DRIVEN BY OUR NO. 1 ELEMENT
THE NORTHERN NETHERLANDS IS MOVING AHEAD WITH HYDROGEN. WILL YOU JOIN US?
Hydrogen is making an impression. According to KPMG, 75% of executives in the international automotive industry, as well as their customers, are convinced that the hydrogen car will gain ground. In the Northern Netherlands, we’ll soon push this percentage to the max. We’re ready to open the hydrogen tap. H₂ is a very convincing energy carrier – it’s reliable, filling up the tank is quick and easy, and you can drive hundreds of kilometres on a single tank. In addition, hydrogen is sustainable and always around: you find hydrogen in 75% of all matter in our universe. It’s also an element that likes joining up with other elements. No wonder that H comes first in the periodic table. H comes first everywhere. It’s our No. 1 element! That’s why in the Northern Netherlands, we’re now taking it out on the road. Will you join us?
THE BIRTH OF A GROWTH MARKET

The super element hydrogen likes to make connections. It has even connected Gasunie, Holthausen and Green Planet. This makes sense, given the rapidly unfolding developments and the measures being taken to prevent emissions of CO₂ and other harmful substances. Hydrogen is the way forward.

The hydrogen infrastructure in the Dutch Northern provinces of Groningen, Friesland and Drenthe is currently undergoing a big upgrade. Hydrogen will soon be available at various petrol stations in this region, for both cars and trucks. The next step will be for the Dutch corridors to be connected to other European corridors. The efforts undertaken by Gasunie, Holthausen and Green Planet will also create opportunities for new initiatives. Will your name be added to the list of hydrogen pioneers?
'As electric driving is still in the startup phase, BOVAG is pleased that the government is financially supporting different options. Public opinion is mainly focused on electric driving on batteries and the installation of recharging points. For the long term, however, BOVAG has high expectations of electric driving on hydrogen and the fuelling stations it requires. BOVAG therefore believes that the targets for hydrogen should be set higher. The two technologies could easily co-exist – each has advantages for different types of transport.'

**WHAT ARE WE LOOKING OUT FOR?**

- Car makers who wish to expand their range with H₂ vehicles
- Connecting corridors in the Northern Netherlands to European corridors
- Increasing the number of filling stations for hydrogen
- The Northern Netherlands becoming the H₂ catalyst for the entire country
- Scaling up the production and storage of hydrogen
- Fleet owners and lease companies providing... their customers with hydrogen cars
- Shippers and transporters joining the hydrogen movement
- Measurable results in terms of the objectives defined by the Paris Agreement on Climate Change, the European Renewable Energy Directive, the Connecting Europe Facility, the Dutch Energy Agreement for Sustainable Growth, the Vision on Sustainable Fuels (SER) and the BOVAG tool ‘Tankstation 2.0’
- We’re looking out for anyone who believes in the future of hydrogen, and anyone who believes that hydrogen will enable us to achieve sustainable mobility.
HYDROGEN FACILITIES IN THE NORTHERN NETHERLANDS
VERSATILE ENERGY CARRIER

Hydrogen and oxygen are the main elements of water (H₂O). The two elements can be separated using electricity through a process called electrolysis. Thanks to the increasing availability of sustainable electricity, hydrogen will be an important clean fuel in our future sustainable energy supply. It can be used for mobility/transport, industry, electricity generation, and more.

By joining forces now, we can make hydrogen accessible and affordable for transport. This is why Gasunie, Holthausen and Green Planet are setting up a hydrogen network in the Northern Netherlands. Sustainably generated hydrogen is stored by Gasunie and distributed by Holthausen to their own fuelling stations and those of Green Planet.
'Since 2013, we’ve gained a lot of experience with implementing new fuels. Green Planet has developed a comprehensive roll-out strategy, which also makes hydrogen more widely available. We’re happy to share our experience. In order to make progress, collaboration is an absolute must.'

Edward Doorten, entrepreneur/initiator, Green Planet

GASUNIE
Gasunie is a renowned European gas infrastructure company. Its subsidiaries EnergyStock and Gasunie New Energy are setting up a power-to-gas installation at Zuidwending (Groningen) called HyStock. Sustainable electricity will be used here to extract green hydrogen from water. In the future, special salt caverns will enable large-scale storage of this hydrogen.

HOLTHAUSEN
Holthausen is a market leader in the field of delivery and transport of gases in the Netherlands, and is also known for its sustainable hydrogen filling stations, the ‘Energy Points’. Holthausen invests in fast-fill hydrogen fuelling stations and will, at some strategic locations, use locally generated solar power for the production of hydrogen. In addition, Holthausen specialises in the safe handling of gases.

GREEN PLANET
In 2013, Green Planet built its first ultra-modern multi-fuel filling station in Drenthe. The Green Planet brand stands for ‘Today for tomorrow’. In keeping with this, Green Planet works relentlessly on a low-carbon/zero-emission fuel supply for both cars and trucks. Now is the time to start using H₂. We’re happy to share our knowledge and experience. Join us!
ADVANTAGES OF DRIVING ON H₂

Driving on hydrogen offers huge advantages – both for the user and for our planet as a whole. Hydrogen can be extracted from water using electricity generated by natural sources, such as solar and wind power. This makes it fully sustainable.

THE BENEFITS AT A GLANCE:

CLEAN PRODUCTION

For the production of ‘clean’ hydrogen, energy from natural sources is used to convert water into hydrogen and oxygen. In the form of hydrogen, energy surpluses can be stored and distributed relatively easily. And because sustainable sources such as solar and wind energy are used, the production has no harmful side effects.
‘In the Paris Agreement on Climate Change, we agreed that there is a limit to the amount of CO₂ that we can still emit. Besides renewable green gas, hydrogen is a logical alternative energy carrier, particularly for sectors that are difficult to make sustainable in other ways, such as the transport sector. Another advantage of hydrogen is the possibility of storing and efficiently transporting sustainably generated solar and wind energy in large volumes.’

Gerard van Pijkeren,
Director of Gasunie New Energy

**CLEAN EMISSIONS**
Cars on hydrogen emit no harmful substances. The only ‘fume’ coming from the exhaust is water vapour. No CO₂ emissions, no odour nuisance and no air pollution of any kind.

**RAPID FILLING**
Cars on hydrogen can be filled rapidly. It takes about three minutes to fill the tank of a passenger car. Each filling station will be able to serve more than 100 vehicles per day. And this number can be quickly scaled up.

**LARGE ACTION RADIUS**
Driving on hydrogen gives the driver a large action radius of 800km on one tank.
Using green energy, HyStock converts water into hydrogen and oxygen (electrolysis).
HyStock compresses the hydrogen and stores it.

Distributors such as Holthausen and Green Planet purchase hydrogen for their special hydrogen filling stations.
As of September: Completion of work on HyStock installation at gas storage installation Zuidwending

As of September: Preparation of construction of hydrogen filling stations in Northern Netherlands
‘Hydrogen is easy to produce: you basically put water and electricity into an installation and, as a result of electrolysis, hydrogen comes out. You can use this hydrogen for transport, for instance. But its success is highly dependent on the market. If other parties also embrace this concept, I think the hydrogen market will rapidly become a growth market.’

Henk Abbing, Director of EnergyStock (a Gasunie subsidiary)

BASIC DETAILS OF THE HYSTOCK INSTALLATION AT ZUIDWENDING

- One electrolysis unit for converting sustainable electricity and water into green hydrogen
- Compression system for filling tube trailers (storage cylinders)
- Mobile tube trailers
- Underground caverns for future large-scale storage
- Salt dome at Zuidwending, suitable for creating future caverns for large-scale hydrogen storage of up to 6,100 tonnes (238 GWh) per cavern
- 5,000 solar panels

2018

June: Work starts on construction of the hydrogen filling station network in Northern Netherlands

2018

September: HyStock installation at Zuidwending starts operations

2019

From January: Hydrogen filling stations ready
## CRITICAL REMARKS CONCERNING HYDROGEN

1. ‘HYDROGEN ENGINES ARE EXPENSIVE.’

That may be true, but don’t let that put you off. This was initially also the case with fossil fuels and electric driving on a battery. A major advantage of hydrogen is that it’s present everywhere and, unlike electricity, can be stored for a long time. When there’s plenty of hydrogen in store, the cost will be lower. The cost of driving on hydrogen is similar to driving on petrol.

2. ‘IT’S SUCH A HASSLE TO MAKE DIESEL CARS SUITABLE FOR HYDROGEN.’

That’s not as bad as it seems. Holthausen has already converted several vehicles. And elsewhere in the Netherlands, people are also gaining experience with it. For greater ease of use, Holthausen has developed a ‘conversion kit’ that mechanics can use to replace diesel and petrol engines by electric engines with a fuel cell. This is now being tested on road sweepers. Of course, you can also buy a new hydrogen car from one of the production lines. Electric engines can also be adjusted to make them suitable for driving on hydrogen. This could increase their action radius by as much as 500%.

## SUBSIDY

Dutch provinces are currently drawing up financial incentives to encourage the purchase of hydrogen vehicles.
In 2019, we’ll start with nine filling stations in the Northern Netherlands. Hydrogen is easy to distribute, but further growth mainly depends on the interest of consumers and companies. Fortunately, we have an attractive proposition that fits in neatly with the climate targets. And this raises expectations, leading to more filling locations being created.

Diesel, petrol and natural gas are safe fuels as long as they are used as prescribed. The same goes for hydrogen. Much experience has been gained with H₂, and there are detailed safety standards and ISO codes for hydrogen filling stations. Thanks to advanced technological developments, hydrogen can be safely transported and used. Hydrogen is even safe to inhale!

‘A couple of years ago, we shifted our focus to sustainable gases to future-proof our company. What’s more, I’m strongly convinced that, together, we need to take better care of our planet. This will only be possible if we approach sustainability in a different way. This includes significantly reducing CO₂ emissions. With the kick-off of this hydrogen network, we’re making an important contribution.’

Stefan Holthausen,
General Director of the Holthausen Groep
LET’S DO THIS

Hydrogen, we’re moving forward! This is the time to weigh your chances and join in. Do you feel inspired by our story? And would you like to work with us on a sustainable and rewarding breakthrough? Get in touch! Even if just for a chat.

Holthausen Groep
www.energypoints.nl
info@holthausen.nl

HyStock
www.energystock.com
info@energystock.com

Holthausen Waterstof Centrum
www.waterstof-centrum.nl
Info@waterstof-centrum.nl

Gasunie New Energy
www.gasunieneuenergy.nl
communicatie@gasunie.nl

Green Planet
www.greenplanet.nl
info@greenplanet.nl