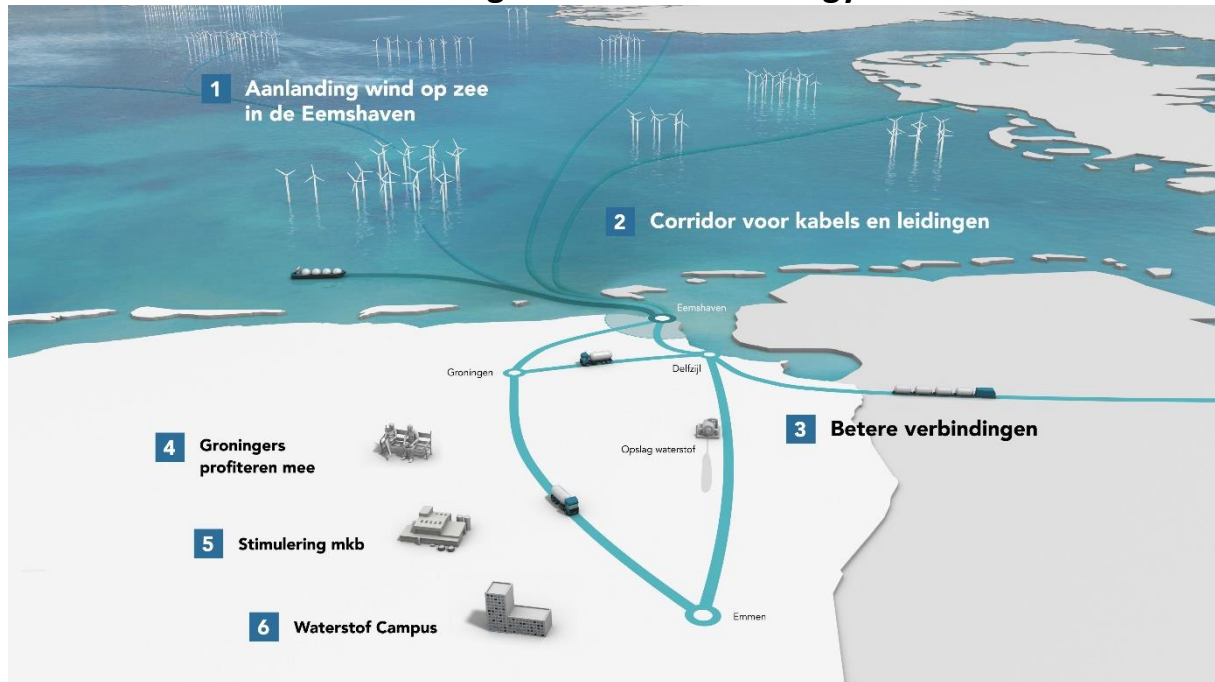


## The future of Groningen

### Northern Netherlands as an engine for national energy transition



#### Summary

Groningen is successfully developing into a leading hydrogen region. In doing so, it is responding to the phase-out of its natural gas position in recent decades. Many projects involving the value chain of hydrogen and renewable feedstock have materialized in recent years - also crucial to the Dutch national energy transition. And there is an investment plan towards 2030 of more than €10 bln.

However promising these developments are and however much appreciation there is from the EU, there are still three basic preconditions for this development that are not yet guaranteed. It is imperative that they are, as soon as possible.

This concerns first of all the guaranteed **large-scale landing of wind at sea in Groningen**, or the guarantee that roughly a third to half of all offshore wind energy generated and to be generated in the Dutch part of the North Sea will land in Groningen (Eemshaven) in the form of electricity or hydrogen.

In addition, a **North Sea-Ems Corridor for cables and pipelines** must be established as soon as possible by creating a future-scale connection for energy flows between Eemshaven and the North Sea and North Sea countries.

Finally, adequate **additional space at Eemshaven** (Groningen Sea Port area) must be made available as soon as possible for the planned activities and the infrastructure around Eemshaven-Delfzijl must be strengthened and tailored to the new activities.

These three steps are all-important. Nevertheless, for the successful development of the Northern Netherlands and Groningen in particular to become the Hydrogen Valley of Europe, it is equally important that the developments also be embraced by the population of Groningen. This means that all kinds of measures are also needed to ensure this, such as: eradicate the relatively extensive energy poverty amongst the region's population, strengthen and expand local SMEs around the theme of hydrogen and renewable feedstock, and strengthen innovation capacity and employment in relation to hydrogen developments.

The development into a leading Hydrogen Valley that is a model for the rest of Europe will eventually lead to a revival of the region into one of the leading suppliers of clean hydrogen, boosters of green chemistry, and centers of innovative applications of hydrogen and related knowledge and training.

"Groningen is the energy supplier of the Netherlands and Europe. Formerly with peat, later with natural gas and now with hydrogen. If we take three crucial steps for energy infrastructure and three steps for population, entrepreneurs and education, we increase Groningen's lead as an engine of the (inter)national energy transition."

## **Introduction**

With the end of the natural gas era Groningen in sight, all kinds of parties in Groningen have been preparing for some time now for a relaunch to maintain the region's dominant international energy position and its benefits for the Groningen people and economy, based on the complete value chain of clean hydrogen and renewable resources. This is also done from the realization that 'Groningen' can thereby provide a crucial impetus to the national energy transition.

A solid and ambitious foundation has already been laid for this, for example, through the first projects aimed at the production of hydrogen and green chemical products (RWE, ENGIE, Lhyfe, North2), the establishment of a hydrogen transport (backbone, with a connection to the Ruhr area) and storage system (Zuidwending and possibly offshore empty gas fields), and numerous local applications of hydrogen and green raw materials in industry (HEAVENN, DJEWELS, SkyNRG, BioMCN and Avantium); transportation (buses, trucks, ships, train); and the built environment (Hoogeveen, Wagenborgen). The related plans toward 2030 were inventoried in 2020 (McKinsey report) and may add up to a project agenda the size of €10 billion and more. This agenda is still expanding daily, driven in part by the need for acceleration due to the Ukraine crisis and the increased desire for security of supply of energy and its affordability for all.

On the European side, these developments have long been seen as so promising that Groningen has already been designated in 2019 as Europe's first Hydrogen Valley and shining example of how a region can be a leader in the energy transition. This example was also cited several times by President Von der Leyen during her recent State of the Union address. Brussels sees that all sorts of conditions have been met that make it possible for the Northern Netherlands, and Groningen in particular, to develop into the hydrogen focal point

of Europe that others can emulate, and thus a European iconic project in the field of energy and booster of energy cooperation in the North Sea region and beyond.

For this development, the region can and does do much itself, but not everything and certainly not alone. Hence, there are also concerns. Will there be enough broad support for the perspective that has been initiated to continue? Will the planned investments in production, transport and storage all materialize? Will the envisioned new applications and components of the manufacturing industry get off the ground? And, most important of all, will the people of Groningen be included in and benefit from this progress? A concern also fueled by broader unease in the region, prompted by earthquake woes, relative deprivation and energy poverty.

Absolutely critical to the breakthrough investments toward hydrogen and green resources and their widespread adoption and benefit in the region is that major steps actually be taken. Looking forward to the announcement of some major iconic projects, such as, for example: FID of 1 GW of electrolysis capacity in Eemshaven/Delfzijl by 2023; by 2025 a substantial import flow through Eemshaven of hydrogen, for example via a hydrogen pipeline Eemshaven - Iceland via the Shetlands or otherwise using ships; and by 2024 the establishment of a large manufacturing plant in Eemshaven running on the first locally produced hydrogen. This would then show even more clearly that the Northern Netherlands, with Groningen, remains the green energy region of Europe. We have the potential, the spirit and the plan, but we do need the coherent actions of the European and regional governments, but above all the national government, in some crucial facilitating parts.

## **Steps that are decisive for progress and must be taken in the short term**

Three steps, which really need to be clarified in the short term with the help of the national and regional government, can be considered absolutely decisive for the further progress and expansion of the Hydrogen Valley to a European Flagship status. Indeed, without this clarity, the long-term prospects of the Hydrogen Valley remain too uncertain to inspire full confidence among all Groningers. And they are steps through which the Northern Netherlands shows that it remains essential for the (green) energy supply in the Netherlands and Northwest Europe!

These three steps are:

**1. Guaranteed large-scale landing of wind at sea in Groningen, or the guarantee that roughly one-third to one-half of the wind energy generated and to be generated on the Dutch part of the North Sea will land in Groningen (Eemshaven) as green electricity or as green hydrogen.**

This can be achieved, for example, by including this location condition in the tender conditions, and/or by including it in the design of the offshore infrastructure.

**2. A North Sea-Ems Corridor for cables and pipelines.**

This concerns the guarantee that an Eems corridor for all cables and pipelines for offshore electricity, hydrogen and CO<sub>2</sub> from and to Eemshaven, the North Sea-Ems Corridor, will be created in the foreseeable future. This will connect Groningen to energy flows to and from the North Sea and North Sea countries via the one-time construction of one offshore corridor. This project would need to be done in a single, large scale to reduce ecological disturbances.

### **3. Adequate space and infrastructure around Eemshaven/Delfzijl.**

There must be a guarantee that the required space around and infrastructure to and from Eemshaven is available. This is necessary to facilitate the intended investments in hydrogen and green raw materials incl. renewable carbon, but also to create a powerful energy hotspot there. So, fast permit procedures aimed at expansion of the port area (Oostpolder), pipeline connections between Eemshaven and chemical cluster Delfzijl for renewable carbon chemistry, better connections via highways between Eemshaven and Groningen and Emmen, and faster connections by ship, truck and train with the North Sea countries.

These three steps are all-important: without them, no credible perspective. But these steps are not enough. They do form the hard core of the region's hydrogen plan, in addition to the anticipated private investments in the production, transport and storage of hydrogen and green raw materials and large-scale applications in chemistry. But more is needed: the people of Groningen must benefit.

### **Additional crucial steps that determine success**

Not for nothing did Brussels find Groningen's Hydrogen Valley unique in that the entire value chain is being developed simultaneously in the region. So 'the hard core' - production, transport, storage and large-scale application - is important, but also, if you will, 'the softer follow-up', such as: (smaller-scale) applications by SMEs, in mobility and the built environment, developing the underlying manufacturing industry, building innovation clusters with start-ups and scale-ups, collaboration with the knowledge institutions and education, and involving local agriculture, local transport and broader population layers in the developments. In short, these steps, too, are crucial. Without them, the development into Europe's premier Hydrogen Valley will not land in the diverse strata of Groningen's population. What is required for this in any case and in the short term are:

### **4. Measures to combat energy poverty and crumbling support.**

It cannot be that the region that has supplied our country and surrounding countries with gas for decades and supplies roughly one-third of our country's electricity is the most energy poor. Thus, in order to restore confidence and support, it seems advisable to address this quickly. Many initiatives to this end can be developed in the reasonably near future. One of the most interesting options is to make plans so that industry can use residual heat on a large scale to heat urban neighborhoods and villages at lower cost via a heat network. In this way, many Groninger buildings can be taken off the gas. This also helps people's wallets and contributes significantly to local support.

And why couldn't the residents of some villages be helped through the existing distribution network to heat their homes with hydrogen through a long-term contract at a portable price? After all, this option, as evidenced by projects in Lochem, Hoogeveen, Wagenborgen and Stad aan Haringvliet, among others, is already being successfully developed for homes. It also helps if substantial investments are made in bio-refinery for green kerosene (SAF) (also to be deployed at Groningen Airport Eelde), because this also means an impulse for the regional farming community that supplies the biomass. All this strengthens the relationship between two sectors that are already dominant in Groningen, energy and agriculture, and thus the support base. Also from the biorefinery, the residual heat can be returned to the inhabitants, while the residual products can be put to circular use. The use in chemistry and possible conversion (into H<sub>2</sub> and CO<sub>2</sub>) of green gas from local agricultural biodigesters can be equally helpful here.

## **5. Measures to support local SMEs.**

Many SMEs in the region are looking for how to green their energy supply. Electrification is an option, but this increasingly encounters long-term bottlenecks in the sphere of demand congestion on the grid and uncertain power prices. Green hydrogen or possibly green gas from the region is a good alternative, if available at acceptable and (via long-term contracts) stable prices. Part of the hydrogen production and imports in Groningen could be reserved for this purpose and delivered to SMEs through existing distribution networks via special regional tenders at favorable conditions. Any technical modifications could be subsidized.

A similar activity could already be developed in the short term for the regional logistics sector, especially buses and trucks, but perhaps also trains, ships and light air traffic. The "German model" seems interesting here: there the organization H2Global buys green hydrogen (expensive), offering it cheaper not only to local industry thanks to subsidies, but also to a company that leases bundled hydrogen trucks to major transport companies. By bundling demand and using the existing distribution grid, such an arrangement would also allow hydrogen costs to remain low for SMEs in our country.

The population of Groningen will be systematically informed about and involved in the plans. And experiences and progress will be shared with them through an experience center.

It is also important for the growth of local SMEs that they are actively recruited for the establishment of related manufacturing industry, such as factories that build, innovate and test electrolyzers, fuel cells or their components together with the regional test centers and knowledge sector. Possibly part of the funding could then be through grants from the state and the EU. Business activity focused on offshore electrolysis could also further strengthen future Eemshaven activities in this area.

## **6. Measures to strengthen innovation capacity and employment.**

Projections broadly indicate that the replacement of current natural gas activities with hydrogen activities can ensure that the jobs lost in the natural gas sector can be (more than) compensated by those in the new hydrogen activities. However, the net employment effect increases substantially if the region succeeds in becoming a major innovation hub.

Therefore, it is important that the education, research and testing activities in the Northern region be bundled and strengthened as soon as possible into a Hydrogen Valley Campus of European stature. This must be done quickly because it takes a long time to train a new knowledge generation, and to set up preparatory research and testing activities. This Campus should become the basic facility for innovation, startups and valorization of research results throughout the Northern Netherlands in the field of the hydrogen economy, offshore electrolysis and green and circular chemistry. If successful, the Campus is expected to act as a magnet for top international talent seeking to focus on the theme: not brain drain, but brain gain. Plans around continuing education lines focused on hydrogen and the aforementioned Campus, by the way, are already under development and can be an important fulfillment of the broader envisioned University of the North.

Finally, what also helps tremendously towards innovation and valorization is the construction of a state-of-the-art site where pilot-plants can develop. Preferably near the hydrogen production or storage hub, Eemshaven and/or Veendam, or near the Campus test centers, such as Groningen.

### **The result in 2050**

The result of the efforts will be that all of the Netherlands runs on energy that is green and affordable, knowing moreover that there is energy security due to stocks of green energy being stored, especially in Northern Dutch salt domes and offshore empty gas fields.

The North is once again the supplier of energy to all of the Netherlands and beyond. After peat and gas, there is now clean hydrogen and the hydrogen carriers derived from it, such as ammonia, methanol and green kerosene. The North also supplies on a large scale the renewable carbon, which, through the green chemistry with the green hydrogen, form the basis for numerous energy carriers, raw materials and products. The investment program envisioned around 2020 has now been far exceeded by a multiple.

The North in general, but especially the province of Groningen, is now reaping the benefits of infrastructure such as: the Lelylijn, the doubling of the N33, the strengthening of the position of Groningen Airport Eelde and the development of a Next Generation Hydrogen Valley supported by a high-quality innovation hotspot, the Hydrogen Valley Campus Europe with all its branches. Hydrogen development also benefits from the activities of the University of the North with all its ongoing lines of education and research, and the braingain it has all generated.

There are energy cables and several pipelines through the Ems to transport green power, hydrogen and hydrogen carriers that land in Eemshaven; through the hydrogen traffic circle in Groningen, the hydrogen is traded and distributed.

The North has become CO<sub>2</sub> negative and thus a climate-positive region. We have a circular economy and vital agricultural sector, which has reinvented itself in the energy transition partly through cooperation with the chemical industry.

Also, the North is: the center of innovative green chemistry; all heavy mobility and part of passenger transport has now switched to green hydrogen; and a substantial portion of homes are heated using hydrogen obtained locally through tenders relatively cheaply from regional production units. The wide availability of hydrogen on relatively favorable terms in the region has led to the advent of quite a manufacturing industry. Energy poverty and relative backwardness are a thing of the past.

## **Colophon**

### **With contributions from:**

New Energy Coalition

VNO-NCW

HyNorth

Gasunie

RWE

Shell

Groningen Seaports

Groningen Airport Eelde

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