

Country Report Sweden

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Biogas Plant Inventory

Anaerobic digestion plants (2012)

Substrate/Plant type	Number of plants	Production (GWh/year)
Sewage sludge	135	660 (+20)
Biowaste	21 (+2)	507 (+90)
Agriculture	26 (+7)	47 (+30)
Industrial	5	121
Landfills	55	254 (-20)
Sum	242 (+9)	1 589 (+120)

Biogas Plant Inventory Substrates (2012)

Substrate	Tonne wet weight
Sewage sludge	5 982 878
Biowaste	244 850
Manure	453 657
Food industry	280 750
Slaughter house waste	110 508
Energy crops	21 870

Biogas Plant Inventory

Biological recycling (2012)

- 60% of all municipalities in Sweden collect source separated food waste
- 90 kg food waste per person each year
- 245 000 tonnes anaerobic digestion
124 000 tonnes composted
303 000 tonnes garden waste composted
- Source: Swedish waste management

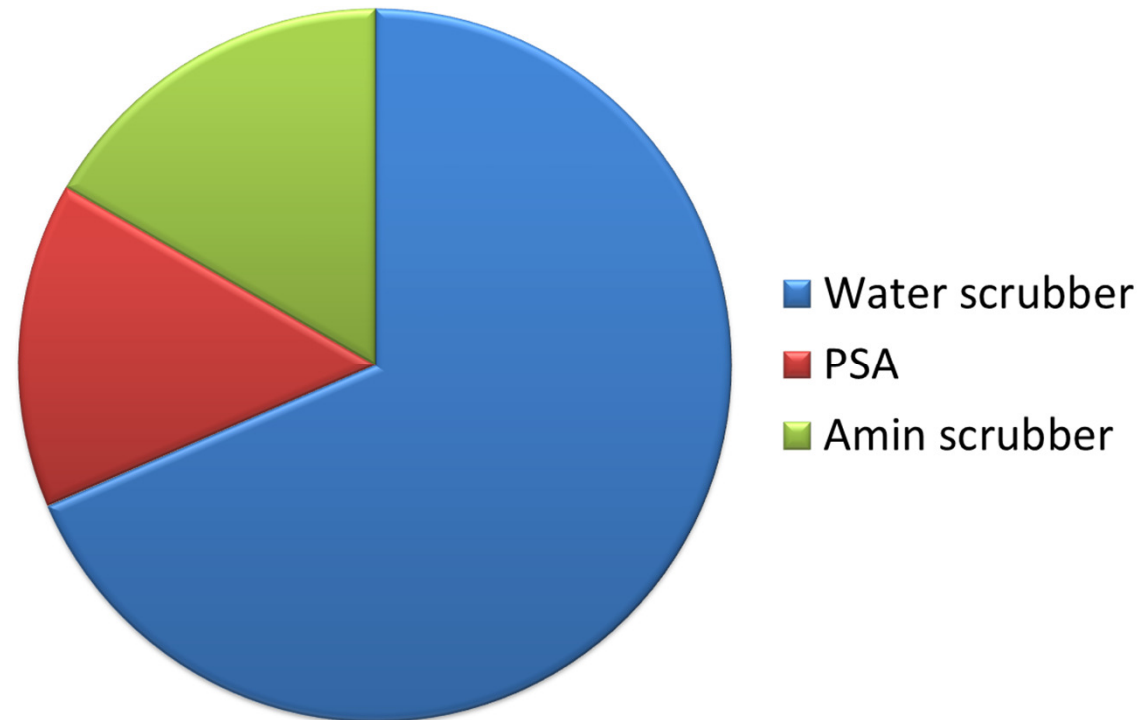


Biogas Plant Inventory

Upgrading plants (2012)

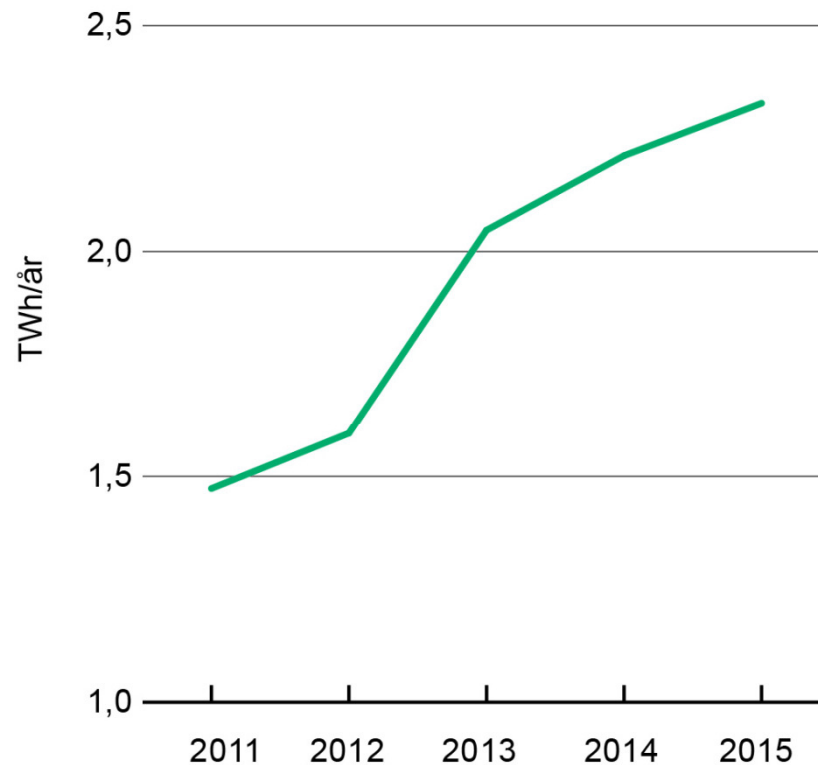
Number of biogas upgrading plants: 54 (11 with injection into the grid)
Raw gas capacity: 28 000 Nm³/h

The first membrane unit is being built



Biogas Plant Inventory -Trends

**Expected development of
biogas production in Sweden,
including gasification**



Källa: Energigas Sverige

Biogas Plant Inventory

Utilisation of the annual production of 1.6 TWh

Utilisation type	GWh	%
Electricity	41	3%
Heat	524	33% (-5)
Upgraded to vehicle fuel	845	53% (+3)
Flare	165	10% (+2)

Production of LBG: 14 GWh

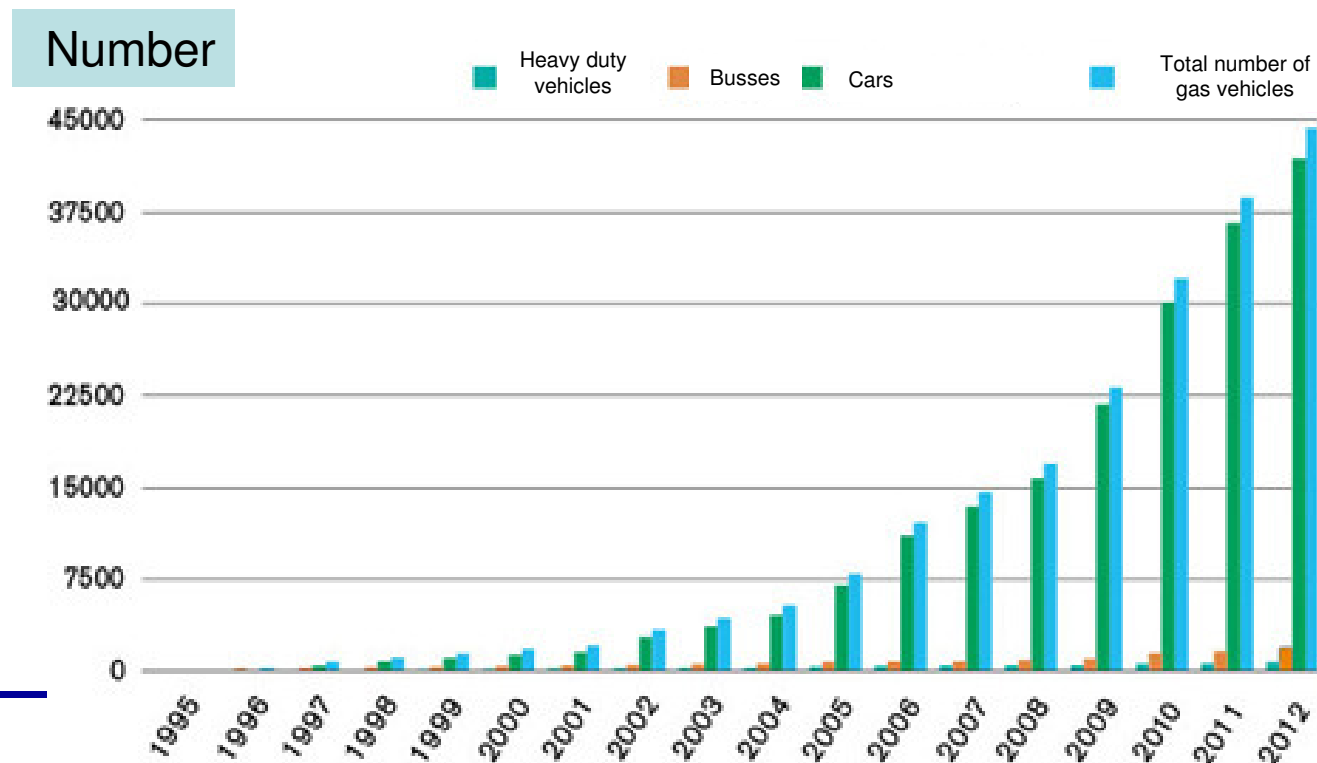
Biogas Plant Inventory

Utilisation of digestate

Plant type	Usage as fertiliser
Sewage sludge	24%
Biowaste	99%
Agriculture	100%

Biogas as a vehicle fuel

- *44 000 gas vehicles
(1800 buses, 600 heavy duty vehicles)*
- *60% biomethane in the biogas*
- *138 public and 57 non-public filling stations*
- *A few filling stations for LBG/LNG also exists*



Financial support systems

The support system in Sweden is mainly focused on increasing the usage of biomethane as vehicle fuel. The existing support systems are:

- No carbon dioxide or energy tax on biogas. Today this corresponds to a value of 68 € / MWh compared to petrol and 52 € / MWh compared to diesel of which 26 € / MWh is from the carbon dioxide relief and the remaining part is from the energy tax relief.
- 40% reduction of income tax for use of company NGVs until 2017
- Investment grants for marketing of new technologies and new solutions for biogas during 2013-2016. Maximum 45% or 25 MSEK (~3 M€) of investment cost
- A joint electricity certificate market between Norway and Sweden. The producers get one certificate for every MWh electricity produced from renewable resources and electricity consumers must buy certificates in relation to their total use. Average price 2012 around 17-22€ / MWh
- 0,2 SEK/kWh (~€ 0,02 / kWh) for manure based biogas production to reduce methane emissions from manure. Total budget 240 MSEK (10 years)

A new biogas plant

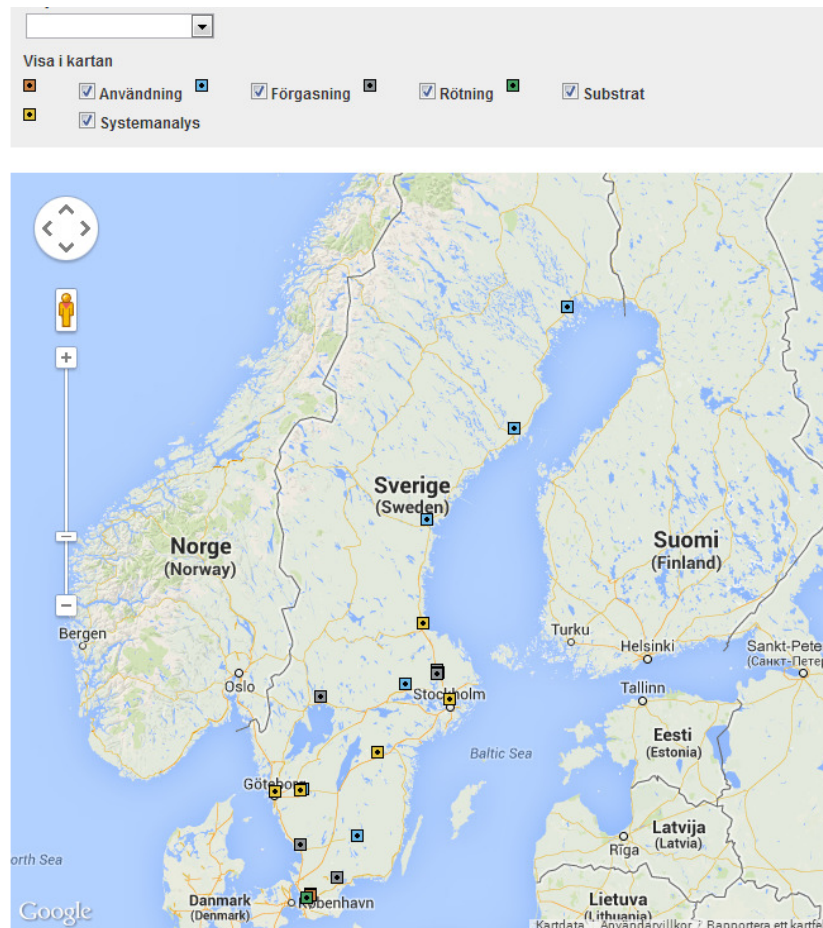
Jordberga biogas plant – under construction

The largest biogas plant in Sweden is under construction
11,7 M Nm³/year biomethane
Substrate: energy crops



Picture: Swedish biogas

Presentation of Swedish Green Gas research centres on www.biogasportalen.se



Sammanfattning

BRC

Biogas Research Center (BRC) är ett kompetenscentrum för biogasforskning som finansieras av Energimyndigheten, LiU och ett antal externa organisationer. Verksamheten bedrivs genom att sammanföra biogasrelaterad kompetens från olika områden för att skapa interaktion på flera olika plan – mellan näringsliv, akademi och samhälle, mellan olika perspektiv, mellan olika discipliner och kompetensområden. Några av de deltagande avdelningar presenteras nedan.

Avdelningen Energisystem, Institutionen för ekonomisk och industriell utveckling

Inom Avdelningen Energisystem vid Institutionen för ekonomisk och industriell utveckling analyseras energitillförsel och energianvändning ur ett systemperspektiv med målet att utforma hållbara energisystem. Ett pågående doktorandprojektet handlar om samverkan mellan energi- och transportsystem, med fokus på användning av förnybara drivmedel i vägtransporter. Fokus ligger främst på biogas och el, och på dessa drivmedels utsläpp av växthusgaser. Detta studeras ur olika systemperspektiv.

Tema Teknik och social förändring

Tema Teknik och social förändring (Tema T) vid Linköpings universitet

Notera att flera forskningscentra ibland ligger på samma lärosäte. Zooma in ännu mer eller välj färre antal typer av kategorier bland symbolerna ovan.