

Energy Savers Plus Program

targets significant energy savings for
Southern Queensland piggeries

PROPOSED SOLUTION 

Potential energy savings

20%

Key facts

Farm / Industry

Piggeries

Product

Pork

Location

Southern Queensland

Case Study Focus

Heating Systems

Solutions

Replace heat lamps with electric heat mats

Site profiles

Energy audits were completed for several piggeries in Southern Queensland where electric heat lamps or heat mats are used on farrowing crates for temperature control.

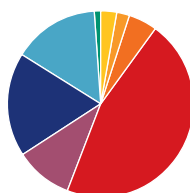
A farrowing crate is an enclosure in which a sow farrows (gives birth) and then remains with her litter and it is designed to protect piglets from being crushed by the sow. New piglets are allowed temperatures of 38°C and this is gradually decreased to 30°C over three weeks.

Heating for young pigs and sows accounts for between 36% and 61% of total energy consumption across sites audited.

Energy Use Breakdown

Typical Site Energy Consumption Breakdown

Lighting: 3%
Cooling: 2%
Feeding: 5%
Heating: 46%
Pumping: 10%
Ventilation: 18%
Effluent System: 15%
Other (including amenities and refrigeration): 1%



Total: 484 MWh p.a.

Post implementation heating would be reduced to 433 MWh p.a.

Heating electricity consumption at the piggeries currently consists of:

- Heat lamps (typically 175W each)
- Heat mats (ranging between 80W and 280W each)

Action

Audits of site energy consumption recommended a number of energy conservation measures for the piggeries including:

- Replacement of heat lamps with new heat mats (payback periods between 4 and 5.3 years)
- Shed lighting upgrade (payback periods between 2 and 4.4 years)
- Installing Solar PV power systems (payback periods between 3.7 and 6.6 years)

- Other quick-wins such as “Switch off” signs to remind staff to turn off fans and lights in empty sheds, fan belt tensioning, tariff reviews and energy monitoring.
- Suggestions with longer payback periods such as roof insulation and retrofitting energy efficient fans.

This case study will focus on replacement of heat lamps with heat mats.

Results

Some farrowing crates at the piggeries have been upgraded to utilise heat mats, but many farrowing crates still utilise heat lamps. A typical arrangement is to use one heat lamp to provide heating for the piglets with an additional heat lamp used during farrowing to dry off piglets and encourage them to move away from the sow.

There are savings available by upgrading to electric heat mats of either fibreglass-reinforced composite or medical grade plastic. Heated mats have many advantages over heat lamps, including:

- Lower power consumption
- More even heat distribution
- No unwanted heating of the sow

An example opportunity at one site involved replacement of a 175W heat lamp in each farrowing crate with a 140W heat mat.

In some cases it may be possible for two adjacent farrowing crates to utilise a double 280W heat mat, which would reduce the overall capital cost of the upgrade.

One site is also trialling smaller 80W heat mats. If this is found to be effective on their site, the opportunity to upgrade to heat mats would be even more attractive.

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



Recommendations

The energy audit recommendations are summarised below:

Solution



Upgrade to electric heat mats

Site	Site A	Site B	Site C
Est. energy savings (kWh/annum)	24,835	86,724	43,506
Est. operating cost saving	\$4,863	\$6,952	\$9,239
Est. cost to implement	\$23,011	\$31,617	\$48,935
Payback period (years)	4.0	4.5	5.3
Est. demand reduction (kW)	3.8	4	8.2
Est. energy savings (% of site heating consumption)	8%	39%	15%

Forecast savings in production costs

	Site A	Site B	Site C
Baseline Electricity consumption (kWh / sow)	278.4	433.5	272.4
Electricity savings (kWh / sow)	12.4	86.7	25.6
Electricity consumption following implementation (kWh / sow)	266.0	346.8	246.8

Note that Site B energy consumption is higher than other sites largely because it includes an on-site feed mill which is a high energy user.



Case studies

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