

## **Anaerobic digestion of farm manure**

Some dairies use anaerobic digestion to process liquid manure from storage ponds. Puget's study says:

Based on typical collection systems, a study by the EPA assumes that one cow will generate 2.5kWh/day and one pig will generate 0.25kWh/day. Given size constraints, it is likely only dairy farms with more than 500 head of cattle or 2,000 head of swine will install a generator. (Cadmus 2009, Volume 1, 66)

According to a 2011 study by the Washington Department of Agriculture (Drennan), a typical cow creates 27 tons of manure a year, and in 2011, there were six dairy digesters in the state, producing up to 1,450 kW of electricity by using the manure from about 11,000 cows and added pre-consumer organic waste of various kinds to enrich their feedstock and increase their gas production. (That's about .13 kW of capacity per cow, or 3.12 kWh/day, about 25% above the EPA's assumption.)

In 2012, the County had five farms with 500 or more cattle (4,525 dairy cows on four farms, and less than 850 beef cattle on the other). If it were economically feasible to build and operate an anaerobic digester on each of these farms, the manure from those 5,375 animals might produce up to 708 kW of electricity. If they operated at maximum capacity all the time, their additional annual output would be .71 annual megawatts, roughly the equivalent of the actual output from 1,486 local 4kW solar arrays, or a tenth of our share by population of Puget's estimate for the technical potential of added production from anaerobic digestion. (They might well also require subsidies to be economically feasible, although their economics might be improved by cleaning and compressing the gas for use in transportation rather than in a combined heat and power plant.) (Nicholas Kennedy)

There are no large farms with hogs or pigs in the County; there are three farms with over 100,000 chickens each, but I assume that even that many chickens do not produce enough manure to support a digester. (Animal Services estimates that there are 50,000 dogs in Thurston County, producing approximately 11 tons of waste per day, and the Thurston Conservation District commissioned a study of the feasibility of installing an anaerobic digester for the dog waste at the Hawk's Prairie Off-Leash Area. (Christy) However, all of the dog waste in the entire County weighs about what the manure from 149 cows does, so it's not a significant potential source of power, either.)

Cadmus 2009 – The Cadmus Group. *Comprehensive Assessment of Demand-Side Resource Potentials (2010–2029)*. July 2009. (Appendix L – “Demand Side Analysis,” of Puget Sound Energy's 2009 Integrated Resource Plan. July 30, 2009.)

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[http://www.pacshell.org/pdf/PSI\\_TCCD\\_FeasibilityStudy.pdf](http://www.pacshell.org/pdf/PSI_TCCD_FeasibilityStudy.pdf)

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Nicholas Kennedy – Kennedy, Nicholas. “Economics Of Dairy Digesters In Washington State.” *BioCycle*, November 2013, Vol. 54, No. 11, p. 36.

<http://www.biocycle.net/2013/11/18/economics-of-dairy-digesters-in-washington-state/>