PigGas Report 48 – 2,200 sow, farrow to finish, conventional and deep litter, multisite piggery, Vic.

December 2014

Production details

This is a large family owned conventional and deep litter piggery on two sites. Most of the pigs are housed in conventional naturally ventilated sheds, with weaners and lactating sows in mechanically ventilated sheds. Some gilts are housed in straw-based deep litter sheds. One third of the grower pigs are transported to a remote grow-out site for finishing to sale weight in conventional flushed sheds. Finisher pigs from both sites are sold into domestic markets at a range of weights, averaging 89 kg live weight.

Feed consumption

50% of the cereal grains (wheat and barley) used in feed rations are grown on-site. All feedstuffs are milled and mixed on-site into dry rations for the different classes of pigs. Total feed consumed by all pigs is 10,570 t/yr.

Sales/Tranfers

39,772 pigs/yr are sold with a total dressed weight of 2,897 t/yr.

Waste management systems

On site 1, the conventional sheds have a combination of automatic drain flushing and underfloor pit storage (pull plug) systems. Effluent is regularly flushed and drained from the conventional sheds to a large collection sump. Grit and course solids are then separated from the effluent prior to thickening by dissolved air flotation (DAF). Effluent from the DAF is recycled to flush the sheds. The thickened solids from the DAF are fed into a two stage engineered anaerobic digester. Effluent from the digester flows to a series of four treatment/storage ponds. The deep litter gilt sheds are filled to about 300 mm depth with cereal straw which absorbs manure.

The National PigGas Extension Project is funded by Ian Kruger Consulting, the Australian Government and Australian Pork Limited.

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On site 2, effluent is flushed from conventional grower sheds to an anaerobic pond treatment /storage system

Manure reuse systems

Effluent from the pond system on both sites is irrigated. On site 1, effluent is irrigated to wheat, barley and canola crops and pasture grazed by sheep. Also, the spent litter solids removed from the gilt sheds at the end of each batch are composted and spread on cropping land each year. Sludge solids from the digester is composted and mixed into bulk and bagged garden and potting mix products for sale off-site. Biogas from the digester is scrubbed and then combusted in a 200 kW genset to produce most of the site electricity during the day and feeds electricity into the grid at night. Some of the waste heat from the genset is used to heat water for underfloor heating of the weaner pigs.

On site 2, pond effluent is irrigated to pasture grazed by sheep.

The total area of land used for cropping and grazing on both sites is approximately 1,230 hectares.

On-Farm Baseline Emissions

The current baseline emissions for this piggery total **3,674 tonnes CO_2-e/yr** with an emissions intensity of **1.27 kg CO_2-e/kg HSCW**.

On-Farm Emissions Reduction Scenario

Historically, the owners have reduced the on-farm emissions from **11,693 tonnes CO_2-e/yr** to the current baseline of **3,674 tonnes CO_2-e/yr (69% reduction)** by installing the engineered digester system with electricity and heat cogeneration.

To further reduce emissions, the scenario modelled was to:

(a) reduce feed wastage in the weaners, growers and finishers (10% to 5%), and;

(b) use remaining waste heat from the genset to heat water for underfloor heating of suckers in the farrowing shed.

This scenario (see table below) reduced on-farm emissions **from 3,674 t/yr to 2,782 t/yr** and reduced kg CO_2-e/kg HSCW **from 1.27 to 0.96 (24% reduction)**.

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Annual Greenhouse Gas Emissions Profile (calculated using PigGas)

Emissions	Current Emissions Baseline	Reduction Scenario ($kg\ CO_2$-e/yr)
Pre-farm		
Grain	2,642,526	2,558,704
Milling & delivery	0	0
Pig freight	0	0
Straw & bedding	2,340	2,340
Total Pre-farm	***2,644,866***	***2,561,044***
On-farm		
Fuels & energy		
Purchased electricity	444,834	172,100
Fuel - stationary	143,782	143,782
Fuel - transport	109,275	109,275
Enteric CH_4	374,9213	374,913
Manure management		
MMS CH_4	2,469,331	1,894,313
MMS – direct N_2O	115,702	111,186
MMS – Atmos. deposition N_2O	57,804	53,053
Waste applied to soil		
Soil – direct N_2O	434,650	407,583
Soil – leaching & runoff N_2O	125,179	117,384
Offsets	-601,370	-601,370
Total On-farm	***3,674,100***	***2,782,218***
Post-farm		
Pig freight	66,081	66,081
Meat processing	1.158,916	1.158,916
Exported manure	301,683	284,550
Total Post-farm	***1,526,679***	***1,509,547***
Dressed weight sold - HSCW (kg/yr)	**2,897,290**	**2,897,290**
Carbon footprint	**($kg\ CO_2$-e / kg HSCW)**	**($kg\ CO_2$-e / kg HSCW)**
Pre-farm	0.91	0.88
On-farm	**1.27**	**0.96**
Post-farm	0.53	0.52
Total	**2.71**	**2.37**

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