

Energy Savers Plus Program

targets significant energy savings for a Queensland aquaculture farm

IMPLEMENTED SOLUTION 

Actual energy savings 

Key facts

Farm / Industry

Aquaculture

Product

Tiger prawns

Location

Gold Coast

Pumps

Motor drive pump

Solution

Implemented:

Installed variable speed drives and power factor correction equipment

Business profile

Gold Coast Tiger Prawns (GCTP), based in the rural locality of Woongoolba in the northern Gold Coast region, is one of Australia's largest black tiger prawn farming operations with an annual production capacity of around 1,000 tonnes.

Current energy usage

Electricity use is dominated by a large number of motors ranging in size from 0.37kW up to 55kW. These motors drive pumps for transferring water, paddle wheels to aerate the ponds and conveyor belts in the processing and sorting factory.

Action

Early in 2015, GCTP discovered that network electricity tariffs were going to change to include a kVA demand charge. This demand charge would increase the cost of electricity for the operation. GCTP engaged Energy Correction Options to review its electricity costs.

Two areas were identified with potential for savings:

- installation of variable speed drive (VSD) motors
- installing power factor correction (PFC) equipment.

Results

Investigations revealed the power factor (PF) across various electricity grid connection points at maximum demand was dropping to near 0.8. The general requirement is for PF to be 0.9 or better. Capacitor banks totalling 775kVAR were installed at seven locations where high voltage power was distributed and stepped down for use across the property. The PFC panels were fitted with visible external alarms to alert farm operators if the units tripped and went into bypass mode so a service call could be arranged.

GCTP also upgraded a number of motors with VSDs, focusing on those motors with variable flow requirements. The largest VSDs were installed on the 55kW harvesting pumps which extract water and prawns from ponds for processing. The VSDs allowed the pumps to maintain a constant water level in the collection drains without the need for

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Photo courtesy GCTP

stopping and starting which causes wear and tear on motors. PF was improved at maximum demand to up to 0.98. This resulted in a reduction of up to 340kVA or approximately 20% of total kVA, and delivered electricity cost savings of up to \$3,400 per month in demand charges.

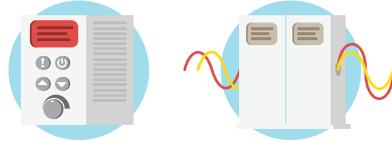
A number of much smaller VSDs were also installed in motors attached to conveyor belts in the processing plant. These motors ranged in size from 0.37kW up to 1.5kW. The VSDs allowed the belt speed to be adjusted during sorting and inspection according to the volume of

prawns being processed at the time. The slow start up experienced with VSDs also reduced belt strain. By upgrading their motors with VSDs, GCTP improved the performance of their operation, reduced wear and tear on their equipment, and delivered electricity cost savings.



Energy savings

A summary of the energy savings achieved is as follows:

Solution	 Installing variable speed pumps and power factor correction equipment		
Electricity cost saving per month	\$3,400		
Improvements in PFC across electricity grid connection points			
Electricity grid connection	1	2	3
Capacitor banks installed (kVAr)	625	75	75
Maximum demand reduction (kVA)	271	34	35
Previous PF at maximum demand	0.82	0.89	0.84
New PF at maximum demand	0.97	0.98	0.98
Maximum demand reduction	19%*	19%	21%

*Energy savings shown are from an independent auditor's measurement and verification report conducted in 2015.

Business feedback

GCTP recognised the energy savings and financial benefits made possible by switching to variable speed pumps and installing power factor correction equipment and made the decision to implement energy efficient systems.