

Kiwa Gas Technology Your Partner for Sustainable Gases

Sustainable gas is a gas which can be produced and distributed in a CO₂ neutral way. Biogas, the product of digestion of biomass, will increasingly be used as a substitute for natural gas. Hydrogen is a sustainable gas if the hydrogen has been produced using sustainable energy or if the CO₂ which is released upon production of hydrogen is being stored. In order to be prepared for the large scale production and application of hydrogen, it is important to gain experience within demonstration projects at this very moment.

Biogas

The upgrading of biogas to natural gas quality, followed by the addition into the gas network is a very important and effective way of making the energy supply more sustainable. Despite the energy consumption needed for the transition of biogas into natural gas, a net result of 70% CO₂ reduction can be achieved. According to the working group Green Gas, founded by the Dutch Ministry of Economic Affairs, a considerable 50% of the gas supply in The Netherlands in 2050 may consist of sustainable gas.

Kiwa Gas Technology has more than 20 years experience with the addition of biogas into the gas network. We were involved with the engineering, installation and evaluation of the biogas upgrading installation in Tilburg, The Netherlands, which was put into service in 1987. It is expected that the use of biogas will expand rapidly in the future. Because of our extensive experience built up over the years, we are capable of providing tailor-made solutions to biogas producers, network companies and end users.



The locations in The Netherlands where upgraded biogas was fed in the natural gas distribution network in 2007



Gas Quality

According to the European guideline 2003/55/EC biogas must be allowed to be distributed, provided that the biogas meets the necessary quality standards. As a consequence, the quality requirements for biogas have been incorporated into Dutch Gas Law in October 2006. Kiwa Gas Technology has been closely involved with the setting up of the guidelines. We advise network owners and also biogas producers and gas users regarding the gas quality, how this is measured and which measures can be taken to improve this quality.

Gas Analyses

In our laboratory we analyse several hundreds of biogas samples for our customers per year. For them it is important to know whether the gas fulfils the right requirements to be allowed to be added to the gas network or for application in a gas engine.

We are able to perform the following measurements for you:

- Main components (Caloric Value, Wobbe-number, methane number, nitrogen, oxygen, CO₂)
- Water content
- Silicon compounds (Siloxanes, amongst others)



- Halogene compounds
- Sulphur compounds
- Higher hydrocarbons, including aromatic compounds

Materials Research

Kiwa Gas Technology has well equipped laboratories for testing materials, in which we can determine the mechanical, physical and chemical properties of metals and polymers. The potential influence of biogas on materials can be measured in these laboratories as well.

Safety

The business team "Safety Gas Installations" is also part of Kiwa Gas Technology and it is the centre of excellence in The Netherlands when it comes to the safety of gas installations. In The Netherlands the government has chosen to transfer the inspection responsibility from the energy suppliers to the local authorities. As a consequence many local authorities now have the need for advice regarding the gas safety of installations in the area for which they are responsible. All knowledge regarding regulations, accident prevention and accident investigation is concentrated and available within one team of experts, whose target it is to provide a substantial contribution to the safe application of (bio)gas in households, companies as well as industries.

Consultancy

In order to provide clarity in the complex matter of incorporating biogas in the energy supply chain, Kiwa Gas Technology performs different kinds of research. The result is an advice which supports the authorities, network companies and manufacturers in the further development of policy, drafting regulations and the application of biogas.

Some examples of the many advices we have provided already are:

Senter Novem:

- Evaluation of a landfill gas upgrading installation
- Inventory of gaseous energy carriers in Europe
- Quality aspects of Green Gas

European Union:

- Feeding in biogas into the natural gas network

Network Companies:

- Economical and technical feasibility of biogas injection into the distribution network
- Quality aspects of biogas

Hydrogen

Hydrogen will play an important role in future energy supply. Upon the combustion of hydrogen no CO₂ is released. Furthermore, hydrogen is suitable for the storage of (sustainably produced) electricity.

By already gaining experience with hydrogen related to the distribution network and gas appliances now, Kiwa Gas Technology offers the decision makers a set of arguments to say yes to a sustainable energy infrastructure.

Ameland as the Demonstration Project

In January 2008 the project Hydrogen in Natural Gas was launched at Ameland, a Dutch Island off the North Coast of The Netherlands. In the project in the apartment complex Noorderlicht in the town of Nes, hydrogen is fed into the normal natural gas network. The use of sustainably produced hydrogen reduces the CO₂-emission considerably. The addition of hydrogen is a first step towards sustainable gas.

In assignment of GasTerra and Eneco, Kiwa Gas Technology performs research after the maximum amount of injected hydrogen at which the appliances (boilers and cooking devices) will still function safely



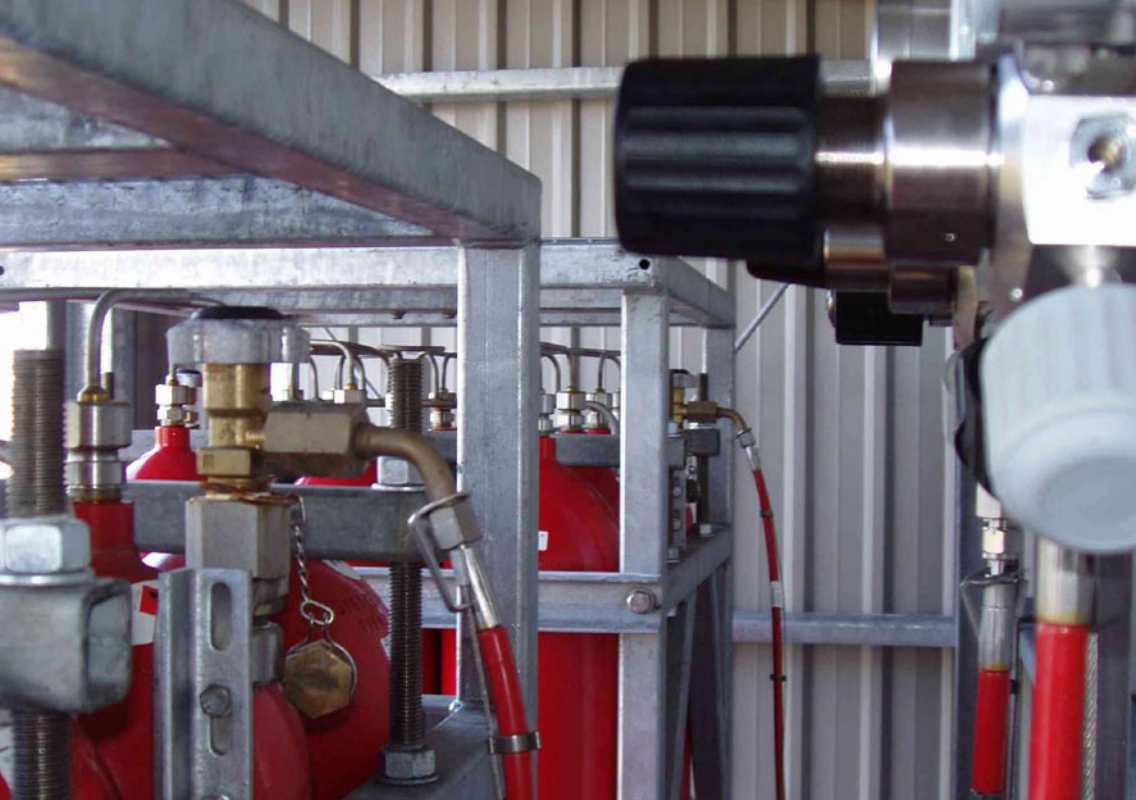
Realiseren hier het project
WATERSTOF IN AARDGAS
een eerste stap naar duurzaam gas

Koken en verwarmen met aardgas gemengd met waterstof spaart ons milieu en de gasvoorraad

Bouwfase 1: september - november 2007

Mede mogelijk gemaakt door Gemeente Ameland IPE Netbeheer en de bewoners van appartementencomplex 'Noorderlicht'

Dit is een project in het kader van 'Duurzaam Ameland'
Voor meer informatie: www.duurzaamameland.nl



and effectively. The influence of hydrogen on the properties of the materials used in the distribution network and on the functioning of gas meters is studied as well.

Development of Appliances

We develop hydrogen burners for respected boiler and automobile manufacturers.

Examples of this are:

- Development of an after burner for a fuel cell
- Fuel reformers
- Boil-off burners for hydrogen vehicles

Consultancy

Because of our extensive experience we can advise you regarding hydrogen, whether it concerns policies, drafting regulations or applications of hydrogen.

Some examples of the many advices we have provided already are:

Dutch natural as Distribution System Operators (DSO's)

- Feasibility of a hydrogen production facility
 - Research into the influence of hydrogen on gas engines
- Netbeheer Nederland, the central organisation of the Dutch DSO's*
- System study and research on the application of feeding in of hydrogen in the entire gas distribution chain

IEA GHG Group

- Reduction of CO₂ emissions by feeding hydrogen into natural gas

More information

Would you like to know more about the products and services of Kiwa Gas Technology, please refer to www.kiwagastechnology.nl.

Profile Kiwa Gas Technology

Kiwa Gas Technology offers gas technology services for gases such as natural gas, LPG, hydrogen gas and biogas. Kiwa Gas Technology delivers the following services regarding gas quality, distribution and application: consultancy, engineering, training, product development and building of components, appliances and systems.

We work for gas producers, gas network companies, the energy-consuming industry, the appliance industry, the machine building industry, the automotive industry, housing co-operations and governmental bodies. Nationally and internationally.

The added value of our services lies in our unique formula and chain approach. Our market knowledge, product knowledge, extensive range of products and services, sector-wide network and our continuous drive to innovate makes Kiwa Gas Technology the Partner for Progress when it comes to gas.

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