Solar water pump secures reliable water on grazing property

Problem

Windmill breakdowns on a cattle grazing property in Queensland's Maranoa district were threatening the water supply to 1000 head of stock.

Solution

A solar submersible pump was installed to replace the windmill network and ensure a more reliable water supply.

Implementation

The property northwest of Roma is a 5,500ha pastoral business and supports the breeding and fattening of 1000 Black Angus cattle.

The business is operated by two full time staff with casual staff employed when the cattle need to be mustered and yarded before being sent to market.

A reliable water supply is essential to production on the property with each head of stock needing about 60 litres of water per day.

There are five bores on the property which supply water to cattle troughs and dams.

One of the bores is connected to the electricity grid and operates on a 'Farm Time of Use' electricity tariff with the remaining bores relying on windmills to pump water.

When an old windmill broke down on the property in 2012, the decision was made to install a solar pump instead of replacing a system that was dependent upon regular wind power and therefore unreliable.

Above: The solar submersible pump in action

The bore on which the solar pump was installed is over 5kms from the nearest electricity grid line and the connection cost alone would have exceeded $50,000.

This cost saving, together with absence of ongoing electricity costs meant the installation of a solar bore pump provided an immediate return on investment for the property owners.

With 'On Farm' electricity tariffs being phased out in 2020, the cost of supplying electricity to the rural industry will also increase significantly.

This activity received funding from the Department of Resources, Energy and Tourism as part of the Energy Efficiency Information Grants Program.

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How it works

Water is pumped from the bore directly into a turkey's nest (dam) storage facility and gravity-fed into a cattle trough.

The pipeline from the bore can also be disconnected and attached to another pipe to bypass the turkey's nest when it reaches capacity and the water is fed directly into a lower dam 200 metres away.

The pumping rate varies according to the light level and the amount of dirt on the panels.

On the day of inspection at 10:30am in early May, 2013, there was little cloud cover and the solar panels were generating 0.25 kWh (1500 litres per hour) which was still sufficient to ensure enough to water was being pumped to maintain dam levels.

When the panels were cleaned this rate was improved to 0.30kWh (1796 litres).

This shows the importance of regularly cleaning the solar panels to ensure maximum pumping capability is maintained.

Technical Data

- The solar bore pump consists of a submersible pump and 2 x190w panels (0.38kWh).
- Bore depth: 38 metres with standing water at 25 metres and pumping from 35 metres.
- Pump rate: 2,275 litres (500gal)/hr at full capacity.
- Total system costs: $ 8,277 – (submersible pump $4,028; solar kit $4,249).
- Installation costs: $600.
- Miscellaneous parts (poly pipe, connections): $1000.

Left: Water is pumped into a turkey's nest
Below: The solar panels that power the pump

Outcome

The owners are so impressed with the performance of the solar pump they have now installed another solar pump on a second bore on the property.

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