

A CLEAN PLANET FOR ALL!

**STRONG
NORTHERN
NETHERLANDS**

POWERED BY SNN



SNN

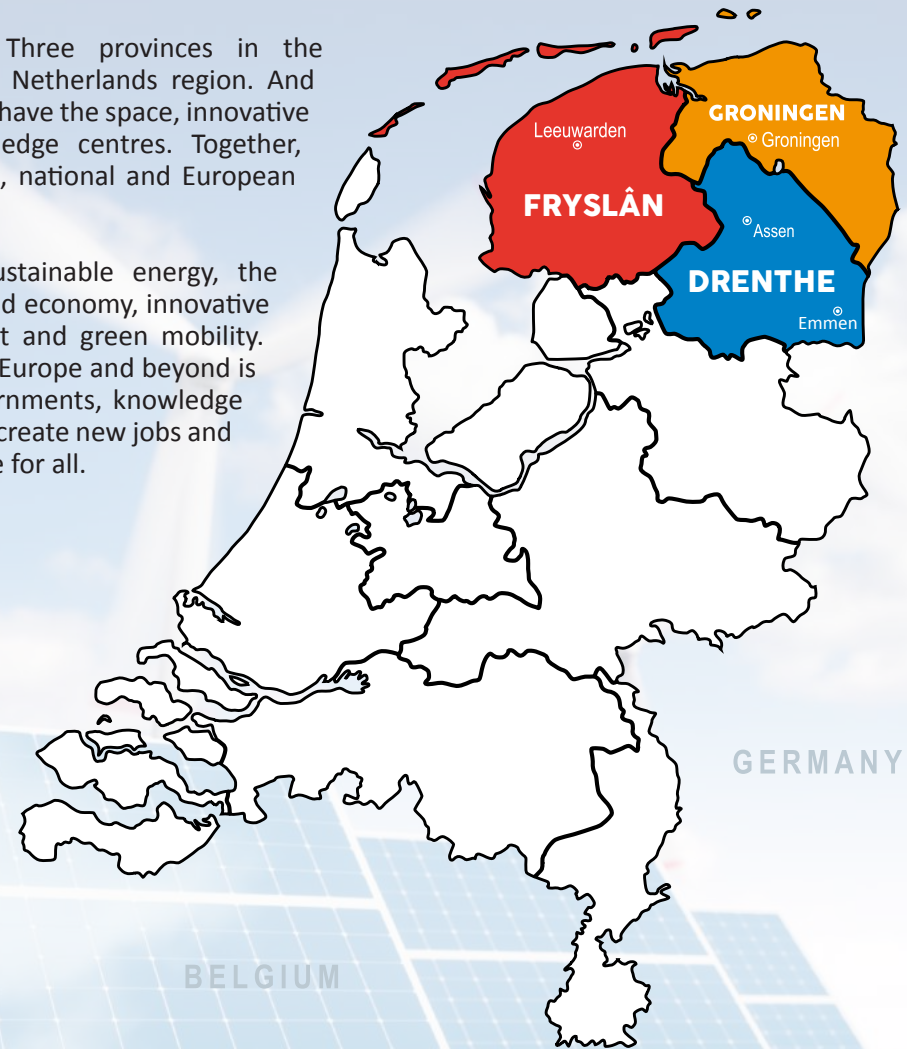
NORTHERN NETHERLANDS
ALLIANCE

WE ARE THE ENERGY ECONOMY OF THE FUTURE

WE ARE THE NORTHERN NETHERLANDS

Groningen, Fryslân and Drenthe. Three provinces in the Netherlands that form the Northern Netherlands region. And what a great European region it is! We have the space, innovative entrepreneurs and top-notch knowledge centres. Together, we find solutions for today's regional, national and European challenges.

We invest in the production of sustainable energy, the development of a circular and biobased economy, innovative agriculture, healthy ageing and smart and green mobility. Cooperation within the region, within Europe and beyond is key! Citizens, local and regional governments, knowledge centres and SMEs all work together to create new jobs and a healthy, green and sustainable future for all.



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ENERGY TRANSITION IS NOT A CHOICE FOR THE NORTHERN NETHERLANDS REGION, IT'S A NECESSITY.

THE NORTHERN NETHERLANDS REGION CALLS FOR AMBITIOUS CLIMATE AND GREEN ECONOMY GOALS

As a region that used to rely heavily on the extraction of natural gas, the Northern Netherlands is now at the forefront of the transition to a sustainable energy supply. This extraction of natural gas causes earthquakes in our region which puts the safety of our citizens in jeopardy. This gave us the motivation to switch to other energy sources. We have the infrastructure and space for the production, storage, transport and application of green energy at a large scale.

Through sun, biomass and wind, the Northern Netherlands is already producing a considerable amount of sustainable energy. One of our focus points is offshore wind energy, north of the Wadden Islands. We use this energy to produce green hydrogen, which also enables us to green our chemical industry. We can store the energy surplus here and transport it through our efficient grid by adapting our existing gas pipelines infrastructure.

Thanks to the production of sustainable energy and in particular green hydrogen, we are managing to decarbonise our mobility sector. The region has a prominent role in testing autonomous and green transport (including trains, utility vehicles, and airplanes) and promoting modal shifts, which includes the use of our ports and maritime and inland waterways. We are committed to energy efficiency by making homes, public buildings and entire neighbourhoods energy-neutral. Efficient use of energy and resources is also key to our well developed circular economy. The leading position taken by the Northern Netherlands region is not solely due to the many projects we are engaged in but also thanks to cross border cooperation with Germany and Scandinavia. This energy transition is also a job market transition as it aims to replace the fossil fuel business with new green sectors as a source of employment opportunities.

We can only achieve this by involving all stakeholders and working together with the EU, the provinces, the cities, as well as businesses, knowledge centres and citizens. The Northern Netherlands therefore promotes a bottom-up energy transition and a localised approach.

***ENERGY TRANSITION AND NEW GREEN
JOBS: WE MAKE IT HAPPEN!***





OUR VIEW ON HOW TO ACHIEVE A CLIMATE-NEUTRAL EUROPE

On 28 November 2018, the European Commission published its Communication “A Clean Planet for all”, outlining its vision for long term decarbonisation. The Northern Netherlands Region would like to share its view and a number of suggestions on how the EU can support regions and cities to make sure the decarbonisation strategy can effectively deliver the best possible results for EU citizens and businesses.

SUPPORTING THE DEVELOPMENT OF NEW CLEAN TECHNOLOGIES

For the Northern Netherlands Region, widely known as the Energy Valley, the transition towards renewable energy is crucial. Therefore, we welcome the proposed EU strategy for achieving the transition to net-zero greenhouse gas emissions by 2050.

We believe the EU should give extra support to regions that are making the transition from the production of fossil fuels to alternative fuels. Funding for the development of new clean technologies is crucial to address the socio-economic challenges, build resilience and adaptability to climate change.

A LEVEL PLAYING FIELD FOR HYDROGEN

The production of renewable electricity is key and we appreciate that the Commission defines hydrogen electrolysis as a major opportunity for the decarbonization of sectors such as heating, transport and industry. The deployment of hydrogen in various applications is already being demonstrated in our industry, mobility and the built environment.

We believe the EU should ensure a level playing field in order to upscale renewable energy production capacity and green hydrogen production in Europe.

THE REGION IS THE PLACE TO BE

We support the Commission in its engagement to ensure this transition is socially fair without leaving EU citizens or regions behind. In order to achieve a successful energy transition, it is necessary to take all stakeholders into account and rely on a local approach. Therefore, the new strategy must be based on a multi-level governance approach.

We believe the EU should recognize the important role of regional and local authorities in the energy transition and allocate more resources to support innovative energy projects, both large-scale interregional projects and small-scale initiatives at local level.

CROSSBORDER ENERGY

We strongly support the Commission’s proposal to create “new financial instruments, addressing both large and small-scale investments such as energy communities that will boost the energy transition”.

We believe the EU should facilitate investments in cross border energy and climate cooperation and infrastructure.

TOWARDS A CIRCULAR ECONOMY

The Northern Netherlands welcomes the steps that the European Commission has taken towards the shift from a linear to a circular economy. The Northern Netherlands is one of the leading regions promoting the circular economy: products from natural materials are being designed, energy neutral houses are being built, delicious products are being grown on saline soil, and household appliances are being made from recycled plastic.

We believe the EU should facilitate regional and cross border bottom-up initiatives in the circular economy in regions and remove regulatory barriers.

HYDROGEN PIPELINES

We welcome the fact that the strategy addresses the potential of biomass feedstock or hydrogen-based chemical production for significantly reducing emissions. The Northern Netherlands region is on its way to becoming a major production center for green hydrogen. Therefore, we underline the importance of making hydrogen infrastructure part of the distribution landscape. The existing network of gas pipelines can be adapted for this use.

We believe the EU should integrate green hydrogen in the EU gas regulatory framework and create the possibility to convert national gas pipelines to hydrogen pipelines.

SMART AND GREEN MOBILITY

Smart and green mobility plays a key role in the strategy for decarbonization. As a frontrunner region in this field, we encourage the EU to commit to the development and upscaling of innovative and sustainable transport solutions to make our mobility sector smarter and greener.

We believe the EU should provide for increased funding for the development and upscaling of smart and green mobility innovations, also for regions that are part of the TEN-T comprehensive network. The comprehensive network should be given equal funding priority with the TEN-T core corridors.

FLEXIBLE RULES AND REGULATIONS

Flexible rules and regulations are necessary to enable the development of innovative solutions. Additionally, it would be helpful if regional governments were given more opportunities for public-private partnerships.

We believe the EU should adopt regulations to create harmonized rules and standards for example for autonomous vehicles.

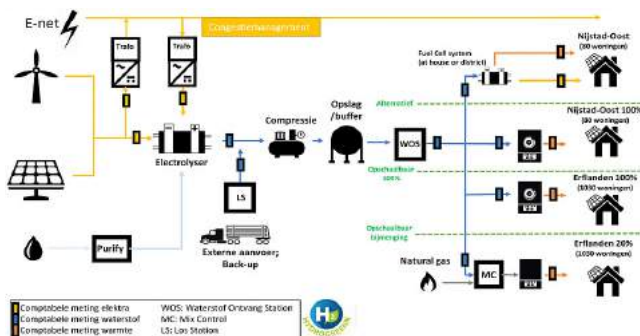


OUR CONTRIBUTION TO THE ENERGY TRANSITION

We have the goal to achieve 100% net zero carbon by 2050. The region is already a front runner in the field of green gas, with the goal of achieving an energy transition that enables 95% of all energy used in the region to come from Renewable Energy Sources (RES), and deliver zero emissions transport by 2035. As outlined in the European Commission's proposal, the road to a climate neutral economy will require joint action in a number of strategic areas. The Northern Netherlands is able to contribute to the realization of this vision in five areas 'Northern Netherlands style': via cooperation and innovation.

1. ENERGY EFFICIENCY

The Northern Netherlands is working on making the built environment energy neutral. It is the essential building block of a smart and sustainable energy system. The ambition to phase out gas in the heating sector will lead to a shift to sustainable heating. In the Northern Netherlands different methods are implemented, selected for suitability on a case by case basis.



THERMAL ENERGY FROM SURFACE WATER

The Province of Fryslân is characterised by the large amount of surface water and initial feasibility studies have shown that this form of energy extraction can provide 35 % of the heat requirement needed for the built environment in Fryslân. The aim is to create feasible business cases with other parties. There is good cooperation with the national government and the water board and in the municipality of Heeg a pilot project is being developed.

HYDROGEN NEIGHBOURHOOD

In the Province of Drenthe, a pilot project has been started using heating from green hydrogen in the built environment. In the municipality of Hoogeveen a new recreational area is being planned which aspires to be the Netherlands first hydrogen neighbourhood. In an inspiring way, the initiative combines the expertise of schools and universities to combine knowledge and innovation in the planning process.

NORTHERN NETHERLANDS CLIMATE SUMMIT

is an excellent example of working together to discuss innovation in the energy sector. The ambitious scale of this event, bringing all initiatives together in one central point, has given the energy transition an extra boost. As an example of deeds rather than words, over 20 public-private agreements were signed during the summit, aimed at setting up concrete projects that contribute to reaching our climate goals. This shows the benefit of progressive government policy and entrepreneurship working together towards building a sustainable regional economy.

2. RENEWABLE ENERGY PRODUCTION DECARBONIZING EUROPE'S ENERGY SUPPLY

The Northern Netherlands wants to become energy neutral and less dependent on natural gas. Offshore wind is crucial to achieve these goals, while creating green jobs in the process. Existing wind parks and planned development of offshore wind north of the Netherlands amounts to 1.3 gigawatts (GW) in 2026. However, to create an affordable green hydrogen economy, much more offshore wind energy production is

necessary. We urge the Dutch national government to appoint new offshore wind areas in the northern North Sea. Moreover, we see possibilities for cross-border projects with Germany, which extends the international grid. Besides offshore wind, land-based wind power parks and solar parks have been built and more will be developed.



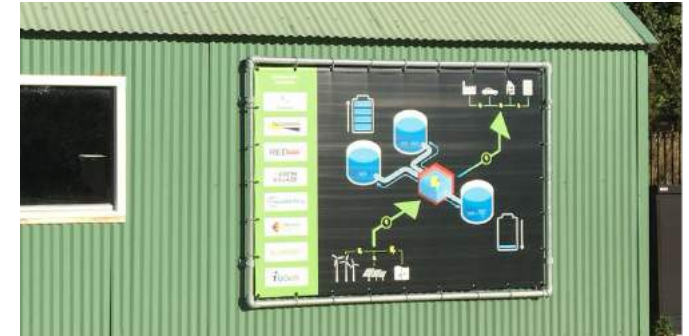
GROWTH OF HYDROGEN TO COMMERCIAL SCALE

Companies in the Northern Netherlands plan to invest in annual production of emission-free hydrogen to an order of magnitude of billions of cubic metres. The aim is to develop multiple plants for the production of green hydrogen with a capacity of at least 100 megawatts (MW) each and production sites for blue hydrogen with a total capacity of at least 1.2 GW. In addition, the parties wish to build the infrastructure for the transportation and storage of hydrogen and enable the use of hydrogen in industry and electricity production.



BLUE ENERGY

REDstack is the global leader in the field of salinity gradient energy, both for power and green hydrogen production. This pioneering company wants to develop and commercialise this energy using Reverse Electrodialysis (RED) technology. When a small quantity of fresh water is added to salt water in a membrane pile (a stack), 'osmotic energy' is generated. This clean energy can be produced wherever rivers run into the sea. The technology produces power or green hydrogen. Available 24/7, it can be used as baseload (grid stability) and peak shaving. The Afsluitdijk is home to the biggest test facility of salinity gradient energy in the world. REDstack can produce electricity as base-load energy, or it can directly produce hydrogen. Currently preparations are underway for the next phase upscaling to an installation of 1MW. REDstack is a core partner of the EU H2020 project Revived.



AQUABATTERY

Aquabattery is developing a BlueBattery which is the only electrical storage system that is 100% sustainable.

- Clean & sustainable: It requires only table salt and water, both of which are abundantly available.
- Affordable solution: The storage materials (salt and water) are abundant and combined with the long life of the system, the levelized cost of energy storage is on a par with the current battery solutions.
- Environmentally safe: No toxic chemicals are used. Even if the battery leaks, the chemicals are safe.

The energy storage solutions of Aquabattery is scalable to any requested size, which could help in load balancing and grid stability. It can be placed at the end user or the producer. In H2020 project BOABAB further testing and upscaling of this promising technology is supported.

3. SMART AND SUSTAINABLE MOBILITY

Our region aims to create a zero emission (ZE) transport system by 2035, encompassing road, rail and inland waterways. Hydrogen will play an instrumental role in achieving this goal, whilst other technologies and alternative fuels which can lead to ZE mobility will be considered and facilitated. A key part of the approach is to strengthen cross border connections in particular railway connections to Germany, as well as exploring the potential for innovative developments such as Hyperloop.



GREEN MOBILITY

The Northern Netherlands is making major progress in making our public transport buses zero emission. In 2020 50% of all public buses in the Provinces of Groningen and Drenthe will produce zero emission and the other 50% will drive on Hydrotreated Vegetable Oil (HVO). Our ambition is that HVO buses will be converted to ZE buses in due course. The Province of Fryslân is aiming to have 100% zero emission public transport by 2025. The biggest challenges we are facing are long distance buses and the energy grid. Batteries don't have the capacity to ensure that long distance buses can reach zero emission. Green hydrogen could be a solution, which requires a network of hydrogen infrastructure and tank installations and the availability of cheaper green hydrogen.

In the Northern Netherlands the train network has no overhead cables. Because installing overhead cable is extremely costly, studies are being conducted looking into alternative solutions. A first pilot project with a hydrogen train is planned in 2019. Public transport is not

the only type of transport we want to make sustainable. 1000 public electrical recharging points for cars are already placed and we actively stimulate cycling and carsharing programmes.



AUTONOMOUS TRANSPORT IN ALL MODALITIES

The Northern Netherlands is the only region in Europe with pilot projects for autonomous transport in all modalities. We started in 2016 with the first autonomous shuttle on a public road. Several projects have taken place including tests with 5G and a public transport service in mixed traffic, transporting passengers between a bus station and the hospital in Scheemda. This project is the first Dutch example of an autonomous shuttle driving in mixed traffic with several crossings.

In 2019 the first tests with an autonomous passenger train will take place between Groningen and Zuidhorn. This will be the first time a passenger train will rely on autonomous drive on a Dutch railroad track. The ATO (autonomous train operation) technique is a huge step forward in creating more capacity on the railroads. On

top of that, it can be safer, uses between 15 to 30% less energy and creates a more comfortable journey for passengers.

In 2019 the Northern Netherlands will start an autonomous shipping project together with Groningen Seaports, centres of knowledge and several private companies.



DRONEHUB

Turning to a different modality, Groningen Airport Eelde is now the home of DroneHub. Several tests have taken place here with autonomous drones, including a successful test together with the UMCG hospital of Groningen. In this test medical packages were transported from the airport to one of the Wadden Islands. Groningen Airport Eelde is the only airport in the Netherlands with an exemption for testing drones. The shuttles and drones are both zero emission solutions.

MOBILITY INNOVATION CENTER GRONINGEN

To make sure citizens benefit most from our fruitful cooperation in the field of mobility, we aim to gather all expertise and experience with innovative solutions in one place. The province and city of Groningen have signed an agreement with institutions of three educational levels, among which the University of Groningen, to create a mobility innovation center (MIC). By now 15 private parties and other organizations have joined the initiative. In June 2019 the MIC will open its doors.

4. BIOBASED INDUSTRIES AND CIRCULAR ECONOMY



CIRCULAR ECONOMY: COOPERATION IS KEY

Cooperation with all stakeholders has ensured that the Northern Netherlands is the frontrunner in the circular economy in Europe. A good example of cooperation is the Circular Friesland Association which aims for a fast transition towards a sustainable and circular economy in the Province of Fryslan. It carries out a wide range of projects together with businesses, governments and civil society organizations.

In the EU project SCREEN, the Province of Fryslan cooperated with eleven EU regions on how to develop policy a circular economy and founded the basis for collaboration in this field all across Europe.

The Northern Innovation lab Circular Economy (NICE), based in the Province of Drenthe, is an initiative of 18 organizations that work together on the transition to a circular economy. NICE contributes to the growth of the innovation capacity for a circular economy by offering companies, governments and initiators a place to share potential business cases in practice with young talent from schools and Universities of Applied Sciences such as Hanzehogeschool Groningen; learning-by-doing together.

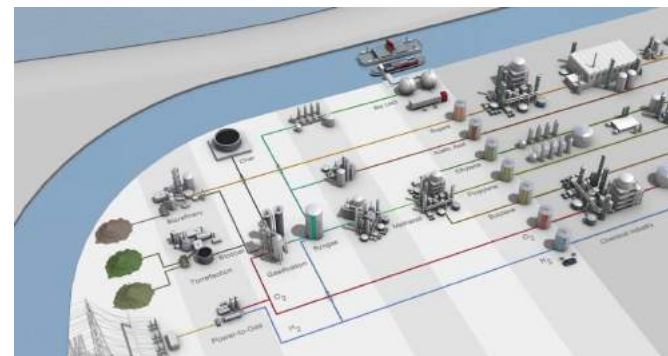


ECOLOGICAL IMPROVEMENTS

WaterCampus Leeuwarden is the innovation ecosystem for water technology within the Province of Fryslan, of which Wetsus is the beating heart. Over 240 companies are connected and participate in sustainable solutions such as recovery of phosphate, ammonia, metals, minerals, cellulose, biogas and heat. In addition, new feedstocks are being produced such as biodegradable bioplastic (PHA), which is produced out of urban waste water sludge. EU H2020 project Scalibur is currently funding the upscaling of this promising technology. It can also help in the innovation missions, which are defined in the framework of Horizon Europe.

The circular economy is also evident in the synergy based Programme Eems-Dollard 2050 that improves the ecology in the Natura2000 site of the Ems-estuary. The surplus sludge in the water of the estuary is used for climate adaptation measures. Dikes will be improved, and additional land will be created thanks to the sludge alongside the rising sea level.

Drained peats, which produce CO₂ emissions will be covered with a layer of sludge. The value for agricultural use will increase, CO₂ emissions decrease, the water level can rise helping adjacent nature areas. Sludge will also be converted into blocks for construction with a low CO₂ footprint.



BIOBASED INDUSTRIES: CHEMPORT EUROPE

ChemPort Europe in Delfzijl and Emmen forms an ecosystem in which companies that are committed to developing a greener chemical sector can flourish. This chemical cluster aims to be sustainable and climate neutral by 2050 and the local and regional government, businesses and centres of knowledge are working together to achieve this. An example of a project using biomass feedstock is the bio-refinery Avantium built in Delfzijl. This process enables the production of raw materials which can be used in the food, pharmaceutical and chemical industries.

Moreover, the Eemdelta has a unique position when it comes to the production of hydrogen. The use of hydrogen as a feedstock for the chemical industry is very promising. In Delfzijl large investments have been made in the infrastructure between the different plants that are housed here. This enables the companies to exchange surplus heat or waste materials that can be used by another as feedstock or raw material. In this manner companies work together in a local circular economy.

Chemical Cluster Emmen has excellent facilities for companies active in the fibers, polymers and composites markets and it is the largest of its kind in Northern Europe. New developments towards bio-based chemicals find a favorable home at this site.

5. NETWORK INFRASTRUCTURE AND INTERCONNECTIONS

The Northern Netherlands energy infrastructure (Gas and Power) is well equipped to play a key role in the greening of the international energy system. The region is already managing vast flows of traditional energy within the existing high-grade energy infrastructure through the well-known concept of the gas roundabout. These assets perfectly enable the region to manage the ever-increasing volumes of sustainable energy, especially as foreseen by the development of the North Sea as a Wind Power Energy Arena. Several innovations are being carried out, such as the

conversion of the Nuon/Vattenfall Magnum power plant into a 'Hydrogen battery' and the development of large scale electrolyser systems based on initiatives by Engie, Nouryon, Gasunie and NAM. These innovative investments offer a viable, robust and future oriented solution to harvest the supply of renewable energy generated by Wind power parks and make this energy tangible in the form of green hydrogen ('canned' energy).



CROSSBORDER COOPERATION

The leading position taken by the Northern Netherlands region is partly due to the close cooperation with neighbouring German regions. This Dutch-German region can take a leading position in the European Energy Union, as it is an optimal environment for innovative projects defining the blueprint for the future European energy system. The Northern Netherlands is connected to the highly urbanized cities in the Netherlands as well as the German State of Lower Saxony to the east which is connected to the regions of Bremen and Hamburg. To the south there is the connection to the Provinces of Overijssel and Gelderland which border the German State of North Rhine Westphalia. EU project SEREH (Smart Energy Region Emmen Haren) is a good example of this crossborder collaboration: it builds an interconnection between two Dutch and German renewable energy markets to become carbon neutral.



ONSHORE WIND POWER PARKS

On top of the management of the offshore wind power potential there is also the serious intent to develop the onshore wind power parks and solar parks (PV) which will make available green/sustainable electricity for use through either the power grid operated by the TSO TenneT or various DSOs (Alliander, Enexis, Rendo). The ever increasing volumes of renewable power cannot be absorbed by the grid operators due to existing and projected congestions in the power grid. The production of green hydrogen provides the logical solution. In this way, large volumes of renewable energy can be managed and stored in salt caverns and transported and distributed utilizing the adapted national gas grid which will be made hydrogen ready.



GREEN HYDROGEN ECONOMY

The production of green hydrogen is the logical solution to overcome congestion challenges in the power grid. Large volumes of renewable energy can be stored in salt caverns and transported and distributed through adapted natural gas pipelines. This requires adaptation of the existing natural gas grid in order to facilitate the transport of emission-free hydrogen from the Northern Netherlands to off-takers in the Netherlands, Germany, Belgium and beyond. This transition will be a game-changer where existing natural assets will become the key for the large scale transition of the industry and energy system from natural gas to hydrogen.



SNN

NORTHERN NETHERLANDS
ALLIANCE

THE ANSWER IS IN THE NORTH

● THE ENERGETIC REGION

We are the green powerhouse of the Netherlands and Europe. We have the knowledge, experience and the best possible infrastructure. We are developing a new economy based on wind, sun, green hydrogen, geothermics and green gas. This way our region contributes significantly to the climate goals of the Paris Agreement.

● THE CIRCULAR REGION

Our future is green. Our business community is rapidly transitioning to a circular and biobased economy. We are making our agriculture and food production more sustainable. Nowhere in the world is agriculture more developed and more innovative than in the Northern Netherlands.

● THE SMART REGION

The north opts for innovation. With our expertise in water, energy, agriculture, circular economy and health, we contribute to a smarter Europe. With green mobility, drone technology and autonomous transport in all modalities we are developing the technologies of tomorrow.

● THE BORDERLESS REGION

Our borderless region connects the Randstad urban conglomeration with Germany and Scandinavia. We believe international and interregional collaboration is key, offering opportunities for the economy, education, science and the job market in Europe.