Hitachi Zosen INOVA

Media release, 1 December 2020

Hitachi Zosen Inova Launches Lighthouse Project to Produce Renewable Natural Gas in Canada

Upgrades to Stormfisher London Biogas Facility helping to green Ontario's gas supply

The largest membrane gas upgrading plant ever delivered by Hitachi Zosen Inova (HZI) has recently been handed over to Stormfisher, who in turn have partnered with Enbridge Gas to inject low-carbon RNG into the company's natural gas distribution system in Ontario, Canada. By taking over regular operation Stormfisher can now extend its business case. It's not just the size of the project in London, Canada, that makes it a special one.

Generating electricity from waste is not quite new in the city of London in the southern part of the Canadian province of Ontario. A local waste treatment plant has for years been producing biogas from all kinds of organic waste that is used to generate electricity in a combined heat and power unit. But now the biogas will also be upgraded to produce renewable natural gas: biomethane. The upgrading technology has been supplied by Hitachi Zosen Inova via HZI BioMethan, the German subsidiary is specialised in developing and constructing gas upgrading plants based on two different processes.

In London, the biomethane is produced by means of membrane-based gas permeation: under pressure the biogas is introduced into modules containing hollow fiber membranes made of high-performance polymers. In the modules the carbon dioxide (CO_2) contained in the biogas is removed from the methane, which at the end of the process is extracted and – with the same quality as natural gas – forwarded to a feed-in station to be injected in the local gas grid.

This is the first gas upgrading plant in Canada to use this process. It enables upgrading capacities of 360-1,200 Nm^3/h of raw biogas. This degree of flexibility is a special feature of the plant. By means of gas upgrading, the client can utilise the surplus biogas and generate additional energy. Stormfisher intends to successively increase the volumes of waste accepted, so more biogas can gradually be fed into the upgrading system. For this reason, the flexibility to process varying raw gas feed capacities was a key factor in the awarding of the contract. The HZI plant covers a range of 30-100% feed capacity.

The project will thus enable the client to optimise the sustainable management of resources in the region, as well as contributing to the Canadian government's climate policy and global decarbonisation efforts.

Pilot Project for North America

This project in Canada was HZI BioMethan's first inter-company venture within the group, with the German gas upgrading pioneer developing and delivering the project in collaboration with HZI Canada in Toronto and HZI US, the group's subsidiary in Knoxville, Tennessee. The adaptation of the technology to local market requirements set down in the ASME (American Society of Mechanical Engineers) Code and the Canadian standard paves the way for further growth in the US and Canadian markets. The Canadian project developer and HZI are already collaborating on another project to produce biomethane.

A second inter-company project is currently being developed in southern California. There, besides biogas upgrading, an additional technology from the HZI Group's *Renewable Gas* portfolio is being used: producing biogas with Kompogas® dry fermentation. Generating energy from renewable resources is gaining in importance, and not just in this US state. HZI is increasingly positioning itself strategically as a one-stop provider, also spanning renewable gas. The portfolio contains the full range of technologies for producing and processing renewable gases in order to deliver solutions for all demands and requirements.

(3,379 characters incl. space)

Background Information on the Membrane Technology

"Spaghetti" for Biogas-based Natural Gas

The modules of HZI's membrane upgrading systems consist of several thousand hollow fibres with their ends embedded in resin and bundled in stainless steel pipes. They work on the principle of selective permeation through a membrane surface, with the membrane module charged with the gas mixture under pressure. Given the difference in pressure and concentration between the inner and outer surface of each hollow fibre, the components of the gas separate. This so-called partial pressure difference is what makes the gas permeate through the membrane. A gas's permeation rate depends on the degree to which it dissolves in the membrane material and its molecular structure. Some gases permeate the membrane quicker than others. The ratio between the transport speeds of two gases is called selectivity. The higher the selectivity, the greater the energy efficiency of the membrane process. This effect is exploited to separate the components of the gas.

The membranes used are made of high-performance polymers that are highly resistant to pressure and temperature and are designed specially for biogas upgrading. When the pre-cleaned raw biogas is introduced into the modules, carbon dioxide and water vapour pass through the membrane quickly, while methane takes more time to permeate the membrane. Therefore, it is retained in the hollow fibers and extracted at the bottom end of the modules. In contrast to other polymers, the membranes, developed based on polyimides, hardly interact with carbon dioxide. A key advantage over conventional plastic membranes is that during prolonged exposure conventional membranes are plasticised by the carbon dioxide which significantly reduces the selectivity.

(1,708 characters incl. space)

Bildmotive:

Gas Upgrading Plant_London-CAN. Jpg; BU: The membrane gas upgrading plant in London is the first in Canada to use this technology

About Hitachi Zosen Inova BioMethan:

Hitachi Zosen Inova BioMethan GmbH is one of the leading providers of gas upgrading systems, delivering its solutions with two processes for separating CO_2 from the biogas or flue gases. The company belongs to the Hitachi Zosen Inova Group.
Zurich-based Hitachi Zosen Inova (HZI) is a global leader in energy from waste (EfW) and renewable gas, operating as part of the Hitachi Zosen Corporation Group. HZI acts as an engineering, procurement, and construction (EPC) contractor and project developer, delivering complete turnkey plants and system solutions for thermal and biological EfW recovery. Its solutions are based on efficient and environmentally sound technology, are thoroughly tested, and can be flexibly adapted to customer requirements. HZI's Service Group combines its own research and development with comprehensive manufacturing and erection capabilities to provide support throughout the entire plant life cycle.

HZI works for customers ranging from experienced waste management companies to up-and-coming partners in new markets worldwide. Its innovative and reliable waste, flue gas treatment, gas upgrading and power-to-gas solutions have been part of more than 700 EfW and biogas reference projects delivered since 1933.