

# IRRIGATORS MOVE TOWARDS PROFIT AND SUSTAINABILITY

AMIDST RISING ENERGY GRID COSTS AND SQUEEZED PROFIT MARGINS, RESEARCH FINDS THAT CANE IRRIGATORS CAN INVEST IN RENEWABLE ENERGY TO GENERATE HIGHER RETURNS AND REDUCED EMISSIONS.  
BY ALYS MARSHALL

(Below) Janine Powell (AgEcon) speaking to Kallee Buchanan (ABC Rural, Wide Bay) at the Southern Region SRA grower research update earlier this year.



**A study conducted by AgEcon and supported by SRA and the Queensland Government aimed to find solutions to lower pumping costs and reduce environmental impact through the use of grid connected micro-grids - clusters of generators that are able to be operated as a single entity.**

"We focused this study on three different farms, all with different energy demands and irrigation application methods," said AgEcon research economist, Jon Welsh.

The case studies were situated in three different sugarcane farming locations and featured furrow irrigation, centre pivot and travelling gun systems.

The results of the three case studies found that the economic feasibility of renewable energy sources is subject to how often they are being used, referred to as "utilisation rates" either by an electric load or export back into the grid.

The study also indicates that seasonal loads with large periods of inactivity between use are only economically viable when the site qualifies for a Feed in Tariff (FiT).

"A Feed in Tariff is a payment to an energy producer – in this case a farmer – when sustainable energy is exported back to the national grid," said Mr Welsh.

"An example of this is the furrow irrigation case study, which uses both 15 kilowatt (kW) and 18kW pumps for furrow irrigation on a seasonal basis," says Janine Powell, research economist for AgEcon.

Optimisation software called HOMER was used to design a solution.

"By using this software, we were able to reduce the energy cost of this site by 26 percent with the use of a grid connected micro-grid comprising of 39kW solar photovoltaic and 30kW inverter while staying eligible for FiT. The investment has an estimated payback time of five years," Ms Powell continues.

"This site's high economic returns were a result of shifting irrigating from nights to days so half of the grid energy was offset by solar, a change in tariff and the FiT income stream.

"Gensets were considered as an alternate energy source for cloudy days, however as the price of diesel rises, it can be assumed that within a few years this will no longer be a cost-effective solution, so gensets were not included within the micro-grid."

For the two larger case study sites also with a sporadic, seasonal load, the micro-grid was restricted to a 30kW inverter to ensure the sites remained eligible for a FiT under Ergon's embedded generation connection policy.

AgEcon modelled the installation of a micro-grid including 39kW photovoltaic to supplement the national electricity grid, which resulted in only nine percent of the site's annual load being met by solar power.

This ensures that when pumps are not being used, outside the irrigation season, an income is still being generated by the solar. The micro-grids for these sites reduced the cost of electricity by 12 percent and 20 percent and had a payback period of 10 and nine years.

In comparison, a larger micro-grid designed to cover the site's whole electricity load resulted in the export limit of 30kW being exceeded and therefore no FiT, with economic returns being insufficient.

In all three case studies completed by the AgEcon research team, the economically optimal solution was a grid connected micro-grid including solar photovoltaics that remained eligible for FiT.

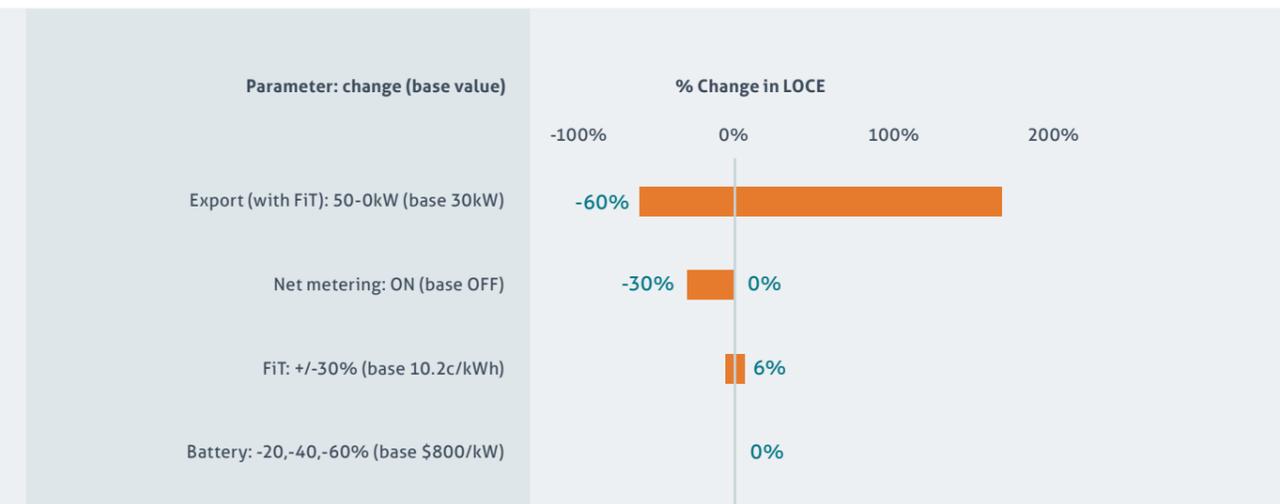
"As sustainability becomes an increasingly topical issue for the sugar industry, micro-grid technologies will be at the forefront in providing an alternative form of electricity to that of the national grid system," said Mr Welsh.

The carbon dioxide abatement for each site ranged between 1245 – 1314 tonne of carbon dioxide (equivalent) over the 25 year scenario.

Each site was restricted to 39kW photovoltaic, so there is potential for greater carbon abatement.

Ergon's evolving tariff structures, FiT and export policies are critical to a micro grid investment. Renewable energy is currently incentivised through participation in Federal Government policy called the Renewable Energy Target, which contributes to a micro-grid's ability to reduce on-farm energy costs. ■

More information can be found at [agecon.com.au](http://agecon.com.au)



The graph indicates the renewable investment is most sensitive to a change in the amount of energy that can be sold back to the grid. The quantity exported, rather than the price received, has the highest effect on the economic feasibility of the investment.