

Summary of 55 PigGas Reports

National PigGas Extension Project, May 2015

PigGas Report No	Piggery Description	On-Farm Baseline Emissions		Reduction Scenario Emissions		Proposed Mitigation	
		t CO ₂ -e/y	kg CO ₂ -e/kg HSCW	t CO ₂ -e/y	kg CO ₂ -e/kg HSCW	%	Description

Conventional farrowing only

4	2,112 sow conventional breeder piggery NSW	548	1.47	450	1.2	18%	Has installed pond cover and combined heat and power generation. Reduce feed wastage of pigs by 5%.
22	660 farrow to weaner conventional piggery Qld	1,162	16.68	404	5.79	65%	Cover anaerobic pond, capture and flare biogas if economical.
40	1,800 sow breeder only conventional piggery Qld	1,813	7.73	424	1.59	77%	New covered anaerobic pond, capture biogas and generate electricity to replace all purchased electricity at site.
41	2,000 sow breeder only conventional piggery Qld	2,580	8.53	700	2.31	73%	New covered anaerobic pond, capture biogas and generate electricity to replace 50% of purchased electricity at site.
51	350 sow breeder only conventional and deep litter piggery WA	473	8.95	374	7.08	21%	Convert a further 30% of conventional dry sow housing to deep litter.

Conventional farrow to weaner

39	675 sow farrow to weaner conventional piggery Qld	2,211	5.99	2,006	5.44	9%	Install 100 kW solar panel array to offset all electricity used on site.
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Conventional farrow to pork

52	285 sow farrow to pork conventional piggery NSW	1,880	6.37	301	1.02	84%	Replace anaerobic pond treatment system with daily spreading of effluent.
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Conventional grow-out only

9	18,925 pig wean to finish conventional grow-out piggery NSW	764	0.28	512	0.19	33%	Has installed pond cover and combined heat and power generation. Reduce feed wastage of pigs by 5%.
11	4,000 pig conventional grow-finish piggery Qld	3,510	5.04	738	1.06	79%	Install screw press solids separator before pond. Cover anaerobic pond to capture and reuse methane for 100% replacement of site energy.
18	28,000 pig wean to finish conventional piggery Vic.	5801	1.23	3,927	0.83	32%	Emissions are low due to existing covered pond (6 years old) with methane flaring. Owners are now planning to install electricity generation and use biogas to directly heat weaners, replacing LPG used on-site.
26	12,000 pig finisher unit, conventional piggery Qld	7,976	3.92	1,993	0.98	75%	Cover primary anaerobic pond and flare biogas.
34	5,990 pig grow-out unit conventional piggery Qld	5,706	5.32	1,177	1.1	79%	Cover anaerobic pond and flare biogas and reduce feed wastage by 5%.

Conventional farrow to finish

1	850 sow farrow to finish conventional piggery NSW	5,193	3.85	1,532	1.14	70%	Sell 100% pond sludge and spent ecoshed solids off-site. Cover settling ponds, capture and flare biogas.
2	2,115 sow farrow to finish conventional piggery NSW	2,220	1.6	1,753	1.27	21%	Has installed pond cover, biogas capture and electricity generation. Reduce feed wastage by 5%. Improved electricity generation as pond activity improves. Collect waste heat from gensets to heat small pigs and replace LPG.
3	1,100 sow farrow to finish conventional piggery Qld	9,676	5.1	2,171	1.14	78%	Cover anaerobic pond to capture and reuse methane for 75% replacement of site energy.
5	200 sow farrow to finish conventional piggery NSW	1,072	3.32	369	1.15	66%	Convert conventional flushed grower pigs to straw-based accommodation. Cover pond, capture and flare biogas. Both options are mainly for odour control.

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6	1,043 sow farrow to finish conventional piggery NSW	2,068	1.12	1,689	0.92	18%	Has installed pond cover, biogas capture and electricity generation. Reduce feed wastage by 5%. Account for excess electricity sales to grid as offsets. Collect waste heat from genset to heat small pigs and replace LPG.
7	4,300 sow farrow to finish conventional piggery NSW	7,692	1.55	4,503	0.91	41%	Has installed pond cover and biogas flaring. Add combined heat and power generation to replace site electricity, feed excess into grid and replace site LPG heating.
10	660 sow farrow to finish conventional piggery Qld	6,617	5.03	1,458	1.11	78%	Cover anaerobic pond to capture and reuse methane for 75% replacement of site energy.
12	540 sow farrow to finish conventional piggery Qld	3,510	5.82	723	1.2	79%	Cover anaerobic pond, capture and burn biogas to generate all of the site's electricity used which includes feed milling and electric bar heating of sucker and weaner pigs.
13	600 sow farrow to finish conventional piggery Vic	3,889	4.18	995	1.07	74%	Stop separating solids from effluent. Cover anaerobic pond and capture biogas methane. Generate electricity to replace all site electricity used. Capture waste heat from genset engine and use to heat water to replace LPG used in heating weaner pigs.
16	1,950 sow farrow to finish multi-site conventional piggery Vic.	16,598	4.93	3,121	0.93	81%	3 anaerobic ponds were recently covered to capture and combust biogas to reduce site odour and to generate energy. Still in the establishment phase, only one flare has been installed on one pond. The intention is to generate electricity and heat, replacing all site electricity and LPG usage and feed an extra 15% power back to the grid.
19	1,200 sow farrow to finish conventional multi-site piggery WA	9,025	3.85	7,069	3.02	22%	Cover anaerobic pond at breeder site only and capture and burn biogas in a boiler to heat water for underfloor heating of suckers in the farrowing shed.
21	2,976 sow farrow to finish and weaner production conventional piggery Qld	12,086	5.02	2,388	0.99	80%	Cover anaerobic pond, capture biogas and burn to generate electricity for site use and capture engine heat to replace LPG used in underfloor water heating of suckers.
24	110 sow farrow to finish conventional piggery Tas	636	5.14	544	4.4	14%	Reduce feed wastage by 5% for dry sows, gilts, weaners, growers and finishers. Install electricity supply to replace 85% of liquid fuels and all LPG used on-site.
31	520 sow farrow to finish conventional piggery SA	3,163	3.32	2,253	2.36	29%	Cover anaerobic pond at breeder site only and capture and burn methane to replace LPG used for heating.

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35	2,200 sow farrow to finish conventional piggery, NSW	13,405	4.11	3,150	0.97	76%	Engineered digester, capture biogas, generate electricity and capture waste engine heat to replace all site electricity and LPG usage.
37	1,675 sow farrow to finish multisite conventional piggery Qld	12,090	3.95	4,305	1.41	64%	Cover pond and capture biogas to generate electricity and heat to replace all purchased electricity and LPG.
43	44 sow farrow to finish conventional piggery WA	280	8.02	250	6.06	24%	Reduce feed wastage of pigs by 5%. Increase pig production and sales by 20%. Install 9kW solar panel array to offset all site electricity used.
49	525 sow farrow to finish conventional piggery Vic	2,486	2.7	1,317	0.71	74%	Double pig numbers on site. Cover anaerobic pond and capture biogas methane . Combust biogas in gas engine driven genset to generate electricity to replace all purchased electricity on-site. Capture waste heat from genset engine to replace LPG used to heat suckers and weaners.
53	180 sow farrow to finish conventional piggery NSW	1,285	4.12	1,165	3.74	9%	Reduce feed wastage of grower and finisher pigs by 5%. Install screw press separator to remove solids from the sow shed effluent prior to pond treatment and sell solids off-site.

Conventional & deep litter grow-out only

8	7,883 pig wean to finish deep litter and conventional grow-out piggery NSW	5,858	3.69	4,873	3.07	17%	Reduce feed wastage of pigs by 5%.
42	2,160 pig wean to finish conventional and deep litter grow-out piggery Qld	1,273	3.3	253	0.66	80%	Reduce feed wastage of all pigs by 5%. Sell (export) 80% of spent litter solids to neighbours as fertiliser. Install covered anaerobic pond, generate electricity and capture and reuse waste engine heat to replace all purchased electricity and LPG.

Conventional & deep litter farrow to finish

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14	530 sow farrow to finish conventional and deep litter piggery Vic	903	1.28	901	1.27	0.2 %	There are few options for this very efficient piggery with daily effluent spreading. Purchase new feeders for weaners and growers and reduce feed wastage in lactating sows, weaners and growers to 5%.
15	370 sow farrow to finish conventional and deep litter piggery NSW	1,456	2.99	991	2.02	32%	Recently installed solar panels reduced on-site electricity use by 20 %. Construct a new deep litter shed for finisher pigs removing manure from the anaerobic pond treatment system. Daily spread 50% of remaining effluent to cropping land with vacuum tanker removing manure from the anaerobic pond treatment system.
17	480 sow farrow to finish conventional and deep litter piggery Vic.	2,457	2.8	735	0.84	70%	Planning is underway to construct an engineered biodigester off-site. All piggery effluent and spent litter solids will be exported to the digester and combined with district dairy and municipal wastes to produce electricity and heat in another enterprise. No on-farm energy offsets were modelled.
20	412 sow farrow to finish conventional and deep litter piggery WA	1,659	2.3	831	1.15	50%	Cover anaerobic pond, capture and flare biogas if economical.
23	160 sow farrow to finish conventional and deep litter piggery Tas	638	2.71	594	2.52	7%	Convert conventional dry sow housing to straw-based deep litter housing for 50% of dry sows.
28	205 sow farrow to finish conventional and deep litter piggery SA	718	2.18	966 (increase)	2.15 (decrease)	1%	Piggery expanding from 205 to 280 sows. To help offset emissions increases, have installed 11kW solar power generation. Also, plan to regularly desludge anaerobic pond and spread and remove sludge off-site by tanker, reducing on-site land application of nitrogen by 20%.
29	740 sow farrow to finish conventional and deep litter piggery SA	2,133	1.91	1,302	0.78	59%	Increase solar power generation from 5kW to 50kW to offset electricity use on-site. Cover anaerobic pond on breeding site and flare biogas to reduce odour nuisance.
30	420 sow farrow to finish conventional and deep litter piggery SA	1,147	2.53	876	1.94	23%	Cover anaerobic pond at breeding site and flare biogas to reduce odour nuisance.
32	576 sow farrow to finish conventional and deep litter piggery SA	1,058	1.16	757	0.83	28%	Export remaining 85% of deep litter solids off-site and export all separated solids and dried pond sludge.

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33	6,880 sow farrow to finish conventional and deep litter multisite piggery WA	40,798	3.79	23,589	2.19	42%	Cover anaerobic pond at grow-out site to capture and reuse methane for electricity generation for use at that site and one of the breeding sites.
36	350 sow farrow to finish multisite conventional and deep litter piggery Qld	2,838	3.72	2,329	3.05	18%	Reduce feed wastage of all growing pigs by 5%. Sell (export) deep litter solids to neighbours as fertiliser.
38	460 sow farrow to finish multisite conventional and deep litter piggery Qld	3,058	3.73	3,058	3.73	0%	No feasible changes identified for this piggery due to separately owned contract grower sites.
44	1,250 sow farrow to finish conventional and deep litter piggery SA	7,895	3.48	1,953	0.86	75%	Reduce feed wastage of all growing pigs by 5%. Cover the anaerobic pond and capture and reuse biogas methane for on-site electricity replacement.
45	1,840 sow farrow to finish conventional and deep litter piggery SA	10,810	3.79	3,871	1.36	64%	Cover anaerobic ponds on breeder site and one grower site which houses 40% of all growing pigs. Pipe biogas 1.2 km from the grower site to the breeder site. Combust combined biogas in a genset to produce electricity to replace all breeder site electricity. Burn excess biogas directly in piglet gas heaters on the breeder site to replace all LPG used.
46	524 sow farrow to finish conventional and deep litter piggery SA	3,323	3.69	2,881	3.2	13%	Reduce feed wastage in growers, finishers and gilts by 5%.
47	600 sow farrow to finish conventional and deep litter piggery Vic	3,230	4.92	1,009	1.54	69%	Reduce feed wastage in the dry sows, growers and finishers by 5%. Install covered anaerobic pond, capture and burn methane in a genset to replace all purchased electricity on-site.
48	2,200 sow farrow to finish conventional and deep litter piggery Vic	3,674	1.27	2,782	0.96	24%	Reduce feed wastage in weaners, growers and finishers by 5%. Use remaining heat from existing engineered digester genset to heat water for underfloor heating of suckers.
50	500 sow farrow to grower conventional and deep litter piggery Vic	2,214	2.25	1,934	1.97	12%	Construct deep litter housing for 38% of dry sows currently in conventional sheds, Install additional 30 kW solar panel array to offset purchased electricity.
54	1,288 sow farrow to finish conventional and deep litter piggery NSW	5,370	4.55	1,395	1.18	74%	Construct new covered anaerobic pond to capture biogas and burn it in a genset to generate electricity, replacing all electricity currently used on-site.

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55	1,145 sow farrow to finish multisite conventional and deep litter piggery NSW	7,065	3.63	4,202	2.16	41%	Construct new covered anaerobic pond at Site 1 only (breeders plus 33% weaners, growers and finishers) to capture biogas and burn it in a genset to generate electricity to replace Site 1 electricity usage.
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Outdoor farrow, deep litter grow out

25	450 sow farrow to finish deep litter piggery Tas	1,064	1.65	1,064	1.65	0%	Very low baseline emissions. No viable options available on this site to reduce emissions.
27	2,050 sow outdoor bred, wean to finish on deep litter, multi-site piggery WA	2,427	1.21	2,342	1.15	5%	Increase piglets weaned and pig production by 2% and reduce feed wastage in growers and finishers by 5%.

On-farm GHG emissions reduction results of all 55 piggeries (24% Australian production)

Piggery Type (No)	Total emissions (t CO ₂ -e/y)		Av. emissions intensity (kg CO ₂ -e/kg HSCW)	
	Baseline	Reduction	Baseline	Reduction scenario
Farrowing only – conventional (5)	6,576	4,224	8.7	3.6
Farrow to weaner – conventional (1)	2,211	205	6.0	5.4
Farrow to pork – conventional (1)	1,880	1,579	6.4	1.0
Farrow to finish – conventional (19)	112,991	72,236	4.0	1.8
Grow out – conventional & deep litter (2)	7,131	2,005	3.5	1.9
Grow out – conventional (5)	23,757	15,410	3.2	0.8
Farrow to finish – conventional & deep litter (20)	102,444	45,488	2.9	1.8
Farrow to finish – outdoor farrowing & deep litter growing(2)	3,491	85	1.4	1.4
Total / Average	Total 260,481	Total 141,232	Average 3.9	Average 1.9