

Solrød biogas



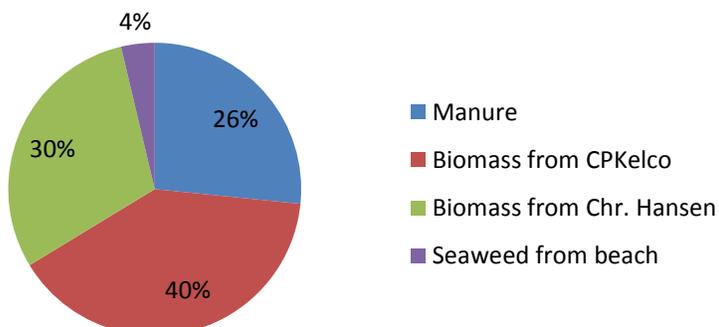
Solrød Biogas A/S was founded May 2014. The public-private development process involved the city council, Solrød Municipality, the local energy supplier, private feedstock suppliers and researchers from Roskilde University.

Vision

Solrød Biogas is driven by the vision of implementing CO₂ neutral energy solutions, while solving important climate and environmental challenges in Solrød Municipality.

The idea emerged from the need to find a sustainable solution to the community's odor problem, caused by seaweed fouling the beach of Køge Bay. Simultaneously, the Solrød Municipality also wished to take concrete action concerning climate change by producing green energy. As local industries also had challenges finding beneficial outlets for their wastes and by-products, they became involved in the projects plans.

Biomass feedstocks



Start of operation:

2015

Capacity:

200,000 t/year

Type of digestion:

Continuously stirred tank reactor (CSTR). Two step thermophilic.

Retention time

28 days

Drymatter content (DM)

10 % in average input

Distance to suppliers of manure: 0 – 25 km

Biogas Production:

6 mio. Nm³ CH₄ /year (30 m³/t)

Utilization of gas:

Electricity: 23 GWh/year to grid
Heat: 28 GWh/year for district heating

Utilization of digestate:

190,000 tonnes of digestate are spread as fertilizer on crop land 0 – 40 km away

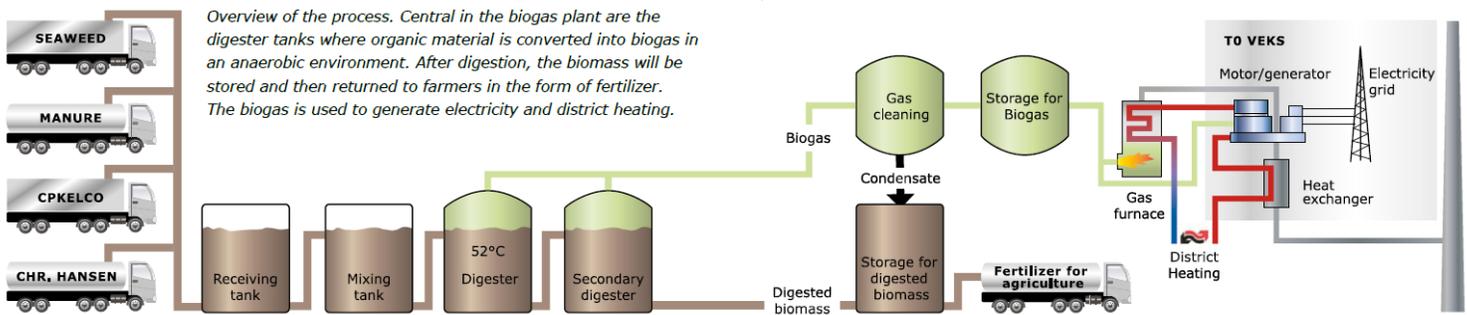
Permanent jobs created: 14

Investment biogas plant:

USD 14 mio. exclusive CHP

O&M costs/year:

USD 3.7 mio. /year



Production and gas use

The plant uses by-products from the pectin and carrageenan production at CP Kelco, biomass residues from the bioscience company Chr. Hansen, liquid manure from pig and cattle farms and seaweed from Køge Bay. The plant receives about 25 trucks with biomass per day.

The biogas is used for CHP generation in a large gas engine. The power is sold to the grid and the heat is supplied to the local district heating system which is operated by Vestegnens Kraftvarmeselskab I/S and owned by 12 municipalities as stakeholders. The energy production of the biogas plant and the anticipated savings of CO₂e contribute to achieving Solrød Municipality's ambitious climate target of reducing the municipality's greenhouse gases by 55 percent by 2025.

Benefits

In addition to the renewable energy production the estimated benefits of the production is reduced CO₂e emissions, lower costs of waste transport and production of digestate as biofertilizer for farmers.

Environmental benefits include reduced leaching of N to aquatic environment by 62 tonnes /year, which is 70% of the requirement for Køge Bay and, reduced leaching of P the aquatic environment by 9 tonnes, which is 100% of the requirement for Køge Bay. Additional benefits are reduced odor nuisance from the beach/seaweed and improved sea water quality and higher recreational value of the maritime coastal area.



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Specification sheet

1. Sources of information:

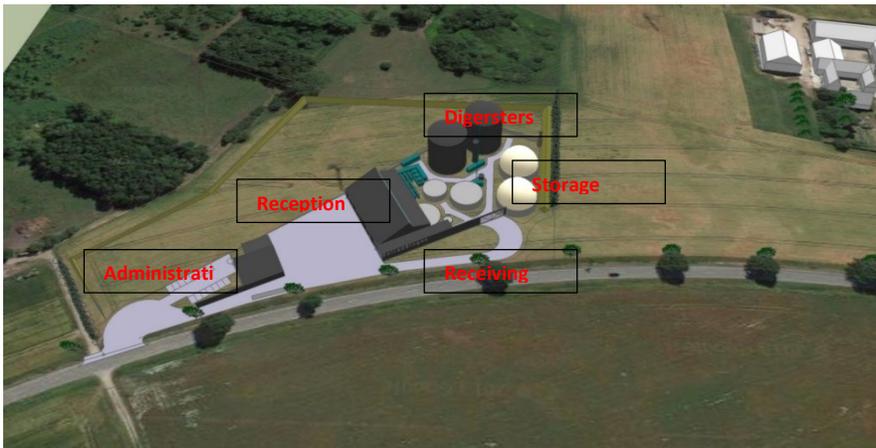
www.solrodbiogas.dk

<http://www.ieabioenergy.com/publications/solrod-biogas-towards-a-circular-economy/>

https://solrodbiogas.dk/wp-content/uploads/2016/10/8.-Rapport-om-Solr%C3%B8d-Biogas_uk.pdf

2. Specify investment costs, what is included?

Biogas plant as illustrated inclusive 2 tanks, 2 digesters, gas cleaning, 2 storage tanks for gas and digested biomass, two biological odor treatment systems, heat exchangers and several mechanic pretreatment units. Besides a large building for administration, meetings and visitors. The CHP – plant and external storage tanks are not included.



Investment	USD exclusive of VAT
Purchase of land	0.4 mio.
Road construction, terrain, embankment, fence, plants and trees	1.3 mio.
Buildings	2.5 mio.
Receiving and storage tanks	0.9 mio.
Digersters	3.1 mio.
Pipes, exchangers, etc.	1.0 mio.
Power and SRO (Supervisory Control And Data Acquisition, SCADA)	0.9 mio.
Other/sundry expenses (including counseling etc.)	1.5 mio.
Unforeseen	0.6 mio.
Project development	1.6 mio.
Total sum	14.1 mio.

3. Specify O & M costs, what is included?

	Specification	Estimated total costs USD/year
Operation	Including personnel, maintenance of equipment etc.	0.8 mio.
Other operational costs	Including electricity (2000 MWh) for stirring etc.	0.5 mio.
Heat	Self-supplying from biogas	-
Administration	Including personnel, insurance, financial audit, counseling etc.	0.4 mio.
Transport - feedstock	Between 6-25 km. Primary feedstock (pectin) derives from CP Kelco 6 km away (using main roads).	0.5 mio.
Transport – digestate	To farmers 5-40 km away.	1.4 mio.
Compensation to farmers	Rental of storage tanks etc.	0.1 mio.
Total		3.7 mio.

1 USD = 6.37 DKK

Not included is O&M of CHP-Plant.

4. Value of gas

The value of produced biogas from Danish biogas plants is highly dependent on current subsidy, gas utilisation and actual commercial agreement in each individual case. The highest value is obtained if gas is used for combined heat and electricity production, or if the gas is exported to the natural gas grid. The net value of the gas will in these cases typically be around USD 0.6 /m³ methane. Net value is defined as income from energy sales minus costs of gas cleaning and conversion processes. Due to competition from other renewable energy sources, the value is expected to decrease somewhat in the future.

5. Who has supplied and approved the data?

Mikkel Busck, Teknik og Miljø
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2680 Solrød Strand

6. Which years do the data cover?

2015/2017