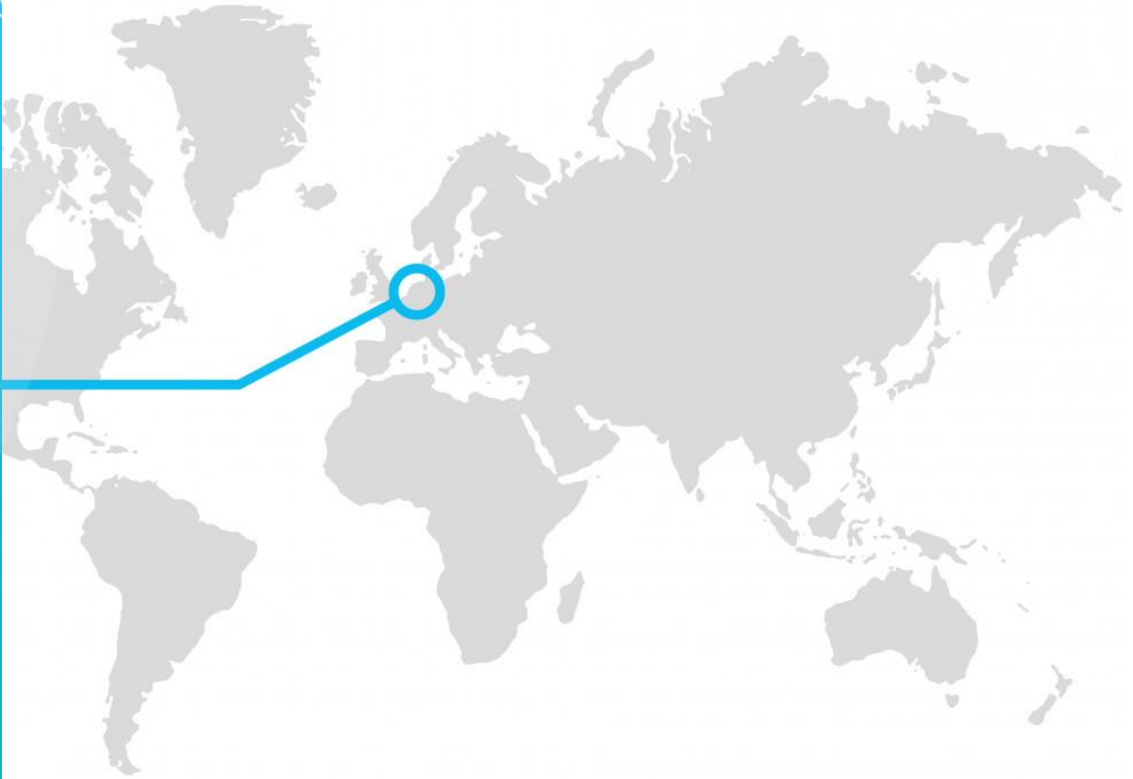


**TOP
DUTCH**

Naturally leading
the transition



ENERGY



ENERGY

TopDutch is energy. Located on **Europe's largest natural gas reserve**, the TopDutch region is the main energy provider for the Netherlands and large parts of Western Europe. Today, the main focus of TopDutch is realizing the opportunity presented by the combination of green electricity and natural gas available. We are determined to be the **Green Hydrogen Capital of Europe**, making the transition from gray, via blue, to green hydrogen production, distribution and utilization. **Here, we power a sustainable future.**

1.

**Natural Gas
Legacy & Switch
to Green Gases**

2.

**The Heart of
Europe's Largest
Futureproof
Energy Sourcing
Area**

3.

**Leading the
Transition to a
Hydrogen
Economy**

4.

**Research and
Development**

5.

**A Generation of
Energy-skilled
Talent**

6.

**Demand and
Supply-side
Incentives**

1. NATURAL GAS LEGACY & SWITCH TO GREEN GASES

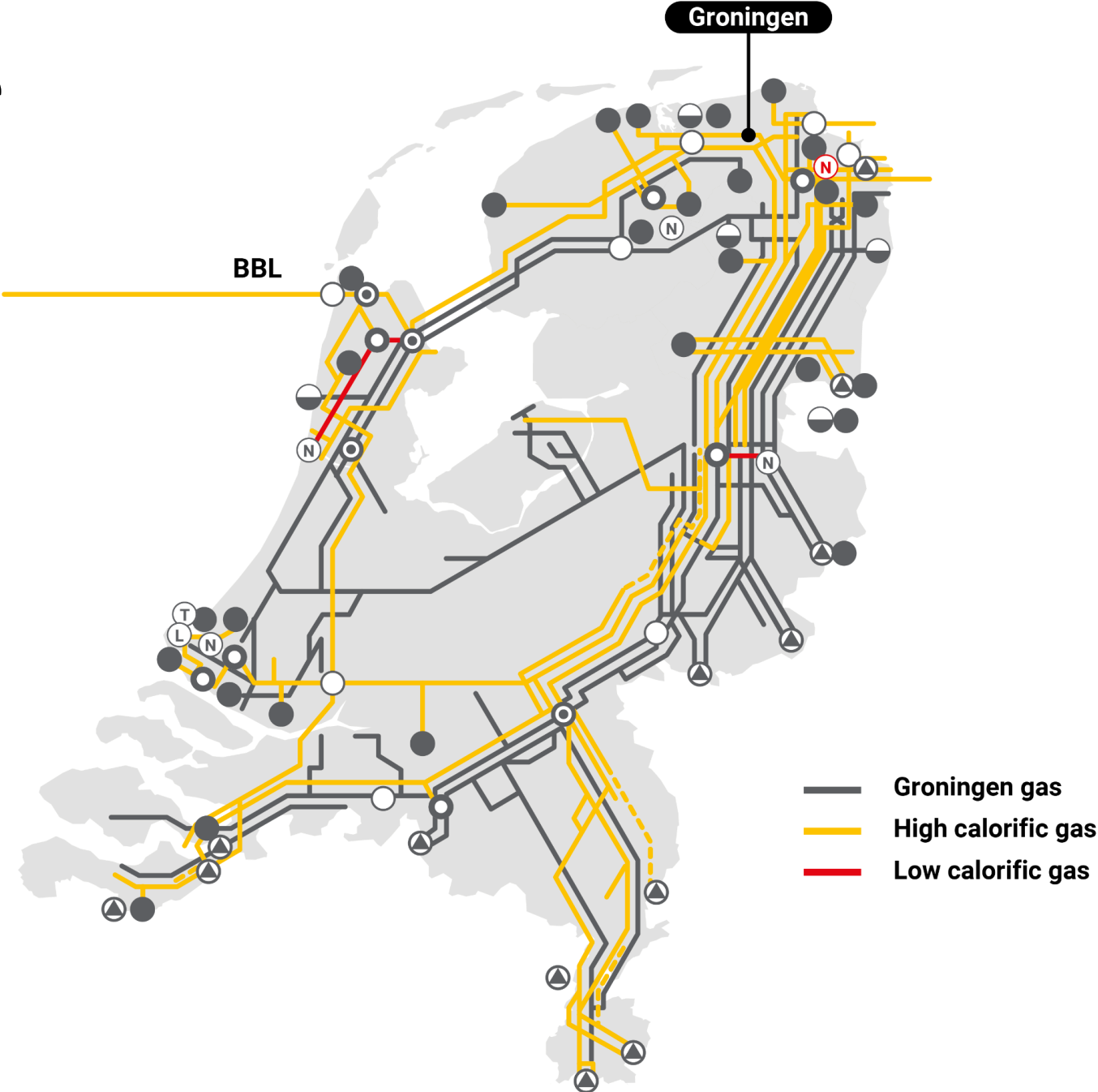


SWITCH TO GREEN GASES

Built on **Europe's largest natural gas reserve**, we've powered economies across the region for decades. Now, we're splitting up with **fossil fuels** and instead investing in infrastructure.

- Gasunie will add carbon-neutral green gas, blue and green hydrogen to the mix of its current natural gas pipelines.
- The redundant gas transmission network enables switching from natural gas to green gas and hydrogen pipeline by pipeline.
- We're upskilling our more than 15,000 experienced workers from the domestic natural gas industry.

TopDutch gas infrastructure



2. THE HEART OF EUROPE'S LARGEST FUTUREPROOF ENERGY SOURCING AREA



EUROPE'S TOP ENERGY HUB

The North Sea as **Europe's biggest green power plant:**

- North Sea offshore wind capacity will expand to 120GW by 2030 and 300GW by 2050.
- In the Netherlands, this represents a target to raise our offshore wind capacity from 11GW (2023) to 21GW by 2030, reflecting about 75% of our current electricity consumption.



EUROPE'S TOP ENERGY HUB

The TopDutch region as a leading **green powerhouse**, and our coastline as a key energy port:

- Northern Netherlands will generate 12.2 TWh of on-shore wind and solar power by 2030.
- Currently 600MW offshore wind capacity off the TopDutch coast, with plans for 3 more sites totaling 4,700 MW.
- Large-scale energy storage and hydrogen production and storage potential on TopDutch's extensive coastline.

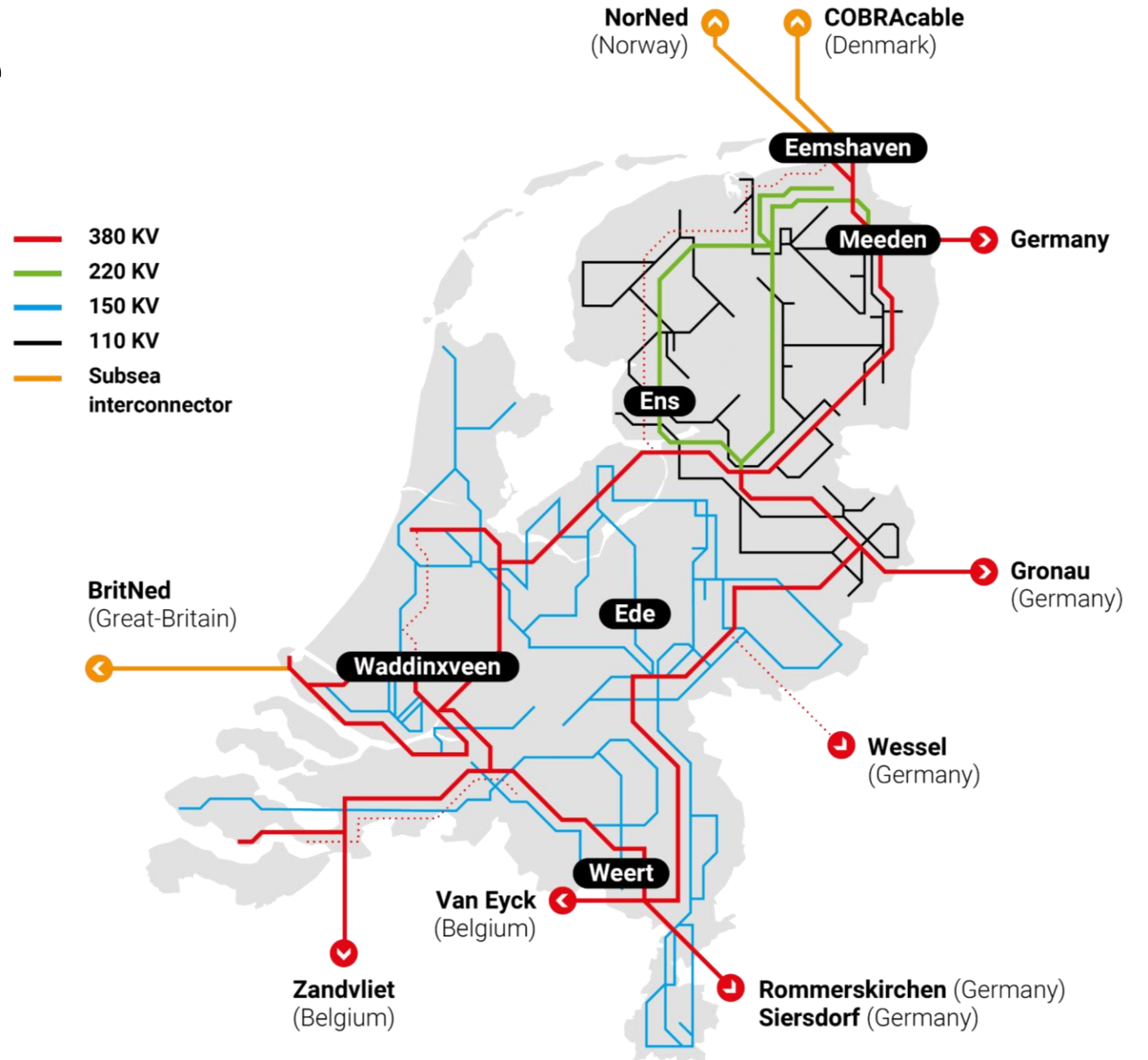


EUROPE'S TOP ENERGY HUB

From the Northern Netherlands to the world:
TopDutch as the Netherlands' **'wallsocket'**

- Energyport Eemshaven is a 8,000 MW power point and balancing hub located on one of our seaports.
- Here, we host three large power stations and a floating LNG terminal, alongside converter stations connected to the NorNed and COBRACable undersea electricity cables

TopDutch power infrastructure





**3. LEADING THE TRANSITION TO
A HYDROGEN ECONOMY**



HYDROGEN ECONOMY

Our inherent **natural resources**, and existing energy infrastructure make us the natural business location for a new **hydrogen economy**

- First region to proactively conclude natural gas extraction.
- By 2025, the TopDutch region will be home to 169km of hydrogen pipelines.
- Connecting to 6,800km of pipelines across the Netherlands, Germany, Belgium and France by 2030.
- The Netherlands has the 2nd largest salt cavern storage capacity in Europe – up to 150 PJ – of which 72% is in the TopDutch region.



HYDROGEN ECONOMY

We will continue to power Europe's economy with 100 PJ of hydrogen p.a. by fulfilling a **\$10 billion joint investment agenda by 2030**. Major production, storage and transportation projects include

- HEAVENN
- HyStock
- The Northern Wadden Islands offshore hydrogen production/ transportation project
- NorthH2



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4. RESEARCH AND DEVELOPMENT



RESEARCH & DEVELOPMENT

TopDutch has a culture of **open innovation**, with a network of **knowledge-sharing initiatives**, living labs, shared testing facilities and innovation centers. **Energy open R&D** institutions include:

- EnTranCe: a living lab for energy transition.
- Hive.Mobility: an innovation center
- EnergieCampus Leeuwarden is an entrepreneurial community for sustainable business.
- NXT Airport is a living lab dedicated to smart and sustainable aviation..



**5. A GENERATION OF ENERGY-
SKILLED TALENT**



SKILLED TALENT

17,000 vocational, applied **science and research university** students are trained for a role in the energy system per annum, and graduate into the **TopDutch workforce ready to change the world.**

- We have the best knowledge cluster dedicated to the energy transition. Dedicated education institutions include Energy Academy Europe, Energy Delta Institute, and Greenwise Campus from the University of the North.
- We have an abundant supply of more than 15,000 experienced workers, from the domestic natural gas industry which will scale down over the next three to five years.



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6. DEMAND AND SUPPLY-SIDE INCENTIVES



DEMAND & SUPPLY

Through the 'National Growth Fund', the Dutch government is investing **€20 billion between 2021 and 2025** in two tracks aimed at sustainable economic development of the Netherlands: **Knowledge Development; and Research, Development and Innovation.**

- As part of the EU's Just Transition Fund, € 330 million will become available to support innovation to accelerate the energy transition in the Northern Netherlands, which can subsize up to 50% of investments in projects.




DEMAND & SUPPLY

The **Nationaal Programma Groningen** has allocated **€1.15 billion** in seed capital to invest in socio-economic development projects in the Province of Groningen

- HyNorth is a public-private consortium dedicated to strengthening and growing our hydrogen cluster, and supporting our partners with research, networking and business development programs.

CROSS- LINKING CLUSTERS: GREEN CHEMISTRY



- From its location in the Hydrogen Backbone Delfzijl, our chemical companies produce bleach, green methanol, amongst others with feedstock from its on-site 20MW electrolyzer. Demand is growing rapidly, so this will soon scale-up to a 100MW electrolyzer.
- In its Emmen location, a 4MW electrolyzer and the GETEC 'green steam' gas turbine will directly connect to our chemical and heavy industry companies via a newly constructed pipeline.

CROSS- LINKING CLUSTERS: DIGITAL INNOVATION

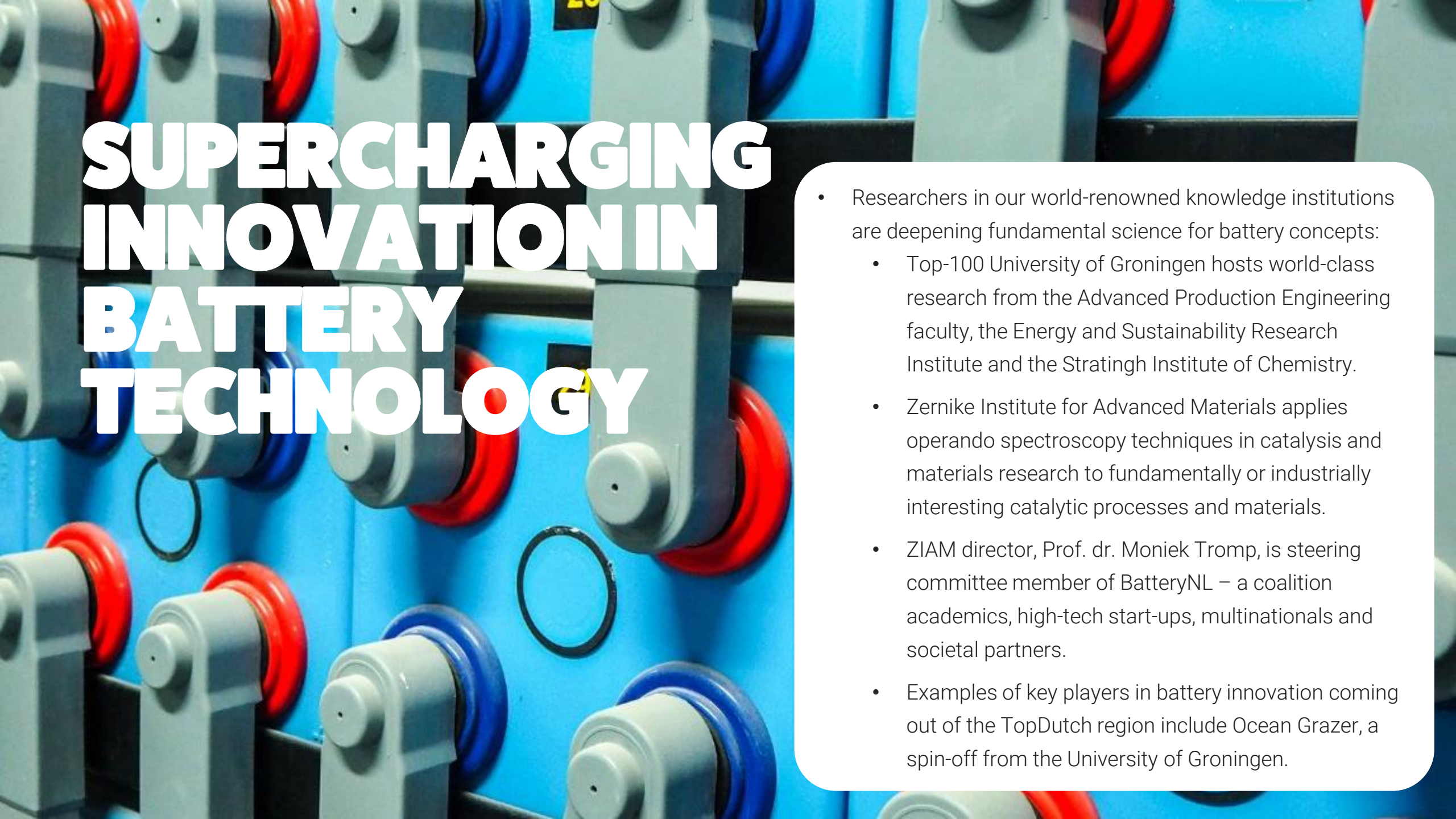
A laptop and a monitor displaying a world map on a desk. The laptop is open and the monitor is behind it, showing a world map. The background is a solid purple color.

- The AI Hub Northern Netherlands (AI Hub NNL) aims to make the TopDutch region a testing ground for concrete applications of Artificial Intelligence (AI). The coalition of partners are building a roadmap for AI in the energy transition.
- Our island of Ameland is one of the two 'pilot islands' in the European Union's IANOS research program. We are contributing to integrated solutions for decarbonization and smartification of islands by developing a reliable and sustainable smart grid, integrated with a Virtual Power Plant (VPP) based on artificial intelligence.

CROSS- LINKING CLUSTERS: MOBILITY



- The Netherlands' mobility target is to sell only zero-emission vehicles by 2030 (BEVs or FCEVs) and have 3,000 heavy-duty FCEVs on the road in the Netherlands by 2025.
- To support that, we are accelerating a number of demand- and supply-side policies including the recent construction of 2,000 charging points across the provinces of Groningen and Drenthe, and the deployment of 20 new hydrogen-fueled buses in the region.
- We produce several new energy vehicles, including the cult-classic EV three-wheeler Carver, and Europe's first ever hydrogen truck plant.



SUPERCHARGING INNOVATION IN BATTERY TECHNOLOGY

- Researchers in our world-renowned knowledge institutions are deepening fundamental science for battery concepts:
 - Top-100 University of Groningen hosts world-class research from the Advanced Production Engineering faculty, the Energy and Sustainability Research Institute and the Stratingh Institute of Chemistry.
 - Zernike Institute for Advanced Materials applies operando spectroscopy techniques in catalysis and materials research to fundamentally or industrially interesting catalytic processes and materials.
 - ZIAM director, Prof. dr. Moniek Tromp, is steering committee member of BatteryNL – a coalition academics, high-tech start-ups, multinationals and societal partners.
 - Examples of key players in battery innovation coming out of the TopDutch region include Ocean Grazer, a spin-off from the University of Groningen.

ENJOY LIFE IN THE TOP DUTCH REGION

- Our landscape is a great mix of **dynamic cities** and **tranquil countryside**. Our residents can enjoy all the benefits of city life, while still being surrounded by beautiful nature.
- We're also less crowded than the western part of the Netherlands, but we are only 90 minutes away from Amsterdam. Here we have **less traffic, cleaner air, lower costs of living and less stress**.
- Explore our cultural and music festivals, such as *Oero* and *Noorderzon*, check out our exciting sports events at *TT Circuit Assen*, get away for the weekend in our iconic nature to the *Wadden Islands* or the *Frisian waters*, eat your favorite foods at the best places and enjoy the fun social activities planned every week with your friends and family.
- We're a seriously **great place to live** - proven by the fact that the city of Groningen is ranked as the 5th happiest place on earth by the World Happiness Report!



Are you interested **in exploring**
what your business possibilities
could be?

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JOIN TOPDUTCH

Want to find out more **how the TopDutch**
region is naturally leading the transition?

Head over to our website: www.topdutch.com

TOPDUTCH.COM

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