Biomethane in Sweden – market overview & policies

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Preface

The aim of this document is to give an overview of the Swedish biomethane/biogas market by describing the latest statistics of use and production of biogas & biomethane, production potential estimates, cost estimates as well as policies and drivers for biogas & biomethane in Sweden. We also briefly describe how the green gas concept and the sustainability criteria scheme is working and possibilities for cross border trade.
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Energy gases in Sweden

In Sweden only about 3% of the total energy supply of 606 TWh is energy gases, which is rather low compared to many other countries in EU (Figure 1). Of the total energy use (377 TWh) about 3% is energy gases, mainly used in industry.

The use of energy gases 2019 is 18.6 TWh of which approx. 80% fossil gases (14.7 TWh Natural gas, LPG and LNG) and about 20% biogas/biomethane (3.9 TWh). Biogas and LNG use has increased, and natural gas use has decreased over the last 10 years (Figure 2). Most of the biogas is upgraded and used in the transport sector.

Figure 1 Total energy supply and deliveries of energy gases in Sweden 2019. Source: Swedish Energy Agency and Swedish Gas Association.

Figure 2 Use of energy gases in Sweden 2006-2019 (TWh per year). Gasol = LPG. orange line = total. Source: Swedish Energy Agency and Swedish Gas Association.
The share of renewable energy in transport was 23% of in total 91 TWh in 2018. The recent years’ large increase of biofuel use is mainly due to a rapid increase of HVO at the Swedish market since 2011. The total use of methane in transportation (CNG/CBG) is about 1.5 TWh or 1.8% share of total energy use in transport sector. The average biomethane share in the methane mixture in transportation was 94% in 2019.¹

Natural gas is mainly used in heavy and small industry (80%), as shown in Figure 3.

**Figure 3** Distribution of natural gas use in Sweden 2019. Source: SCB.

**Production and use of biogas/biomethane**

There were 280 biogas plants producing in total 2 044 GWh of biogas 2018, which is almost the same as 2017. Most of the biogas is produced from different types of biowaste and residues in co-digestion plants (47%) and from sewage sludge in 138 wastewater treatment plants (35%) as shown in Figure 4.

**Figure 4** Number of biogas plants and share of biogas production for different plant types in Sweden 2018. Source: Swedish Energy Agency/Swedish Gas Association.

The use of biomethane for transportation has increased rapidly over the last 10 years, whereas the use for heating has decreased. In 2018 63 % of the produced biogas was upgraded to biomethane of which 87 % was used as transportation fuel (Figure 5).

![Figure 5 Use of produced biogas in Sweden 2018. Source: Swedish Energy Agency/Swedish Gas Association.](image)

There were 69 biomethane upgrading units producing about 1.25 TWh biomethane 2018. About 0.5 TWh of this is injected to the south-western gas grid (connected to the European gas grid) and in the Stockholm gas grid, the rest is used locally or trucked to filling stations. There are in total 14 injection sites.

There is also one LBG plant producing 44 GWh LBG 2018 (part of the 1.25 TWh biomethane produced). One new LBG-plant will start producing during 2019 and another during 2020. More LBG plants are planned.

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2 Note that this is part of the total biogas production 2044 GWh of which 63% is upgraded in 69 upgrading units.
Biogas and biomethane is mainly produced by various organic wastes and residues, such as sewage sludge, organic household waste (food waste), manure, waste from food industries and slaughterhouses (Figure 7).

Figure 6 Map of biogas plants and biomethane upgrading units in Sweden 2019. Source: https://www.energigas.se/fakta-om-gas/biogas/karta-biogasanlaeggningar/

Figure 7 Share of substrates (raw materials) for biogas produced in Sweden, calculated from the amount of used substrates (ton wet material), thus not properly considering actual gas yield conversion factors.
Total use of biomethane and biogas including imports

The biogas export is still very small. The import of biogas through the gas grid has increased rapidly since 2015 to about 0.2 TWh 2016, 0.8 TWh 2017 and 1.65 TWh 2018. About 2/3 of the import is from Denmark. About 1/3 of the import is used for transport and 2/3 mainly substituting natural gas in industry and heating. The import seems to increase further during 2019, but at a slower pace.

The total biogas use in Sweden 2018 including imports is estimated to 3.7 TWh of which 2.9 TWh is biomethane. The total biogas use has increased with 29 % from 2017 and with 90 % compared to 2015 (Figure 8).

The biomethane market in Sweden

The Swedish biomethane market is to a large extent off-grid with several small local and regional grids or stand-alone biogas gas plants and filling stations. A large part of the biomethane in Sweden is transported on the road as compressed gas (200/260 bars) and to a very small but increasing extent as liquefied gas (LBG). Local and regional gas grids gain more attention aimed to connect industries, cities and biomethane production plants with a LNG-terminal at the coast.

The gas pipeline infrastructure is limited to the south-western part of Sweden where the transmission network is connected to European gas network via exit Dragörr (connection with Denmark). There is also a regional gas network in Stockholm, fuelled with locally injected biogas and shipped LNG. See Figure 9.
Most of the biogas (63%) is upgraded and used for road transport due to favourable support system. The market for methane as transportation fuel is now rather developed in Sweden but is highly dependent on increased policy incentives and long-term support systems to take the next step. The use of methane in transport increased rapidly up to 2014 to have stabilized at around 1.5-1.6 TWh the last years (Figure 10). The biomethane share has however continued to increase and was 94% 2018.
The number of gas filling stations has increased from less than 20 in year 2000 to about 195 stations end of 2019, plus 60 non-public stations. The number of gas vehicles development has during the same period increased from just a few hundred to in total 53 982 in the end of 2019. 2 618 of these were buses (about 18 % of all buses) and 1 034 trucks (incl. approx. 140 LNG trucks) and the rest passenger cars and other light vehicles (Figure 11).
Increased biomethane import presses Swedish producers but open up for increased biomethane market

As mentioned above most of the biogas in Sweden is upgraded and used for transport. The interest and use in industry have however increased the last years and is expected to increase further. The last years’ increasing imports of biomethane, i.e. subsidised biomethane mainly from Denmark, has pressed down the biomethane price and thus more competitive with natural gas in sectors where tax exemption is not very effective, such as industry.

At the same time, as long contracts are renegotiated or new customers are to be contracted, the Swedish biomethane producers and suppliers now are facing a margin pricing that often do not cover the production costs. The situation is due to different support regimes in Sweden compared to other countries. In Sweden incentives are so far focused on the use of biomethane (of which the most important is the tax exemption), but in other member states often focused on production or injection. This means that imported biomethane can be double subsidised. 2017 the imports from Denmark was 0,8 TWh, which during 2018 increased to about 1,7 TWh.
The difficult competition situation for Swedish biomethane production made the government to grant a temporary production support for biomethane (except from sewage sludge and landfill) for production during 2019 of total 270 MSEK, or 0.26 SEK per kWh (=0.02 Euro/kWh). In September 2019 the government announced another 100 MSEK to extend the temporary support into 2020.

Long-term energy and climate policy

New climate act sets long-term ambitious GHG targets for 2030 and 2045

Ambitious energy and climate goals push for increased renewable energy, especially in transport. The government 2020 goals for renewables are already reached by far: 50 % of the total energy utilisation and 10 % goal in transports.

More important are the climate law and the ambitious long term climate and energy goals that were adopted by parliament in 2017:

- Climate neutral energy sector 2045 of which at least 85 % GHG emission reduction in Sweden. From 2045 negative emissions.
- 100 % renewable electricity production 2040 (agreement between 5 of 8 parties in parliament)
- 63 % GHG emission reduction in non EU ETS sector in 2030 and 75 % 2040 compared to 1990
- 70 % GHG emission reduction in domestic transport (excl. aviation) 2030 compared to 2010
- There is also a vision to have a fossil free transportation sector by 2050.

There is still no overall government strategy for meeting these goals, but a number of important steps and policies have been implemented or are being investigated in addition to the existing high CO₂ tax on fossil fuels and the green electricity certificate system as main drivers. As stated in the climate law a climate policy council will analyse the current climate policy and make recommendations. The climate policy council presented their first report early 2019. The government is also committed to present a climate policy plan every 4 years. The first will be presented late 2019.

Roadmaps and visions in the gas industry

There is so far no official strategy or goals for biomethane or energy gases in Sweden. However, the Swedish biogas industry 2018 launched a proposal for a National Biogas Strategy with a specific target of 15 TWh biomethane/biogas use in 2030, of which 12 TWh in the transport sector and 3 TWh in industry. Most of this biomethane should be produced in Sweden, with a production goal of 7 TWh biogas digestion from various organic waste and residues that should be realised in a first step. The long-term potential is well above 20 TWh biomethane, but includes more agrobiomass, gasification of forest residues and other production routes such as Power-to-methane. The biogas strategy was updated in 2018, with the aim that the government will implement a National Biogas Strategy and adopt the proposed policies and measures. Since then the Government has appointed a broad biogas market investigation which will present their report in December 2019. See below.

The Swedish Gas Association is preparing a roadmap on how to achieve fossil free energy gases by 2050, within the governmental initiative Fossil Free Sweden. It will replace the current gas industry’s vision “Green gas 2050” which includes the following goals:

- 50 TWh renewable gas production by 2050 and 100 % renewable gas in the national grid
• Climate neutral industry with gas
• Fossil-free land transportation with gas by 2030
• Cleaner shipping with gas
• Fossil-free heat and electricity with gas

**Regulatory framework, support systems and drivers for biomethane market**

In Sweden general fiscal incentives in terms of high CO₂ and energy tax on fossil fuels and tax exemption for renewables has been the main driver for decarbonising since the 1990-ties and is still the main driver for biomethane. Since the taxes are highest in the transportation sector, most of the biomethane has been used for road transport, but also to some extent for heating. In other sectors, such as industry with high natural gas use, the tax advantage for renewables are generally much lower. It is only during the last 2-3 years that the biomethane demand in industry has risen dramatically due to subsidised imported biogas which has been rather competitive with natural gas.

The biomethane production has increased steadily since 2005 mainly driven by investments by municipalities and regions in biomethane driven public transport (busses) and new biogas plants with upgrading for recycling of organic household waste (co-digestion plants). Biogas production has occurred for several decades in many sewage plants but since 2005 the share with biomethane upgrading has increased. There have been a number of investment support programmes that has facilitated this development. In the recent years a large part of new production is run by private companies mainly focusing on industrial organic waste such as manure, waste and residues from agriculture, food industry and slaughterhouses. It is also in the private sector where most of the additional production capacity investments are foreseen in the future.

**Existing policies and drivers**

**Fiscal incentives - CO₂ and energy tax exemption**

• **Transportation:** Exemption from CO₂ and energy tax for biomethane as transportation fuel until the end of 2020. Natural gas for transportation is exempted from energy tax and only pay CO₂ tax. The CO₂-tax rate 2020 corresponds to 233 SEK/MWh (~21 €/MWh). The value of the biomethane tax exemption can be estimated with the corresponding tax for petrol. The CO₂-tax for petrol is 284 SEK/MWh (~27 €/MWh) and the energy tax is 450 SEK/kWh (~44 €/MWh).

• **Heating fuel (including industrial use):** Exemption from CO₂ tax and energy tax for biogas or biomethane for heating (including industrial use) until end of 2020 Corresponding tax on natural gas is 3559 SEK/1000 Nm³ (~31 €/MWh). Fossil fuels like petrol, diesel or natural gas used in the manufacturing process in industrial activity (for other purposes than use in motor vehicles) are exempted from 70 percent of the energy tax. For industrial activities included in the EU ETS, such use is also exempted from 100 percent of the CO₂ tax.

• **Heat or CHP plants:** Exemption from CO₂ and energy tax for biogas or biomethane when used in heat or combined heat and power plants. Natural gas, and other fossil fuels, for such use within the EU ETS, are exempted from 9 percent of the CO₂ tax.
Production support/premium

- 0.40 SEK/kWh (~37 €/MWh) production support for manure based biogas and biomethane to reduce methane emissions from manure. Given to the biogas producer. Total budget 355 MSEK (2015-2023). Continuous yearly applications, no guaranteed period based on contracts etc..

- A temporary biomethane production support of in total 270 MSEK is granted for production Oct 2018 to Sep 2019, as a response to the disturbed competition situation for domestic biomethane due to double subsidises for imported biomethane. It is given to biogas producers for upgraded biogas aimed for transportation from various substrates except sewage sludge and landfill. Food crop based biogas from new production plants is not included either. The support given 2018/2019 corresponds to 0.26 SEK/kWh (~24 €/MWh) biomethane. Biomethane from manure is eligible for both the biomethane support and to the existing manure biogas support. Another 100 MSEK was granted in the autumn (18th Sep 2019) to extend the temporary biomethane support into 2020, but the details and the expected premium per kWh has not yet been decided upon.

Quota/green certificates (GC)

- Green electricity certificate scheme: A joint electricity certificate market between Norway and Sweden since 2012. The producer gets one certificate for every MWh electricity produced from renewable resources and electricity consumers must purchase certificates in relation to their total use. New producers receive certificates for 15 years. Certificate price has declined from 140-190 SEK/MWh (~13-17 €/MWh) in 2014-2015 to 126 SEK/MWh (~11.5 €/MWh) in 2018. However, the certificate prices are expected to be drastically lower during the 2020-ties since the new installed production capacity of renewable electricity (mainly wind) is expected to exceed the 2030 target of the quota system already around 2022. Stimulat new electricity from biomass. The price for terms for 2022-2023 is only 15-20 SEK/MWh (1.4-1.8 €/MWh). The electricity certificate scheme has not been very important for stimulating large electricity production from biomethane. One reason is that biogas purchased from the natural gas grid so far has not been eligible for electricity certificates since the green gas principle (mass balance) is not accepted within the electricity certificate system.

- Blending obligation for gasoline and diesel: GHG reduction obligation for gasoline and diesel since July 1st, 2018. The obligation is expressed as a minimum GHG reduction that each supplier must reach for all sold gasoline and diesel respectively, by blending of sustainable biofuels. Reduction levels 2018 are 2.6 % for gasoline and 19.3 % for diesel with an indicative reduction level of 40 % 2030. The former CO2 and energy tax exemption for low blend biofuels has been replaced with full tax. High blends such as E85 or HVO100 and biomethane are not part of the obligation and are still eligible to tax exemption until end of 2020.

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4 The joint target (and quota) for Norway and Sweden is 28.4 TWh new renewable electricity 2012-2020. Sweden has extended the scheme with another 18 TWh to 2030 (without Norway).
Investment support

- **Local climate investment programme (Klimatklivet):**
  Investment support (up to approx. 45 %) for all types of investments or measures that lead to high GHG emission reductions, 2015-2023. The budget for 2020 is 2.3 Billion SEK/year (~0.21 Billion €). A significant part of the investment support so far has been granted to biomethane investments (39 biogas plants and a number of CBG and LBG filling stations) but also other measures such as EPV charging infrastructure.

- **200 MSEK support 2018-2021 for the establishment of an LBG innovation cluster** – for promotion and demonstration of the whole production and utilisation chain in a region for LBG in heavy road and sea transport. The project Drive LBG won the tendering process administrated by the Swedish Energy Agency and the project started early 2019. Drive LBG is co-ordinated by the Swedish Gas Association. Investment support for various LBG investments have been granted within the project, including biomethane liquefaction plants, filling infrastructure and long-haul HDVs.

Previous (ended) investment support programmes:

- Investment grants for marketing of new technologies and new solutions for biogas during 2010-2016. Maximum 45 % or 25 MSEK (~2,3 M€) of the investment cost.
- Climate investment grant for municipalities: Total budget 1,925 MSEK (~176 M€) until the end of 2018.

Fiscal incentives and other regulations for low emission road transport, including biomethane

- A new "Bonus-Malus" taxation system for light vehicles from July 1st 2018. Bonus up to 60 000 SEK (~5700 €) when purchasing new low emission cars. Gas vehicles is granted a bonus of 10 000 SEK (~915 €). Malus in terms of increased CO₂-based vehicle tax first three years for high emission cars (gasoline and diesel cars).
- 40 % reduction of income tax for use of company NGVs until the end of 2020 (max 10 000 SEK). If and how this will be extended is still not decided.
- New legislation for environmental zones in cities will be implemented from 1st of January 2020. Cities will be able to put up restriction zones for polluting (noise and emissions) vehicles in three different restriction levels. Only new gas vehicles (NGVs), hydrogen and all-electric vehicles are allowed in all three zones. On the heavy-duty side, new plug-in hybrid electric vehicles (PHEVs) are also allowed. This may become a driver for more gas vehicles.
- Requirement since 2005 for larger filling stations to provide renewable fuels (pumplagen5), such as E85 or CBG. However, this requirement has created a strong incentive mainly for the building of filling stations for E85.

Other policies and regulations that affecting the biomethane market positively

- Environmental information about all transportation fuels must be displayed at the filling station, including origin and CO₂ reduction from 2020.
- Rules and environmental criteria for public procurement of fuels and vehicles

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5 Lag (2005:1248) om skyldighet att tillhandahålla förnybara drivmedel
• Advantages for taxi driven on gas and other renewables at airports
• Municipalities must provide systems for separation and collection of organic household waste from 2021. National goal of collection and recycling of nutrients from 50 % of all organic household waste, and at least 40 % with energy recovery.
• Sea transport: International environmental legislation (sulphur and nitrogen oxide limits) together with some environmental-differentiated port fees now push for more LNG ships. However, no energy or CO₂ tax on maritime fuels means no fiscal incentives for renewables at this point.

Ongoing processes and coming policies

• An ongoing biogas market investigation will propose new long-term policies and measures for biogas from 2021:
  The government-initiated biogas market investigation (M 2018:06) that started in summer 2018 has a broad scope and shall analyse the social and environmental benefits and the competition situation of biogas and propose measures and policies to fully utilise biogas as a resource and to achieve long term competitive conditions for increased use and production of biogas and biomethane. The investigation, which will report to the government December 2019, is expected to suggest that the current exemption from energy and CO₂ tax is extended after 2020 and is complemented with a new production premium scheme for biomethane from 2021. Prolongation after 2020 of current exemption from energy and CO₂ tax is being discussed. Specific goals for biogas production and nutrient recycling are also being discussed. Additional premiums to stimulate biogas production from manure, liquefaction to LBG, increased biomethane use in industry and biomethane production of renewable gas from lignocellulose (i.e. gasification) are part of the draft proposal.

• Bonus for low carbon HDVs:
  A vehicle purchasing bonus scheme for low carbon/alternative HDVs was suggested by the government September 2019, which supposedly includes CBG and LBG HDVs. A law proposal, including all the details, is under preparation.

• Guarantees of Origin for renewable gases:
  A national biogas registry/Guarantees of Origin system will probably be implemented by the Swedish Energy Agency by 2021. A first investigation was reported by the SEA to the government 15th of September 2019 suggesting a national GoO system for renewable gas as required by the RED2 Article 19. However, the SEA suggests a pre-study to further investigate how to solve certain aspects, such as co-ordination with the sustainability criteria system and mass balance requirements and co-ordination with a suggested national database for renewable transport fuels to fulfil the requirements of the coming EU-database according to RED2 Article 28.2. SEA also acknowledge the importance of cooperation with other registries and initiatives for cross border trade, such as AIB and ERGaR.

• Cooperation between authorities for fossil free domestic transports:
  A strategic plan for fossil free domestic transports was presented in May 2017 by the Swedish Energy Agency in co-operation between all relevant authorities for transport. The work with the plan within the authorities and implementing proposed measures continues to 2019. Several proposals have been adopted by government since then.

• Swedish Energy Agency is since 2018 responsible to co-ordinate the development not only of EPV charging stations but also for infrastructure for other alternative transport fuels such as gas filling stations.
Some policy barriers for further development

- Long-term conditions and a biogas strategy from the government are missing. It is still not clear what the long term support system will be for biomethane after 2020, which has.
- Not harmonising support systems between member states leads to double subsidised imported biomethane and has resulted in a disturbed competition situation for domestic biogas production. The biogas use has increased rapidly the last years, but the production has planed out.
- The green gas concept (that the biogas share in gas purchased through the gas grids is based on agreements and mass balance principle) is not accepted or applicable in important support systems such as EU ETS, green electricity certificate system and climate investment programme (Klimatklivet). This is a barrier for large biomethane expansion in industry. A future biogas register or Guarantees of Origin system might a solution and is currently discussed between industry and authorities.
- Some general reductions of energy tax and/or CO₂ tax for fossil fuels in some sectors make the general tax exemption for biomethane not competitive enough, e.g. working machines and transport within forestry and agriculture. For agricultural use, diesel used as fuel in other motor vehicles than passenger cars, trucks and buses are granted exemption from CO₂-tax of SEK 1930 per m³ of fuel. This tax exemption is a barrier to the use of gas for instance in the agricultural sector. For consumption for purposes other than the operation of motor vehicles in agricultural or forestry, fossil fuels such as petrol, diesel or natural gas is exempted from 70 percent of the energy tax. The former tax reduction for diesel within the mining sector is recently taken away, which will open for gas driven working machines in mining.
- There are a couple of taxation rules that are disadvantageous for biomethane, for instance that taxation now is based on volume instead of energy content. Some of these are under review by the ministry of finance and may be changed in the near future.
Regulation on sustainability criteria, mass balancing in gas grids and cross border trade

Green gas concept allows for mass balancing in gas grids for tax purposes

There is no biogas registry or independent certification system currently in place in Sweden, but mass balancing is possible for biomethane in gas grids since 2011 in the taxation regulation as well as in the sustainability criteria scheme. The Tax Authority, however, has the possibility to request full documentation from all taxable companies using the green gas concept. All companies are using in-house accounting to make sure that they produce or buy as much biomethane as they sell. Some companies use third party auditing for this.

![Image of green gas concept](image.png)

**Figure 12** The green gas concept in Sweden. 100 % biomethane can be purchased and claimed as biomethane from the gas network or local gas grids through the mass balance principle and is eligible for exemption of energy and CO₂ tax. Full in-house documentation and a purchasing contract between the user and the supplier is required.

In the Act (1994:1776) on energy taxes the green gas concept was introduced in 2011, which means that biomethane users connected to the gas grid or in a local grid can buy and claim any share of biomethane even though it is a physical mix of NG and biomethane. Biomethane from gas grids is eligible to full energy tax and CO₂ tax exemption. The biomethane content shall be decided by the purchasing contracts between the user and the supplier, and the supplier must assure that the same amount has been injected to the grid. Transmission capacity from the injection point must thus be booked. Companies responsible for paying the energy excise duty need to account for all biomethane sold in order to become reimbursed for the tax exemption. The Tax Authority has the possibility to request full documentation from all taxable companies using the green gas concept. All companies are using in-house accounting to make sure that they produce or buy as much biomethane as they sell. Some companies use third party auditing for this. The Tax Authority also has the possibility to cross check most of the biomethane through the supervision of the Act on energy taxes. The system worked rather well and the risk for double counting seem to be small, no major inaccuracies has been reported so far. However, there are obvious advantages in terms of trust in the market and a reduced risk for double counting if there was a centralized and independent tracking system such as a biogas register with Guarantees of Origin.

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6 Lagen (1994:1776) om skatt på energi (Chapter 2, 2 a §)
The green gas concept is applicable for both imported and domestic biomethane and is possible also between gas grids in Sweden that is not physically connected.

RED sustainability criteria

The national RED sustainability criteria scheme is regulated by the Sustainability Act (2010:598)\(^7\) and is supervised by the Swedish Energy Agency. All suppliers of biofuels (including biomethane aimed for transport) eligible for taxation must apply for a Sustainability Decision (Hållbarhetsbesked) by the SEA. To be eligible for tax exemption or be counted for in other support systems, such as the GHG reduction obligation for gasoline and diesel, green electricity certificates or EU ETS, all liquid and gaseous biofuels and liquid biomass fuels must meet the sustainability criteria, which is proven by a valid Sustainability Decision. In order to get a Sustainability Decision the supplier must set up a control system covering the whole production and supply chain with routines - including agreements with sub-suppliers, regularly sampling & auditing, and a mass balance system - that assures that biofuels supplied meet the sustainability criteria. A statement from an independent auditor assuring that the control system fulfils the requirements must be sent to SEA together with the application. The supplier must in April every year report to the SEA the amounts of sustainable biofuels delivered and their sustainability characteristics. The sustainability decision is reviewed every second year or so by the SEA, based on independent auditing of the control system including samples of actual biofuels consignments delivered. All suppliers of biofuels must have a sustainability decision, but an alternative to show that all requirements in the national regulations are met is to refer to certification by a Voluntary scheme (VS) approved by EC. Biofuels covered by certification from a VS is always compliant with the sustainability criteria in Sweden.

For biomethane export (which so far is very limited) Swedish producers normally use voluntary scheme certifications. For imports VS certificates are usually used to prove compliance in Sweden, but it is not necessary if the supplier’s control system have sufficient routines that can assure RED compliance through the whole production chain and if this was described to the SEA in the Sustainability Decision application. From 2021 the sustainability criteria will apply to all bioenergy, including all biomethane. SEA is currently investigating how the RED2 sustainability criteria should be implemented in Sweden, but the current national RED regulation is expected to continue in a similar way but expended to all biomass fuel.

Mass balancing in the gas grids and cross border

Just like the green gas concept in the tax regulation mass balancing is recognised within the Swedish national gas networks and local grids, based on purchasing contracts and proves of injection of the same amount of biomethane into the grids. Up to summer 2017 it has been possible to comply with the sustainability criteria for imported biomethane through the gas grid (and to be eligible to tax exemption) only if the biomethane was certified by a Voluntary Scheme approved by the European Commission, or of course imports of biomethane with truck or ship. After the European Court of Justice sentence\(^8\) in summer 2017 (see following chapter) there is no such barrier in the national scheme for cross border mass balancing of biomethane in the gas network, imported biomethane and domestic biomethane are treated the same.

\(^7\) Lag (2010:598) om hållbarhetskriterier för biodrivmedel och flytande biobränslen (hållbarhetslagen)
\(^8\) the E.ON – Energimyndigheten case C 549/2015
Current discussions of biogas registry and guarantees of origin in Sweden

So far there is no national biogas registry or centralized system for register and tracking biomethane in Sweden. As mentioned above the most important driver for biomethane –exemption from energy and CO₂ tax - is already possible through the green gas concept which is supervised by the Tax Authority. The Swedish biomethane market is mainly off grid and only a small part of south western Sweden is connected to the European gas network, and there is a regional gas network in Stockholm. There are some local grids or just stand alone plants and gas filling stations. This is another reason why biogas registry has not been prioritized in Sweden until now.

However, establishment of a national biogas registry and/or system for GoOs has gained more interest recently and a working group within the Swedish Gas Association is now working to make this happen. Due to the recently decided RED2 Article 19 which states that Member states are requested to grant GoO also for renewable gases from 2021, it is expected that the Swedish Energy Agency will set up a GoO system or a biogas registry.

Reasons identified among the companies to investigate the relevance of a national biogas register are:

- To strengthen the trust of the green gas concept and to secure no double sells of biomethane.
- High administrative cost could be reduced for companies for proofs of origin and sustainability to customers with an audited standardized third party system instead of different in house systems.
- Imports and exports of biomethane could be easier and less costly (if compatible and accepted in other countries)
- Access to support systems not possible today:
  - The green gas concept is currently not accepted for CO₂ credits in the EU Emission Trade Scheme (EU ETS). According to the responsible regulator the Swedish Environmental Agency this would however be possible with a biogas register and a law adjustment. This is the case in e.g. Denmark, Germany and Finland.
  - The Green Electricity Certificate system or the climate investment support programme (Klimatklivet) does not accept the green gas concept or mass balancing in the gas grids. Biogas registry might be a solution.
- A biogas registry with information of received production support could, potentially, be a base to reduce the current problem of double subsidies for imported biogas in Sweden (since Sweden have tax exemption and e.g. Denmark have production support), if national support system is adjusted accordingly.
- REDII newly decided Art 19 which extends Guarantees of Origin to renewable gas from 2021.

Some identified concerns:

- Green gas concept already in place in taxation and is working rather well
- Administrative cost of establishing and running the system
- Relevance for the large off grid market?
- Access to important support systems and acceptance from authorities
- International compatibility and acceptance
- Risk of parallel administrative systems (sustainability criteria, biogas registry, RED II databases for advanced biofuels, REDII Guarantees of Origin etc.).