

GREEN GAS HUB

Provision of biogas by farmers by pipe
to a Green Gas Hub with a centralised
upgrading process



MISSION AND VISION

The waste treatment company Attero was the first green gas producer in the Netherlands and supplies energy to 350,000 households. The company operates a green gas hub at Wijster. Local farmers deliver their biogas from their own facilities, after it is dried and desulphurised, via a biogas pipeline to the Green Gas Hub at Wjister. The farmers do not have to invest in a refining installation to achieve natural gas quality as this is now carried out at the Green Gas Hub.

THE GREEN GAS HUB CONCEPT

The Wijster Green Gas Hub is in a rural sparsely populated area. According to Attero's Lars Huigen the hub's goal was to collect local biogas and to combine the refining and injection steps for a number of digesters. Mr Huigen points out "At Wijster, we started with just a single supplier to the collective biogas pipeline, a farm that digests residual plant products." Lars Huigen notes that "We started generating biogas from our landfill 25 years ago to overcome fugitive methane release. Dumping of household refuse in landfills is now prohibited in the Netherlands, but the digestion process is set to continue here for many years yet."

LESSONS LEARNED

Separation of different feedstocks in different digesters

At Wijster, Attero has a digester for the organic liquid fraction. This is organic household refuse that has ended up in grey wheelie bins and may not be used in compost as a result. Mr

Huigen notes that "Organic household refuse is separated from the 'grey' waste stream and is digested separately; in this way, it's still sustainable. In addition to that, we have a digester for green organic household refuse, which is separated at source. We use the component that is easily degradable and convert it to biogas. What's left of the digested materials is mixed in with bulky organic household refuse and turned into compost."

Affordability of biomass

One of the most important success factors in the development of biogas projects is the availability of affordable biomass and the corresponding logistics required to deliver it and to transport the products away. The Wijster plant has years of experience in this area. Lars Huigen notes that "We have been working on an energy infrastructure that facilitates biogas production from a regional centre: the green gas hub."

Refining to natural gas quality

The most valuable part of the process is refining biogas to natural gas quality. "Any CO₂, contaminants, and moisture that are present have to be removed. For this reason we have three installations at Wijster, each of which works in a different way. The first one to become operational, a Pressure Swing Absorption (PSA) system, pressurises the gas to remove CO₂ and any contaminants. The second one is a water scrubber that uses water to refine biogas to green gas. Since 2014, we have been operating a membrane installation that, in addition to green gas, produces pure liquid CO₂ for use in horticulture. All residual products are thus put to good use."

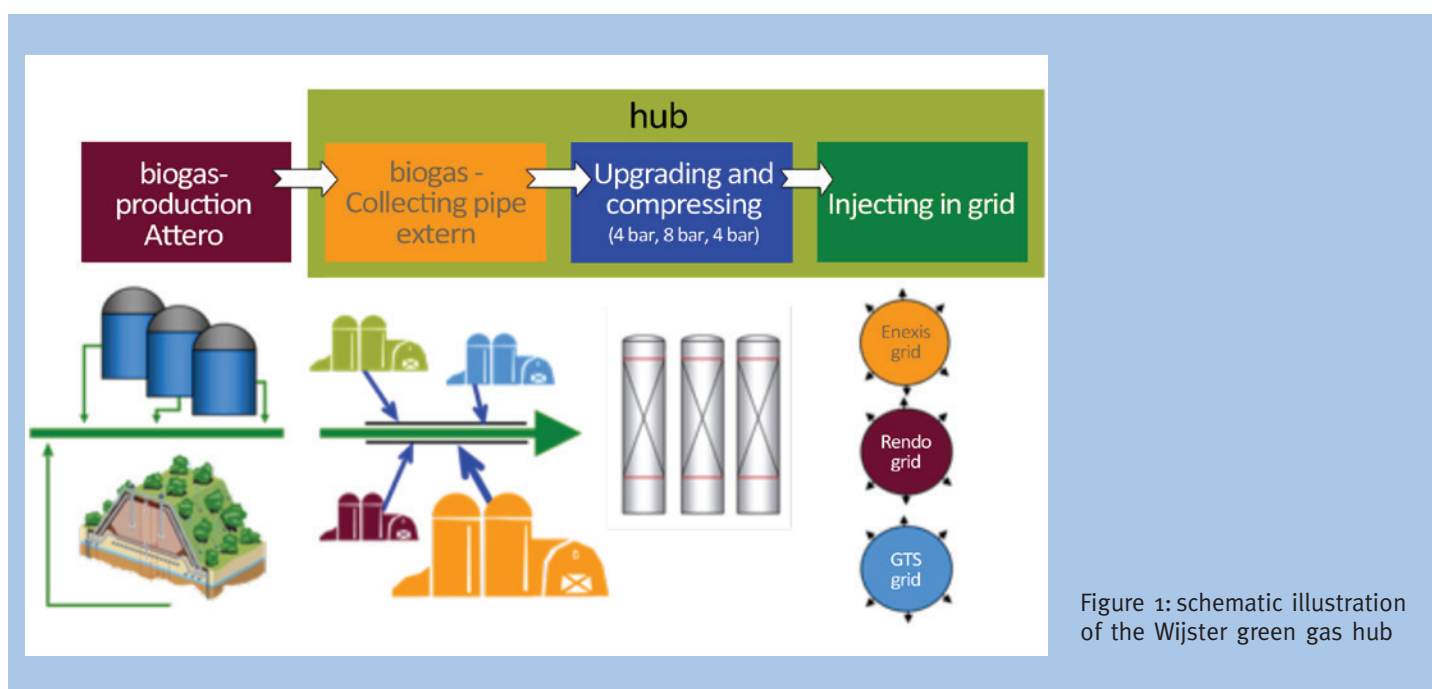


Figure 1: schematic illustration of the Wijster green gas hub



Figure 2: gas upgrading membranes at the Wijster green gas hub

Pilot for liquid natural gas (LNG) and other options

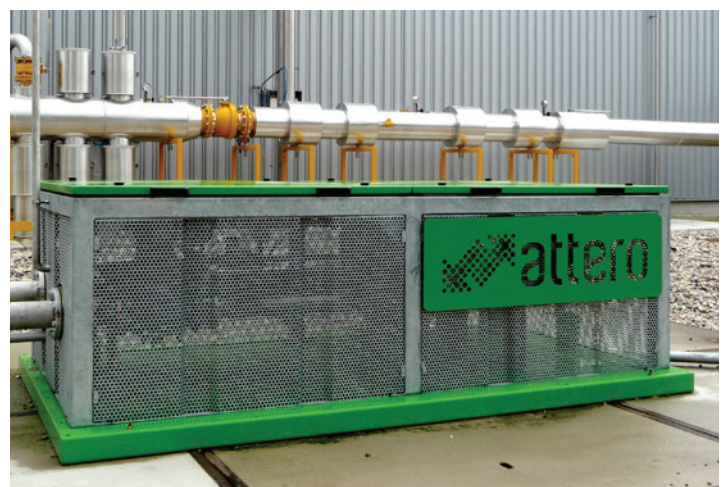
The Wijster site also boasts a fourth installation, which is used to refine biogas to bio-LNG. “The bio-LNG installation is a pilot project run by the Iveco Schouten car dealership. We supply the biogas on which their cryogenic installation runs, and which is used to produce green gas to fuel lorries. Now that the green gas hub is operational, local companies can use their bioenergy in even more ways. They can choose between converting it to electricity, refining the biogas for use in a local network, or supplying it to us.”

Technique	Capacity Nm ³ biogas/hour	Green Gas Nm ³ biogas/h	Year of installation
PSA.	1200	840	1989
Water Scrubbing	1000	700	2012
Membrane	800	560 (plus liquid CO ₂)	2014

Table 1: Attero’s gas refining installations at Wijster

THE FUTURE

According to Mr Huigen. “A hub is not always the best solution, especially if you have to install a relatively large number of pipelines, which can be costly. Due to the economies of scale, we have been able to create a win-win situation for all stakeholders. By converting waste streams to sustainable energy, we are contributing to the objective of 14% sustainable energy by 2020. However, it is important to have a commercially viable business. We still require government support to convert waste to green gas. The Sustainable Energy Production Incentive (SDE) helps compensate for this, and thankfully the provincial authorities have also helped with other investments in the hub. The costs of our innovative, sustainable technologies may fall in future, and become market standards.”





IEA Bioenergy task 37
“Energy from Biogas”
<http://task37.ieabioenergy.com>

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Further Information

IEA Bioenergy Task 37:

Energy from biogas

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