



City of Gothenburg

Gothenburg Biomass Gasification Project, GoBiGas

Gothenburg Biomass Gasification Project, GoBiGas, is the name of large investments in biogas production by gasification of biofuels and waste from forestry. In March 2014 the first phase was inaugurated, which means that the world's first gasification plant for biogas production is started with a production of about 160 GWh per year. The total investment for the first phase is approximately 1,4 billion Swedish Crowns. Fully developed GoBiGas is expected to deliver 1000 GWh. GoBiGas is a major step to reach the target in the Climate Programme (see other Action) that at least 1200 GWh of biogas will be produced in 2030.

The project was initially run in partnership with E.ON, but is now entirely in the hands of the municipally owned company Göteborg Energi. GoBiGas was granted financial aid at 222 million SEK in September from the Swedish Energy Agency, as one of three selected projects, provided acceptance from the European Commission. In 2020 Göteborg Energi expects to deliver biogas equivalent of 1 TWh. It represents about 30 percent of current deliveries in Gothenburg or fuel to 100,000 cars.

In the eighties national natural gas grid was built in southern and western parts of Sweden, with natural gas from Denmark. This network is an important part of the conversion to renewable energy. Göteborg Energi has invested heavily in biogas and sees biogas as one of tomorrow's most important energy sources. A major benefit of biogas is that you can use the existing natural gas grid for distribution. Natural gas is becoming a bridge over to the renewable biogas.

The potential for sustainable biogas from forestry residues in Sweden amounts to tens of terawatt hours, making it possible for biogas to be one of the main fuels in a decarbonized transport sector, that the Swedish government has decided to have implemented by 2030.

Biogas replaces natural gas – biomass becomes biogas

The GoBiGas biogas project is about producing biomethane (Bio-SNG) by thermal gasification of forest residues as branches, roots and tops. The biomass is converted to a flammable gas in the gasification plant. This so-called synthesis gas is purified and then upgraded in a methanation plant to biogas with a quality comparable to natural gas to enable the two types of gases to be mixed in the gas network, until the natural gas is phased out. Since biogas is produced from renewable sources this does not contribute to increasing emissions of carbon dioxide as fossil fuels do.

GoBiGas based on new technology

In spring 2006, Göteborg Energi conducted a feasibility study with Swedish and Dutch expertise in order to compare the technology and economics of the two gasification technologies, indirect gasification and pressurized oxygen blown gasification. In 2007 in-depth studies of various gasification technologies with multiple suppliers were carried out. The choice fell on indirect gasification with technology from the Austrian company Repotec, based on technical and economical performance and operational experience.

Göteborg Energi cooperates in particular with Chalmers University of Technology and has invested in a research facility for the indirect gasification constructed together with an existing biofuel boiler, built with CFB technology.

In 2008/2009 a Basic Design was conducted of the proposed technique for stage 1. Repotec has built a small gas plant in Güssing, Austria, which has been in commercial operation since 2002. Adjacent, on the same site, there is also a pilot methanation plant, based on technology from the Swiss company CTU. From October 2009 to January 2010 the GoBiGas project involved operational staff from this site in order to evaluate the technology.

Objective to achieve good performance

In the choice of technology and plant design the project aims to get as high efficiency as possible. The goal is to reach 65 percent of the biomass into biogas, and that the overall energy efficiency will be over 90 percent.

The plant is split into two stages

The gasification plant is scheduled to be built in two stages, the first stage (about 20 MW gas) became operational in 2014. The second stage (about 80-100 MW gas) is scheduled to be in service in 2018. How and when to implement stage two will be decided after evaluation of the stage 1 plant.

Localization in the Rya area on Hisingen

Stage 1 is built in the Rya harbour, on the same site as the Rya hot water plant, just off the Älvsborg bridge. The plan for the location of Stage 2 is on a nearby plot of land with jetty access. The location has been chosen so that the plant will be close to a hub for the electricity, gas and district heating networks in Gothenburg, and also allowing a long-term and flexible fuel reception because it has the potential for both ship and rail transport. Cooling water to the process can be taken from adjacent Göta River.

Forest as a raw material

GoBiGas involves large-scale production from forestry waste such as branches, roots and tree tops, a fact that requires negative side effects to be analyzed. The forestry waste is possible to take from large parts of Sweden since the GoBiGas plant is easy to reach for both ship and rail transport. The plant is also located close to a gas-, district heating- and electricity hub. The availability of raw material from the forest is good in Sweden. A recent report (2014) from Swedish Biomass Association estimates that 200 TWh of biofuel is possible to obtain. On the other hand, there are other industries that plan to convert to non fossil production by use of raw materials from forest. Therefore it is important to continuously follow the development and research to ensure that forestry waste in the GoBiGas project is used without threatening biodiversity and regrowth of forest.

More information:

GoBiGas web page (in English):

[http://gobigas.goteborgenergi.se/English version/Start](http://gobigas.goteborgenergi.se/English_version/Start)