

# GoBiGas: Universities are natural forerunners in transition

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The development of biomass gasification at Chalmers began in 2005. Göteborg Energi, an energy utility owned by Gothenburg Municipality, had run in to problems when exploring the possibilities to invest in a biomass gasification plant for the production of vehicle fuel methane. The dominating technology at the time; pressurised gasification, was perceived as expensive and not in line with the company's objective.

Due to a long term relation between Göteborg Energi and Chalmers, Chalmers was contacted for assessing pros and cons of different options and solutions to the problem. The Chalmers researchers suggested an indirect gasification processes, displayed at an Austrian site in Güssing, a technique that was less costly and potentially quick to commercialise. In addition the Chalmers researchers managed to come up with a new technological design where existing Circulating Fluidised Bed (CFB)-boilers could be retrofitted and turned into indirect gasification units at a significantly lower cost than constructing a dedicated gasification plant from scratch.

With this new option in hand, Göteborg Energi offered Chalmers to convert its existing CFB-plant used for heating the campus area at Chalmers into a research and demonstration plant of significant size (4MW). This was financed by the company and made at a relatively low overall cost (10MSEK).

The demonstration plant was built by Valmet Power AB and commissioned late in 2007. The first researcher was recruited the same year, denoting the starting point of what was to become a world leading research environment on fluidised bed gasification.

## The importance of research infrastructure

Since the commission of the demonstration plant, the research and the infrastructure have developed rapidly. Today the research group for indirect gasification of biomass is about 20 full time equivalents with half of the workforce originating from a dozen different countries. Chalmers Energy Initiative has taken an active role as infrastructure developer in the establishment of the largest research gasifier, and the internationally recognized research and education environment. Today the demonstration plant is with its size and dynamic construction a very important research and educational infrastructure for the transition to renewable fuels.

*“Such a plant makes it possible to study scaling effects, as well as allowing detailed studies, for example, on the importance of fuel quality, different flow regimes, heat and mass transfer, fuel particle conversion, transport, deposition and corrosion, and emissions and their reduction. It is not possible to perform all these kinds of research in the single small-scale reactors commonly available at universities. The Chalmers demonstration plant is unique, and is thus of the*



Chalmers 12MW boiler

## Making Science Useful

**Roles:** Seven types of roles are identified in relation to making science useful. The roles are developed from different activities for diffusion and utilisation, carried out by one or a group of researchers, or by an entire part of the organisation. The roles are; researcher, educator, advisor, debater, entrepreneur, infrastructure developer and networker. These roles are in general intuitive but develop differently, based on personal characteristics, area of research, the recipients of results within the area, and by different local traditions of how to work with utilisation.

**More information:** This framework is developed by Staffan Jacobsson, Eugenia Perez Vico, Chalmers University of Technology, Hans Hellsmark, SP Technical Research Institute of Sweden and Merle Jacob, Lund University. For more detailed information, please contact Eugenia Perez Vico (eugenia.perez@chalmers.se) or Hans Hellsmark (hans.hellsmark@sp.se).

*utmost importance in a European context.”*

– Johan E. Hustad, Pro-Rector innovations, NTNU.

### From research to energy

The collaboration and the new knowledge created in the research environment and at the demonstration plant has quickly been transferred into a commercial context. Göteborg Energi has made a billion SEK investment in building the next generation biomass based gasification plant (GoBiGas), a pilot plant inaugurated 2014, with a gas production of 20 MW Bio-Methane and with a production target equivalent to 1 TWh in 2020. This plant was built by Valmet Power AB, and would never been realised without the experiences from the demonstration plant at Chalmers campus.

Åsa Burman, Project director and Managing director at GoBiGas states that *“Göteborg Energi has a long history of collaboration with Chalmers, and through research conducted at the pilot gasifier we have gained valuable knowledge for our multi-million SEK investment in GoBiGas. This collaboration has been of great value in our ongoing project, in which we have successfully applied operating modes developed at the Chalmers pilot gasifier in the commissioning of our demonstration plant, GoBiGas.”*

In retrospective – the decision taken by Chalmers to convert its CFB-boiler into a research demonstration plant for indirect gasification of biomass has facilitated the

important transition from research to industrial implementation. Sited at campus and the multi-purpose design of the research demonstration plant enables research on the most fundamental questions all the way to issues related to the evolving of a new technology and the construction of a commercial gasification plant, such as the GoBiGas pilot plant.

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