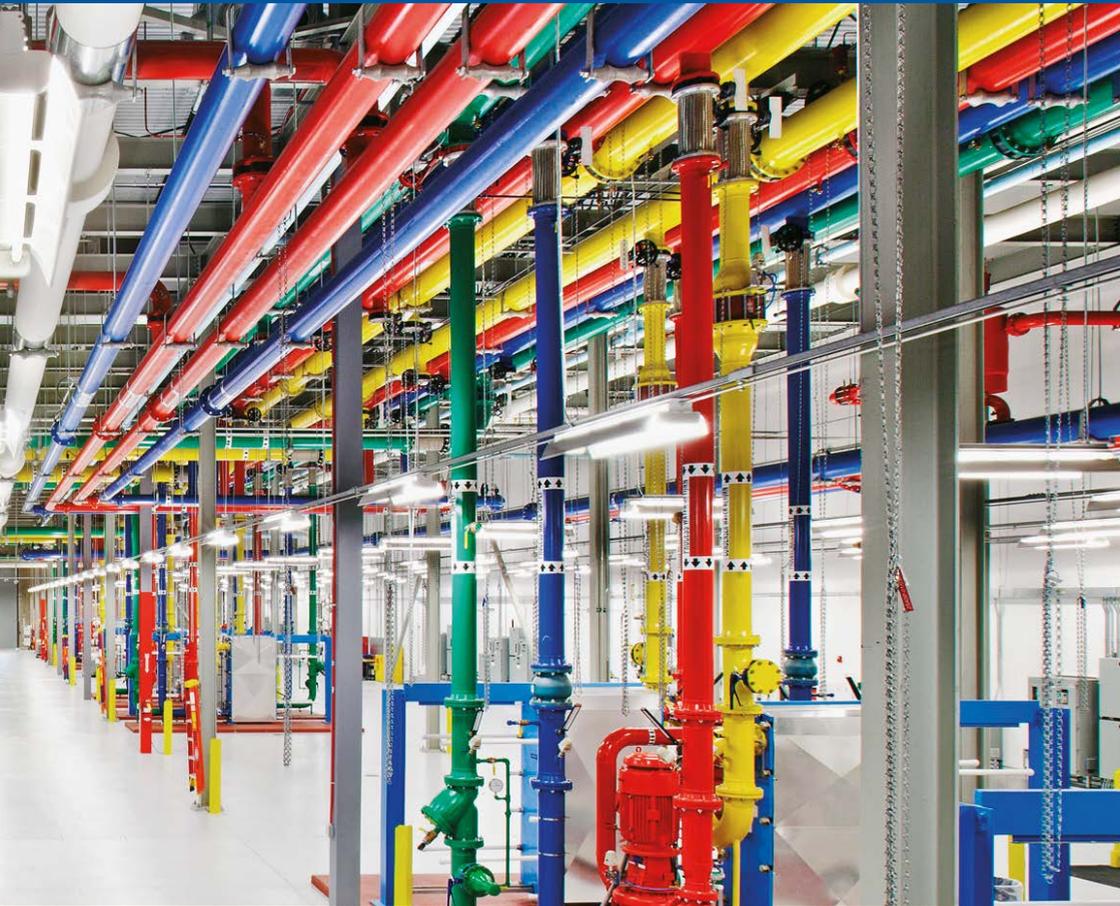


Introduction | June 2018

The promising connection

Digitalisation and sustainable energy in the province Groningen



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Martini Tower Groningen

Welcome to Groningen!

This booklet takes you on a tour through our province and shows you how we work on two crucial pillars of our economic policy: digitalisation and a sustainable chemical industry. We are very ambitious about these two areas, which is self-evident since we have a great deal to offer. The connection we create between the two pillars is an extra bonus.

Digital frontrunner in the Netherlands,

Groningen holds a key position right at the heart of the global digital transformation of society and the economy through:

- A vast innovative digital community that acts quickly
- Excellent cooperation between knowledge and research institutes as well as government and entrepreneurs
- Know-how and activities in diverse specific areas

Groningen is the digital frontrunner of the Netherlands in a variety of fields and in some cases we are European leaders: 5G, block chain, big data, e-health, cyber safety, start-up-scene and quick Internet connections. In addition, we are a living lab in diverse digital terrains, experimenting with new digital technologies in a responsible way. Science, economy and government work closely together in the quest for the application of new digital technologies to solve societal issues.

From this starting position our region can play a major role both in taking on those challenges at a national level as well as living up to the ambition of making the Netherlands Europe's digital trailblazer.

Commitment to green development and green jobs

Groningen can contribute a great deal to sustainable energy supply, realizing a green chemical industry and achieving climate goals. Why?

- At this stage, our region provides one third of the total Dutch energy requirements; it delivers 15% of basic chemical production and 60% of Twaron polymers (plastics)
- The Delfzijl Chemical Park and the more advanced, smaller chemical industry at the Groningen Campus make us an attractive base for premium chemistry
- We have space for growth and sufficient agricultural areas



We are highly ambitious when it comes to energy transition. We aim to have substantially completed the move to the use of sustainable resources by 2030. In order to achieve this, we are focusing on sustainable growth and jobs. The Delfzijl Chemical Park is at the core of our efforts to make the chemical industry in our province green. This is where energy and IT meet and therefore it provides excellent opportunities for employment and sustainable development - opportunities, which are relevant from a national as well as a European perspective. Not without reason - and certainly with pride - we bear the title European Demonstration Region for Biobased Economy and Green Chemistry

The connection

The connection between the digitalization and green chemical industry pillars provides considerable added value in three contexts:

1. **Saving energy.** By means of IT applications, we can introduce savings in energy and energy balance much quicker. Smart process applications and investments can result in up to 30% power saving
2. **Producing efficiently and effectively.** IT procedures are essential in effective and efficient production as well as in minimizing errors and waste
3. **Necessity for encrypted processes and cyber safety.** Large-scale usage of IT in energy production/storage/balance and in production processes demands a high level of encrypted processes (e.g. block chain) and cyber safety.

Groningen has an international reputation in this area through its knowledge institutes and IT-businesses.

A new long-term base for the European manufacturing industry is being created through investment in innovation and applications in the fields of sustainability and digitalisation. And it all starts in Groningen!



Patrick Brouns,

Regional minister Entrepreneurship and Innovation
Provincie Groningen



The Province Groningen: Digital Trailblazer and the Netherlands' Living Lab

IT has an increasing influence on all of us. Some call it the fourth industrial revolution, the digital revolution. This revolution will have a major impact on health care, education, safety, housing, energy budget, transportation, leisure, labour and the economy. Governments have to anticipate this.

Strong starting position for the city and region Groningen

Above all, digitalisation provides opportunities; opportunities for Groningen whose city and region have an excellent starting point at their disposal to play a major role in this global digital transition. Groningen has seized the opportunities that digitalisation offers in many sectors. We excel in the following ways:

- *Knowledge infrastructure with highly educated employees and young professionals*
Our region possesses a well-educated workforce with excellent knowledge of big data, Blockchain and Cybersafety through (thanks to) the presence of the University of Groningen, Hanze University of Applied Sciences, the University Medical

Centre and other knowledge institutes. Moreover, our IT Academy North-Netherlands trains employees in relevant IT skills. This was one of the most important reasons for IBM's choice of Groningen as a location. The IT Academy recently launched a new educational programme that trains our future cyber specialists. This programme was developed in close collaboration with local businesses.

- *Runner-up digital city with a dynamic IT start-up scene*
Groningen is the Netherlands' runner-up city in digitalisation and is still growing. We possess a large-scale young, dynamic and innovative IT ecosystem, which invites students to remain working at Groningen after graduation but also challenges them to become entrepreneurs. Through the G-Force Capital fund, the province commits to digital start-ups.

Approximately 10.000 people work in the IT sector with numbers increasing continuously. At this moment, there are 500 vacancies in IT. The opportunities regarding the online economy especially are being used to its full extent. The Deloitte Technology Fast500, the annual election for the fastest growing tech company in the Netherlands, contains eight businesses from Groningen, among which are StreamZilla, Mr. Chadd, Chordify, Crowdnews, Simpicate, Catawiki and Voys.

Groningen's Start Ups

The majority of start-ups that eventually become successful businesses were founded in Groningen. A few examples:

- HackerOne began as start-up of two students. The company, which helps businesses detect security breaches, is successful in the United States and has now settled its headquarters in San Francisco.
- Insitesecurity developed from a one-man start up into a company with 50 professionals in Groningen and Haarlem.
- Web-IQ received the 2017 National Innovation Prize for Law Enforcement for a programme that scans the covert parts of the web for child pornography, crimes and culprits.

- *Digitalisation creates plenty of opportunities in our highly developed societal sectors.*

Our region has always been equipped with strong societal sectors: healthcare, energy, mobility, agribusiness and smart manufacturing. Those areas especially experience the most profound changes due to far-reaching digitalisation.

Digitalisation presents many possibilities: smart mobility and autonomous transport, quick innovation in manufacturing due to, for example, 3D printing, remote healthcare and predictable energy usage through data analysis

- *Strong digital infrastructure*

Groningen possesses a strong digital infrastructure with a transatlantic glass fibre connection. If there is not any digital infrastructure yet, we create one. Groningen and specifically the earthquake region, has access to the first field lab for the next generation mobile technology: 5G.

Companies, knowledge institutions and governments innovate together

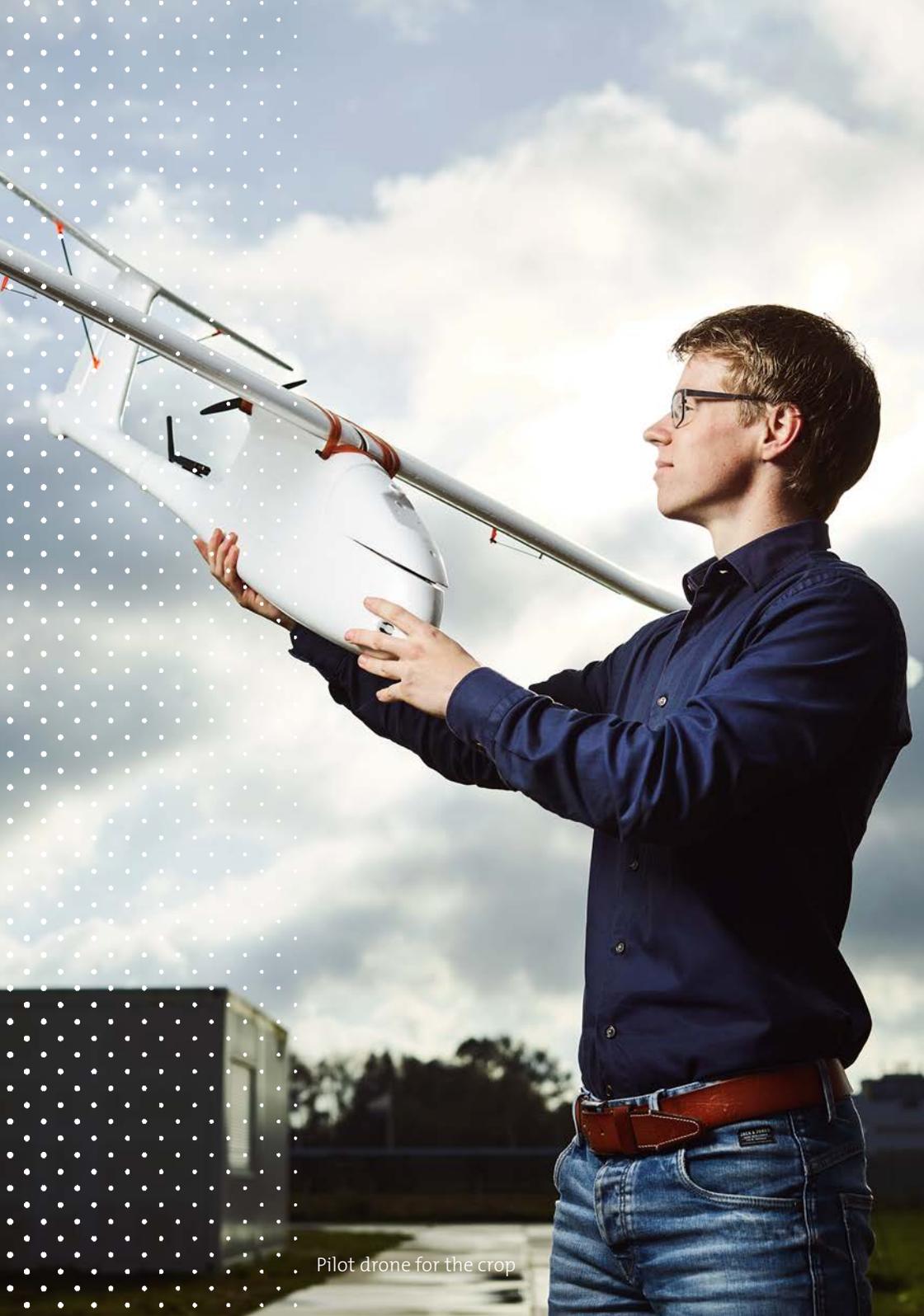
Groningen Province is very special because of the collaboration between people with smart IT and digital knowledge on the one side, and business and knowledge institutions on the other. Together, they work on new applications and solutions within the societal sectors. This is how we keep the sectors, and the region alike, vibrant.

Crossover digitalisation with other industries and sectors

We contribute to a vital and economically strong region by means of crossover digitalisation with other industries and sectors, such as energy, agri-business, healthcare and the green chemical industry. We are doing this using the key topics 5G, Blockchain, Cybersafety and Big Data.



3d printing



Pilot drone for the crop

5Groningen testing grounds National Fieldlab

5Groningen is transforming the northern part of our province into the testing field for the newest mobile Internet generation. The possibilities of this extremely fast connection, which will be available within the next five years, are revolutionary. That is why entrepreneurs and experts are currently testing the applications of the 5G networks. Envisage remote healthcare via the telephone, diverse sensors, self-driving cars and busses or analysing data in real-time while a drone is flying above the fields.

5G Lab at EnTranCe and Fieldlab in rural areas

At the 5G Lab at EnTranCe on the Groningen Campus the first tests are currently running. After completion, it will be tested “for real” at the 5Groningen Fieldlab on different locations in the earthquake area. It will be the world’s first testing ground for 5G applications in the countryside.

Topics

5Groningen is performing tests in five domains:

- Energy
- Transportation & Logistics
- Habitat
- Healthcare
- Agriculture

Goal and challenge

The goal is to assist middle-sized businesses in the development and specific usage of promising opportunities in 5G applications. The challenge in the coming years is to implement the testing field on a larger scale. Our ambition is to position Groningen as an internationally distinctive open innovative environment in which commerce, science and students collaborate to apply tomorrow’s solutions to the present day.

Partners

The 5Groningen Programme is an initiative of the Economic Board Groningen (EBG). Other partners are Radiocommunications Agency Netherlands, Ericsson, SURF, Hanze University of Applied Sciences, Huawei, KPN, Vodafone, TNO and the University of Groningen.



Start Dutch Blockchain Hackathon 2017

Groningen national frontrunner Blockchain

Groningen is the national frontrunner regarding Blockchain. Blockchain is estimated to be one of the most promising revolutionary technologies, which will change the world. Entire business branches, such as finance, education, healthcare and food can be radically reformed in this way.

Dutch Blockchain Hackaton

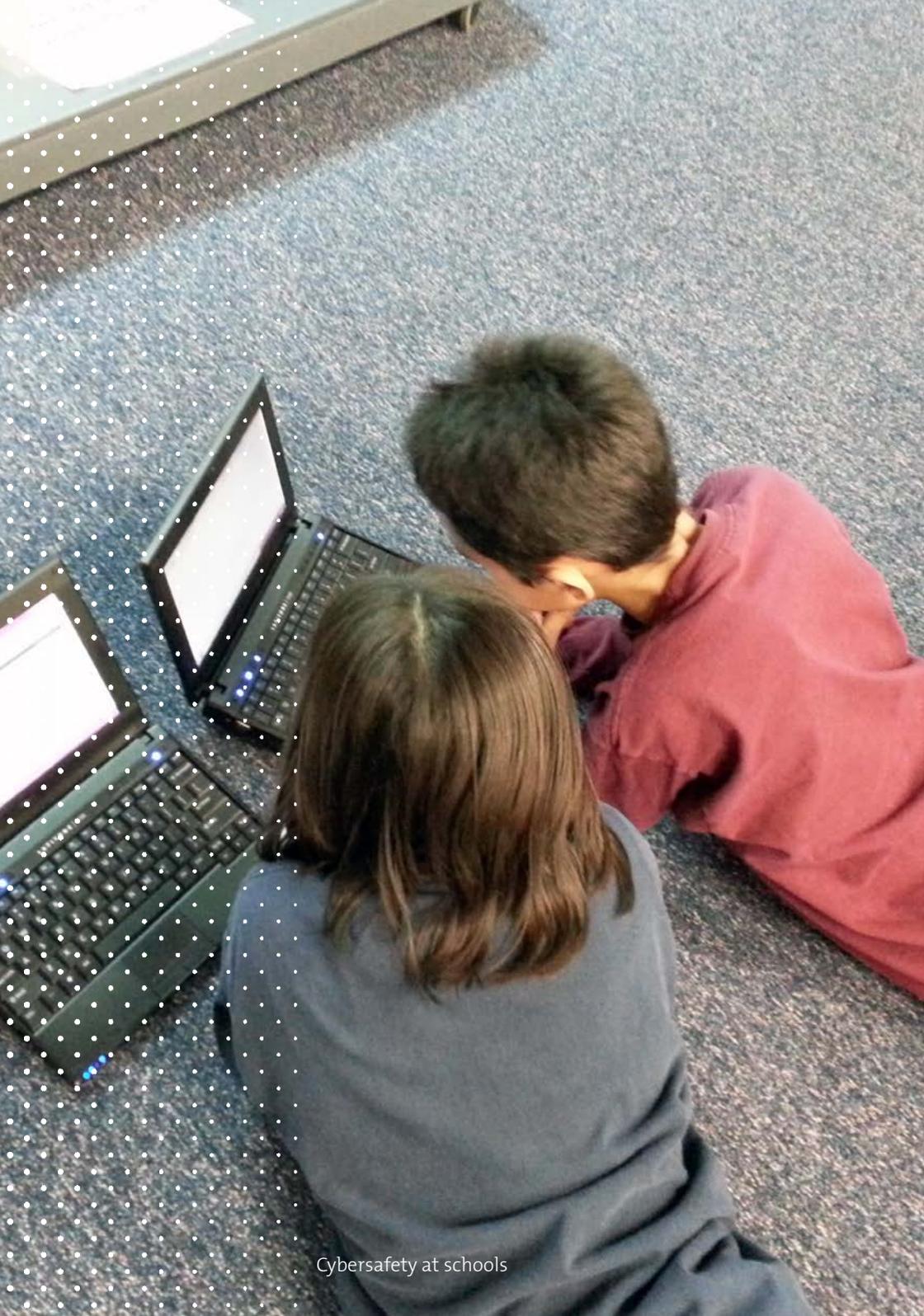
In 2017 and 2018, during one of Europe's biggest and most challenging Hackathons, the Dutch Blockchain Hackathon, Groningen was the epicentre of Block chain technology. Here, with the use of Blockchains, practical solutions are created to address societal problems.

SBIR competition

In April 2017, the province, together with the Ministry of Economic Affairs, organized the SBIR competition for Blockchain applications. The sum of € 500.000 was made available for the development of Blockchain solutions to problems in the government services, energy and healthcare sectors. The competition boosted the development of Blockchain in Groningen and provided IT businesses with the opportunity to put their talents into practice. The competition turned out to be a tremendous success with 38 enrolments and 5 winning ideas. The Hackathon and the SBIR competition for Blockchain led to a dynamic Blockchain community in Groningen consisting of businesses, knowledge institutes (University of Groningen) and government.

Blockchain Fieldlab education in Groningen

The Groningen based business Quintor, in collaboration with the DUO/ Ministry of Education, Culture and Science, Groningen Declaration Network (GDN), the Foundation for ePortfolio Support (StePS), TNO and the Rabobank, founded the Blockchain Fieldlab Education. The essential regional, national and international experts and the expertise are brought together in this Blockchain lab, in consultation with the University of Groningen, the Ministries for Economic Affairs and Education, Culture and Science and the Dutch Blockchain Coalition. The expectation is that these activities will result in new high-end employment and activity in Groningen in the future.



Groningen goes “all in” on Cyber safety

A crucial condition for realizing our ambitions is a functioning IT infrastructure for government and businesses. However, there are increasing digital threats. Cyber attacks occur more and more often. Cybersafety is no longer just an IT problem. Governments and businesses must anticipate threats and unexpected situations and need to work on the safety and protection in the digital domain. This is especially true for government services and large-scale businesses in vital sectors such as energy and telecommunications. However, it is also the case for mid-scale commerce that is often not aware of the digital threats it faces and therefore does not know how to protect itself.

Groningen goes “all out” for digitalisation and Cybersafety. The objective is to enhance our region’s ‘Digital Security Hub’. We are aiming at a stimulating environment and a responsive network, in which government, businesses and knowledge institutions meet, research and develop new technologies.

The ultimate goals are:

- Supporting commerce in the fight against cyber crime
- Making our society safer
- Enhancing innovation
- Creating employment

Cybersafety in schools

Children find their way into the digital world easily. However, they are not aware of the risks it brings. By introducing the Cybersafety Project into schools, the province is attempting to give children in grades 7 and 8 an insight into protecting their information. This task was assigned to ITurnIT from Groningen. They are teaching the children with suitable materials, which enable the children to understand what Cybersafety is and how they can ensure it for themselves. The pupils are actively doing this by making vlogs and sharing information on social media. The project started as a pilot at 10 schools throughout Groningen.



Self-propelled bus

Developing new services for mid-scale businesses using Big Data

Big data stands for the collection, combination, interpretation and analysis of large amounts of data from various sources in order to detect patterns and make predictions. Based on this, new products and services can be developed.

The province supports the project “Internet of Things: business value from the intelligent swarm” by Target Holding, the University of Groningen and 15 mid-scale companies from Groningen. The goal is to develop four specific new services for mid-scale businesses for a healthy life, energy usage, logistic services and a measuring network for the environment. By means of a toolbox with intelligent and proven methods for Big Data analysis, smart use of huge data clusters will become attainable and affordable for mid-scale business and industry. It is expected that the project will create 40 new jobs and while retaining 10 more.

University of Groningen and entrepreneurs collaborate at Groningen Digital Business Centre

At the knowledge centre Groningen Digital Business Centre (GDBC), the University of Groningen and the Northern Online Entrepreneurs (NOO) are collaborating in digital business and the big data domain. The GDBC has four separate ambitions: creating a knowledge platform, developing new educational programmes, making a match between students and northern companies and improving the sector’s education. This hotbed of digital North-Netherlands provides a special Professorship in Digital Business and has developed the multidisciplinary master’s degree in Digital Business & Analytics.



Hospital specialists experience ambulance work

Region of Smart Factories (RoSF)

Forty partners from the North-Netherlands, among which are world-class companies, such as Philips and Fokker, are developing the “Factory of the Future”. The focus is the creation of intelligent, connected and customized production processes for intelligent, connected and customized products. Clusters of businesses and institutes are conducting 10 pilots, with the emphasis on impeccable production, model based engineering and customization. The core of RoSF is the building of an ecostructure. Education (vocational, higher and academic), research, a business network and a Centre of Expertise Smart Industry work together with all the northern Universities of Applied Sciences and vocational institutes. RoSF is an official Fieldlab on the National Smart Industry Agenda.

E-Health

Because of an increase in chronic illnesses and healthcare spending a transition from Sick-care to Health-care is necessary. Standardization will be replaced by customization. Big data and individual data and ICT play an indispensable role in personalized therapy, improved diagnostics and customised preventive care. At the same time, citizens want to be in control. ICT plays a major role in this as well. It is Groningen’s ambition to be a frontrunner in the development of the cooperation between organisations, such as Lifelines, the population screening service, and the relevant expertise of businesses and the universities.

Data collection of the 165.000 Lifelines participants forms a unique Living Lab for innovation. Through projects, such as the Personal Health Environment, the testing grounds Newborn, which is focused on connected devices, and the testing field Digital Health, we are enhancing the digitalization in health care and customized care in the triple helix.



Chemical Park Delfzijl

Focus on green energy as a sustainable resource for the chemical industry

In order to realize the energy transition, the province Groningen focuses on green energy as a resource for the chemical industry. We are pursuing three paths in this.

Biomass

One example is the testing factory Avantium, a predominant company in chemical technology, which is running a Biorefinery pilot at the Delfzijl Chemical Park. This experimental factory aims at proving the technical and economical attainability of the 'Zambezi process', which turns wood shavings and other second generation biomass into resources for the chemical industry.

Exploitation of sugars

The North-Netherlands produces half of all sugar beets in the country. Groningen's Sugar Union (Suiker Unie) utilizes everything the beet has to offer by even recycling waste products. In this context, research is done on the possibilities of turning biomass into a resource for fuel.

Electrolysis

This concerns turning energy into hydrogen. One third of Dutch energy is produced in the Northern part of the Netherlands. A great amount of this is already green energy (bio, wind, solar). In addition, we utilize green energy from Scandinavia, Germany and offshore wind parks.

Creating an entirely green chemical and manufacturing industry

All three paths result in green ethanol, acetic acid, methanol and ammonia. In this way, the chemical industry can become entirely sustainable – no matter which technology will break through eventually. The manufacturing industry will follow. Apart from innovations for the highly educated population, this also means the creation of jobs for a lower educated workforce which is a challenge for now, tomorrow and the distant future.

The energy transition: resource for the industry of the future

We will achieve our goals by supporting present businesses in digitalisation and sustainability and by providing opportunities for growth to our vital start-up scene. Another focus is (international) acquisition through the Top Dutch label. Additionally, we will be tendering for start-up tracks, in order for them to come up with solutions that will be located and executed in Groningen. This means that we are not only considering the energy transition as a connection of resources but also as a resource for the industry of the future. We are, therefore, making more efficient use of the means that are available for the energy transition.

Industrial Agenda Eemsdelta

At the Eemsdelta, NOM, Groningen Seaports, Business Collaboration Eemsdelta (SBE), the Ministry of Economic Affairs, the province and knowledge institutions work closely together in the triple helix team for a programmatic approach in making the (chemical) industry green. This is articulated in the Industrial Agenda Eemsdelta.

The agenda consists of three inseparable main paths:

1. Energy saving and electrification of industrial processes
2. Chain integration by means of an infrastructure for co-current flow, hydrogen and CO₂
3. Green resources

In addition, there is a great deal of reciprocity regarding the task of energy transition (offshore wind parks and hydrogen). This too was elaborated in a specific programme. The investment projects are based on current developments in this cluster, as are the estimated revenues.

Energy efficiency

An important step in making the (chemical) industry green is an acceptable approach for achieving energy efficiency, electrification and energy innovation. We are focusing on an active programme that precisely measures each large-scale consumer's energy usage in the Eemsdelta. It has been proven that this creates the basis for major energy saving, sometimes as high as 30%. To do this, businesses are implementing major adjustments. Commerce and governments are developing a plan to put these savings into effect, for example through collective facilities or exchange of flows between the companies. However, it is crucial to introduce a financial trigger to realize those major interventions in the processes. It is also suggested to instigate stimulating policy for energy efficiency, maybe even through the Regional Investment Support Groningen (RIG).

Electrification

Electrification is another solution. Electricity and gas prices as well as customized covenants are necessary to achieve this. In advancing our ambitions for 2050, most chemical companies only have one investment cycle. Within this cycle, these

ambitions have to be realized. These topics form part of the discussions at the industry table in the Climate Agreement.

As part of the Climate Agreement, a sector table for industry was established, which has several sub-tables. One of those sub-tables is focused on the North-Netherlands' industry. At this table, companies and government (province and national) make agreements on how to support industry in the transition to sustainability. In this context, the national government, in honouring the Climate Covenant, is working very hard to broaden existing and to develop new instruments in order to realize CO₂ reduction in the industry.

The previously cited Industry Agenda Eemsdelta contains a list of projects from the main paths, referred to above, that can start immediately and, therefore, advance the 2050 ambitions.





Chemport Europe

The chemical industry at the Eemshaven, Delfzijl and Emmen needs to become sustainable in the medium term. This is why on Tuesday, 7 February 2017, the project Chemport Europe was launched.

Our goal is to have almost completed the transition to the use of sustainable resources in the chemical sector of the provinces Groningen and Drenthe by 2030 by means of positioning, acquisition and the implementation of the Industry Agenda.

At this stage, there are already chemical companies that utilize biomass, such as BioMCN in Delfzijl that produces bio-methanol derived from the gas from beet pulp. In addition, plenty of green energy is being produced at the Eemshaven. In addition, the region grows crops that are suitable as resources for the green chemical industry, namely potatoes, sugar beets and wheat. Those crops can also be exchanged among the companies. In this project, government, business and knowledge institutions work closely together. Chemport Europe is being promoted in order to convince international companies to open facilities in the north.

More information: www.chemport.eu





Regional Investment Support Groningen

The province, the Groningen Economic Board and the national government have contributed to the innovation through the Regional Investment Support Groningen (RIG 2017). In 2014, a total of 40 million Euros became available for the RIG for a four year period, as an investment support to existing and new business in the Eemsdelta and at Zernike Science Park. Start-ups and innovative companies in the chemical, recycling and energy sectors can also draw on the RIG.

More information: www.rigscoorttop.nl

Two practical examples of RIG support

PolyVation is expanding at Campus Groningen

PolyVation from Groningen is expanding rapidly and chose a long-term location at the Groningen Campus. The company will increase their production capacity for polymers and will extend their R&D activities. This will result in 75 additional jobs in stages by 2024. The realization of an extra 1300 m² facility and a new 275 m² R&D lab is also part of those plans.

Through the use of chemistry, PolyVation forges big molecules, or polymers that are the starting point for innovative medical and pharmaceutical products, such as the regeneration of tissue or controlled medication in the human body. The enormous advantage of polymers is the great amount of forms and almost infinite amount of possible connections and characteristics that can be made. PolyVation is one of the few businesses in the world today that are able to develop and produce such special polymers using Good Manufacturing Practices (GMP). Through this expansion, PolyVation will become even more attractive for collaboration with the global top ten medical and pharmaceutical production companies.



↳ Datacenter Google at the Eemshaven