



Information when you need it

ENERGY case study

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Energy-efficiency plan pays off for Gunnedah irrigator

GUNNEDAH farmer Scott Morgan has slashed the amount of money he spends on electricity used to irrigate cotton on his property, “Kensal Green”, by investing in solar and by reducing the amount of energy he uses to pump water for his crops.

In a program which started five years ago, Mr Morgan has installed a travelling irrigator fed by a two-kilometre pipeline which has eliminated the need for two lift pumps, replaced a fixed-speed pump with a variable-speed unit on one of his two bores, and installed a 9.6kW solar array.

“I initially began investigating ways to reduce my operating costs, and found myself focusing on the cost of pumping water,” Mr Morgan said. “My reliance on bore water, which requires a lot of energy to lift, is what eventually motivated me to explore ways to save energy.”

The installation of 160 solar panels next to one of the lift pumps provided Mr Morgan with a source of renewable energy for the pump, as well as an income stream from the feed-in tariff. “The success of these projects delivered further savings with regard to labour and repair and maintenance costs.” One of the challenges Mr Morgan faced initially was the complexity of the variable-speed drive on the electric bore.

“If you are considering installing a variable-speed



Gunnedah cotton grower Scott Morgan.

unit, you need to line up a competent local service agent before you make your purchase.”

“They are more complex than fixed-speed pumps for sure, and if you’re 400km from a servicing point, your downtime could be a number of days and that would be detrimental to a crop.”

Mr Morgan said the variable-speed pump has allowed him to slow the operating speed when peak delivery is not required during the growing season, and that has saved on energy costs.

While Mr Morgan is a qualified electrician, he said anyone can determine the peak efficiency of a variable-speed pump by reading the flow rate and input power displays. “While the set-speed submersible ran at 2900rpm, the inverter on the variable-speed pump has meant I can run it at 2700rpm, which has reduced its power usage by 10 per cent.”

“It’s one of those areas where you could be wasting money on power and not realising it.”

Mr Morgan bought bronze pumps to attach to the 75kW submersible electric motors because they were likely to provide a longer service life, and he said they have halved the number of times they have had to be lifted out for repair. The complete units weigh approximately 250kg and hang 50m below the pump head on a high-strength lay-flat pipe which can be towed out by a tractor in less than an hour.

The purchase of a travelling irrigator three years ago has also added efficiency to energy use on “Kensal Green”, and enabled Mr Morgan to water 170 hectares – more than half the farm’s cotton area – last year. “With the water we saved, we were able to irrigate durum wheat.”

“I generate 10kW of electricity with 160 solar panels, and all that energy is exported at the feed-in tariff of 60c/kW hour which has given us a good return...”



Scott Morgan with his 160-panel solar array which generates 9.6kW of power. On sunny summer days, it is capable of producing 70kW hours per day of energy, and averages 40kW per day for the year.

“Kensal Green” covers 730 hectares and relies predominantly on bore water to irrigate 300 hectares of cotton per year.

Mr Morgan said his reduction in net energy outlays has come from pumping water more efficiently, and from the sale of solar power to the grid. “Just one season on from installing the 10kW array of solar panels, I had saved a substantial amount of money on my electricity.”

Mr Morgan said one of the solar array’s greatest attributes is its absence of moving parts – a rarity in agriculture – which means it requires virtually no maintenance. “And if there’s one thing Gunnedah has in abundance, it’s sunlight, and that’s one reason

why installing solar panels made economic sense.”

“I generate 10kW of electricity with 160 solar panels, and all that energy is exported at the feed-in tariff of 60c/kW hour which has given us a good return on our investment,” Mr Morgan said.

He said growers who are considering installing solar PV generation to reduce their pumping costs should aim to use as much of the generated solar energy as possible in order to make the project a viable option. “I doubt it would provide a short payback period on the investment for irrigators that only used their pumps for three months of the year”.

Mr Morgan has an off-farm business where he designs and installs solar PV systems, and his dream

is to take the family homestead “off the grid” by 2020.

Presently the capital cost of energy storage is approximately \$3000/kW hour, and Mr Morgan estimates he would need battery capacity for 20kW hours – a \$60,000 spend on current pricing – before he could disconnect. However, Mr Morgan said he expected a dramatic reduction of this cost over the next five years which would make solar energy storage a financially viable for farmers, even without feed-in tariffs.

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