Department of Primary Industries

Climate Change Research Strategy - Energy Efficiency Solutions

# Feasibility Case Study – Riverina Fresh, Wagga Wagga

**Wagga Wagga milk and dairy producer, Riverina Fresh, and four supplier dairy farms participated in a study to assess the feasibility of the dairy farms generating renewable energy on-farm with Riverina Fresh guaranteeing to purchase excess generation.**

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 Riverina Fresh feasibility study.

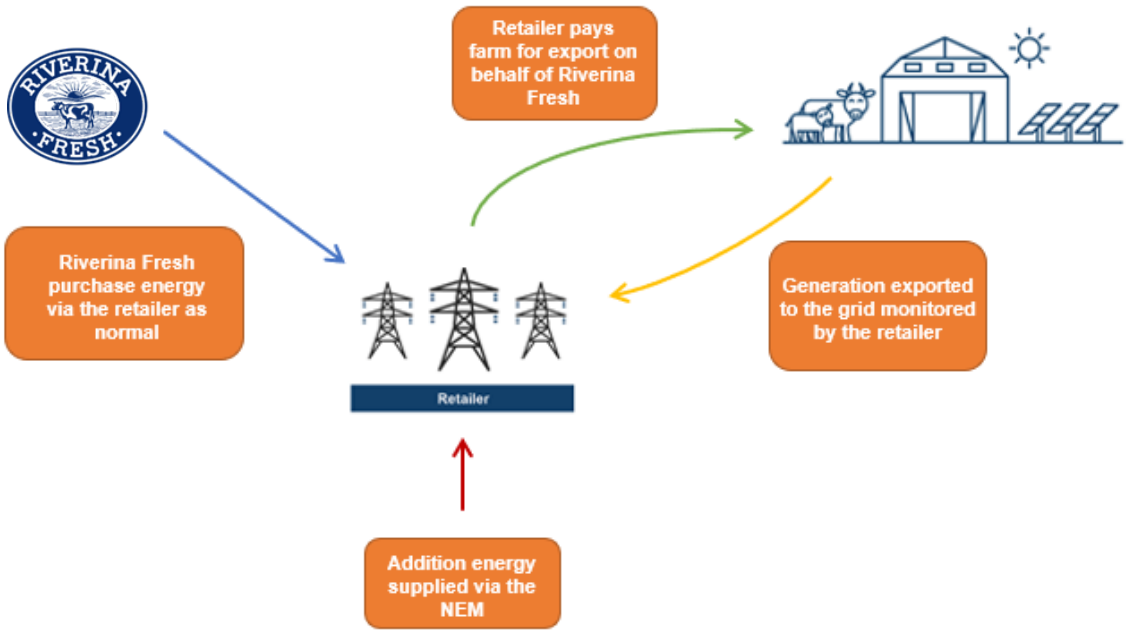
## Context

The proposed project involves a collaboration of five entities. The main proponent is Riverina Fresh, a 100% Australian-owned and independently operated award-winning milk and dairy producer based in Wagga Wagga, NSW. Four small-to-medium sized family owned dairy farms who have direct commercial arrangements with Riverina Fresh as milk suppliers are secondary proponents.

## Proposal

The proposed concept involves the deployment of on-farm renewable energy generation using solar photovoltaics (PV), with Riverina Fresh guaranteeing to purchase excess generation. Via a facilitating retailer, Riverina Fresh and participating supplier farms would enter into a peer-to-peer (P2P) energy trading arrangement, illustrated over. Riverina Fresh's guarantee to purchase excess generation aimed to improve the payback period of the on-farm solar PV, which historically has poor commercial viability within the diary sector due to the unique load profile of dairy farms (low demand in the middle of day when solar PV is generating at high levels).

## Overview of proposed concept and the role of a retailer




### Estimated costs and benefits

A summary of potential benefits for different sized solar PV systems is detailed below.

| | 25 kWp | 50 kWp | 75 kWp | 99 kWp |
|---|---|---|---|---|
| Capex | $30,000 | $57,000 | $82,000 | $100,000 |
| Simple payback period with export revenue | 8.9 | 8.0 | 7.5 | 7.1 |
| Simple payback period without export revenue | 19.3 | 32.2 | 41.6 | 47.7 |
| Annual electricity consumption saving (GJ) | 72 | 108 | 108 | 144 |
| Annual electricity cost saving | $2,000 | $3,000 | $4,000 | $4,000 |
| First year revenue from export | $1,355 | $4,106 | $7,072 | $10,023 |
| Annual electricity saving & export revenue | $3,355 | $7,106 | $11,072 | $14,023 |
| Annual carbon saving ($tCO_2e$) | 17 | 25 | 25 | 33 |

kWp is peak kilowatts i.e. the rate at which electricity is produced under ideal operating conditions

### Key findings

Although the proposed concept presents noteworthy theoretical benefits, it had poor payback periods and was found to be unviable for these particular proponents for a range of reasons including:

- Network constraints – the area network where the supplier dairy farms are located currently has zero capacity for exports from new generation.
- Commercial risks – the proposed concept is not attractive to a retailer and Riverina Fresh would likely have to contractually agree to purchase a fixed volume of export and farms guarantee a level of generation. It is noted receipt of revenue for solar exports significantly improves the payback periods of PV investments.

### Replication potential

This type of scheme could be feasible in other regions and situations if the following conditions were met:

| Success criteria | Description |
|---|---|
| No network constraints | Access to the distribution and transmission network is unrestricted. Preferably all proponents are on the same local network. |
| Sufficient on-site electrical infrastructure | Metering, distribution boards and cabling in good order and there is capacity to support solar PV. Additional costs for switchboard upgrades can be significant. |
| Available on-site physical infrastructure | Space and structural integrity to support the solar PV system. |
| Purchaser with high, stable demand profile | Large loads available during daylight hours of weekdays and weekends to match solar PV generation peak. A mixture of industrial, commercial and residential with different load profiles could help balance the overall system. |
| High export price | The export price must meet or better the cost of grid power for each participant. Also the price needs to include retailer commission, network review and possible network upgrade costs. |
| Tier 1 retailer to facilitate | Tier 1 retailer to meet the acceptance criteria for procurement around retail price and risk. |
| Large number of participants | Incentivises larger retailers to participate and minimises risk. Greater ability to share costs and to match loads and export power. |
| CAPEX incentives | Support for participants with up-front capital costs. |

**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, Energetics.

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