

Swedish biofuel production and the role of gasification

Background

In June 2017, the Swedish Parliament passed a law on the Climate Policy Framework with the overall goal that Sweden should have no net greenhouse gas emissions to the atmosphere by 2045, and thereafter achieve negative emissions. A number of sub targets have also been set. Emissions from domestic road transport should be at least 70 % lower in 2030 than in 2010. Biofuels have in recent years increased significantly and in a relatively short time, and have contributed to a reduction of greenhouse gas emissions from the transport sector in EU as well as in Sweden. With a biofuel share of 22 %¹ in the sector (year 2018), Sweden is at the top of the EU-countries.

In October 2018, the Government commissioned the Swedish Energy Agency to investigate certain issues regarding the Reduction Obligation System. This included, amongst other things, preparing proposals for reduction levels for the years 2021 to 2030. **Currently, about 90 % of the biofuels used in Sweden are imported, either in terms of feedstock or fuels.** According to the reduction obligation quota, the increased blending target to 2030 will result in more than a doubling of the use of biofuels compared to the current level (to about 40 % of total road transportation fuel use). To this, biofuels for use in domestic and international shipping and air traffic should be added. A recent investigation has proposed a quota obligation also for bio jet fuels of 30 % by 2030.²

Through the changes in the updated Renewable Energy Directive (RED II), including defined maximum levels of biofuels from cultivated crops (conventional biofuels) and targets for so-called advanced biofuels, as well as a number of ambitious targets in other countries, the demand for biofuels will increase also internationally. This will make it more difficult to increase the use of biofuels in Sweden that is, as previously mentioned, to a large extent based on imports. A further increased import of biofuels is thus neither a long-term sustainable alternative from a supply nor from a financial perspective. This is even truer for advanced biofuels, whose production is very modest today, but where the target for all Member States is 3.5% (with double counting) of final energy use for land-based transport by 2030.

Sweden, together with Finland, has very large assets of forest raw materials and thus plays a central role within Europe in developing technologies for the production of advanced, forest based biofuels. Investment in such biofuels production in Sweden will lead to job creation, rural development, increased security of supply and an improved trade balance, in addition to reducing the climate impact of transport. All in all, strong efforts are now required to create viable market conditions to favor domestic production of advanced biofuels.

Efforts to secure domestic production must be in line with the ambitious goals

Sweden has a great potential to replace fossil fuels with, above all, domestic forest raw materials, but also crops and waste. Investments in production and broad commercialization of advanced biofuels technologies have so far not been sufficiently made in Sweden. It is therefore both desirable and necessary that Sweden creates the conditions for achieving large-scale production of advanced biofuels from domestic raw materials, in addition to those that are currently produced using tall oil as a base or that may be extracted from a limited part stream of the forest industry's black liquor. The biofuels produced and used in Sweden must have the best possible climate and energy performance. The initiators of this position document believe that **gasification is one of the most**

¹ Swedish Energy Agency, 2020 (Totally 78 TWh was used for road transports in 2018, of which 17.5 TWh was biofuels)

² Biojet för flyget, Betänkande av Utredningen om styrmedel för att främja användning av biobränsle för flyget. SOU 2019:11

cost-effective and environmentally friendly technologies for the production of advanced biofuels.

This is because the conversion process has

- a high energy efficiency
- low production costs in large scale capacities
- a high greenhouse gas reduction (highest default values in Annex V of the Renewability Directive)
- a high feedstock flexibility, i.e. manages to convert forest raw materials, other bio raw materials and waste
- a high product flexibility, i.e. products such as hydrocarbons, alcohols, biomethane and hydrogen
- large integration opportunities with existing and future industries

In addition, gasification technologies have a high technological readiness level (TRL) and can be implemented broadly and on a large scale already today if the right surrounding conditions prevail. Swedish companies like Domsjö, E.ON, Gothenburg Energy, Rottneros and others have had far-reaching project plans that have not been realized due to too large uncertainties in politically decided instruments.

There is an immediate need for powerful policy measures beyond the generally benevolent wording to support the expansion of a Swedish biofuel industry and which strongly contribute to the goals set in the Climate Policy Framework. **Such measures must aim at making investments in large-scale domestic biofuel production economically sustainable over time.**

We therefore call for...

...fast and effective measures from the Swedish Parliament and the government to enable investments in large-scale production of advanced biofuels based on domestic raw materials as a central part of Swedish climate policy.

In addition to the already existing reduction obligation, new effective instruments should be introduced as soon as possible, for example by:

- Targeted instruments such as so-called Contract for Difference (CFD) for the first large-scale production facility, possibly in combination with governmental participation through industrial players and as a financier. This is deemed necessary to ensure that the politically decided added value in green products compared to fossil fuels provides sufficient cash flow during the time the loans, interest rates and returns are paid. This is also because the first industrial plants have higher costs and economic risks than a fully established and mature technology, while competing in the short term with existing plant's marginal price
- Introducing an investment support as a complement to the existing Industrial and Climate Programs with the aim of enabling the installations of large pilot and demonstration plants for biofuels in Sweden based on feedstocks in RED II Annex IX A. The level of support shall be adjusted so that it provides a significant contribution to the financing of such investments. At the same time, it should enable additional public financing through grants and loans at Swedish or EU level in accordance with current regulations, this in addition to investments of equity from financiers
- Introduction of a blending quota for advanced biofuels based on feedstocks in the RED II Annex IX A. The blending levels should gradually be increased and in 2045 constitute a significant share of Sweden's needs for domestic transport fuels. This quota should be fulfilled by the fuel distributors. A sanction cost of the same order of magnitude as that in the current reduction obligation system should be paid if the quota is not filled.



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Initiators and support organizations for this position document

The Swedish Gasification Center (SFC), with the support of The Swedish Bioenergy Association (SVEBIO), is the initiator of this position document. The document has partly been formulated by the SFC's management group and program council and partly on the basis of discussions at two workshops, "*New instruments for renewable fuels and their impact on future gasification establishments*" held in Stockholm 2019-01-31, and "*New instruments for investments in Swedish bio refineries*" held in Stockholm 2019-04-08.

A total of approximately 65 people from universities, authorities, institutes, associations, companies and industries participated with a common interest in reducing climate impact and accelerating the transition to a fossil-free transport sector. Based on a draft of the present position paper, a large majority of participants supported the content.

However, this does not mean that every participant, and by extension, the organizations they represent, shares the views expressed in this document in its entirety or in its various parts. The document mainly expresses the SFC's position, and does not claim to express the views of any other person or organization beyond what is stated above.

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