area as installing PV presents a good opportunity to reduce energy costs and carbon emissions. However, the Bargo farm does not currently have any solar PV panels installed.

Proposal

The opportunity to install ground mounted panels at Ingham's Chickens, Bargo was investigated in the feasibility study. Roof mounted panels were not found to be viable due to:

- Concerns over the limited weight-bearing capacity of the shed roofs.

- The east and west, not north, orientation of roofs, reducing panel performance.
- The sheds' location inside a biosecurity area with strict quarantine requirements. Therefore, installing and servicing solar panels inside this area would be a challenge.

After discussions with site staff, it was established that there is sufficient space outside of the quarantine area to install a ground-mounted solar array. Further, the land is flat, easy to access and near the main switch board. Below is the proposed location of the solar site.

Ingham's Chickens, Bargo

Two options with regard to size of the PV array were investigated:

1. ***Peak Demand***: 170 kW ground-mounted solar array to meet the average daily peak demand and minimise export to the grid.
2. ***Net Zero***: 700 kW ground-mounted solar array sized so the farm has net zero grid electricity use. During the day, excess electricity generated by the solar panels will be exported to the grid and at night electricity will be imported. Overall, electricity generated by the solar array will equal the total annual electricity consumption of the site of 1.07 GWh per year.

Estimated costs and benefits

	1. Peak Demand (170 kW)	2. Net Zero (700 kW)
Project cost excl GST	$350,000	$1.5 million
Net energy cost savings	10% p.a.	30% p.a.
Grid electricity reduction (% of total site energy use)	900 GJ p.a. (8%)	4,000 GJ p.a. (30%)
Emissions reduction	200 tCO2e p.a. (15%)	900 tCO2e p.a. (65%)
Simple payback period	>6 years	>9 years

Note, some solar PV providers offer Power Purchase Agreements as an alternative to upfront purchase, as assessed in this study, which may be more economically viable for some sites.

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, DETA Consulting.

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