Energy Savers Plus Program

targets significant energy savings for a

Queensland cotton farm

IMPLEMENTED SOLUTION

Actual energy savings 15%

Key facts

Farm / Industry

Cotton

Location

Cecil Plains

Irrigation

Flood

Pumps

Submersible

Solution

Implemented:
Pump upgrade

Site profile

The farm located in southern Queensland produces cotton utilising flood irrigation from an on-site irrigation dam. A bore pump was assessed that is used for irrigating 144 Ha of the farm and to replenish the irrigation dam as required.

Irrigation occurs between September and February with a combination of water from the storage dam and operation of the bore.

Current energy demand

The existing pump was a line shaft bore pump direct driven using a 30kW electric motor.

Action

An audit of pump energy consumption evaluated:

- Pump upgrade
- Solar PV implementation

Results

Of the opportunities evaluated, two options for energy saving initiatives were identified for upgrade of the existing pump and motor or installation of a solar PV system to offset pump energy consumption.

The energy audit report identified an option to upgrade the existing 30kW bore pump to select a pump that was most efficient for the pumping task as the 30kW pump was considered oversized for the required duty. The selection process included consideration of required flow rates, total dynamic head and static lift over varying bore water levels.

A new 15kW turbine pump was installed, which resulted in increased flow rate enabling irrigation to be completed with reduced pumping time as well as reduced electricity demand. Measurement and verification of the new pump installation identified that energy consumption would be reduced by approximately 20% over the irrigation season. Cost savings are associated with the reduced energy consumption as well as reduced demand tariff charges due to the smaller motor.

The audit report also identified an option to install a 25kW solar PV system to operate the pump off-grid and thereby achieve energy savings. This would require operating the pump during daylight hours only which would mean it would be suitable for moving water to the storage dam, but the pump would not be available to pump if needed at night, or below capacity on cloudy days. Using the pump for around 140 days per year means the solar PV would have a lower utilisation and lengthen the payback period. The farmer has not implemented this action at this time.

The Energy Savers Plus Program is funded by the Queensland Department of Energy and Water Supply

QFF

ERGON ENERGY NETWORK

Queensland Government

Outcomes

The pumping system efficiency has been significantly improved:

	Old Pump	New Pump	Improvement
	35kW	15kW	20kW
Water Pumping Capacity	2.6ML/day	3.7ML/day	1.1ML/day
kWh/ML/m head	7.41	4.28	43%
Combined Efficiency	**36.8%**	**66.7%**	29.9%

Energy savings

A summary of the energy savings achieved is as follows:

Solution	Pump Modification (Implemented)	Solar PV Installation (Not Implemented)
Est. energy savings (kWh/annum)	4,120	32,148
Est. operating cost saving	$2,619	$6,544
Est. cost to implement	$20,697*	$32,500
Payback period (years)	9.5	5.0
Est. demand reduction (kW)	8.5	**22.1**
Est. energy savings	**20%**	**100%**

** cost excludes general maintenance works to bore casing amounting to $11,200 completed along with pump upgrade.*

Forecast savings in operating costs	Existing System	Upgraded System	Reduction in Operating Costs
Annual operating cost	$4,250	$1,631	-
Cost to implement	–	$25,000	–
Total energy costs for 10 years	**$42,500**	**$41,310**	**$1,190**

Farmer feedback

Reduced energy consumption and reduced pumping hours are now delivering cost savings to the farm.

Case studies

To see how other agriculture businesses are saving energy and costs, go to **www.qff.org.au/energysavers**