

Welcome Pacific Northwest



Introduction

*Hydrogen and other forms of energy impacting the
seaports
of Eemshaven and Delfzijl*



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Governance structure Groningen Seaports

Since 14 June 2013, Groningen Seaports has been a public limited company, which is subject to the rules of private law.

The public limited company consists of a general meeting of shareholders (AGM), a supervisory board and a management board.



Key words

- **Renewable energy**
- **Port facilities**
- **Green chemicals**
- **Synergy**
- **Circularity & recycling**



INDUSTRIES



ENERGY

DATA

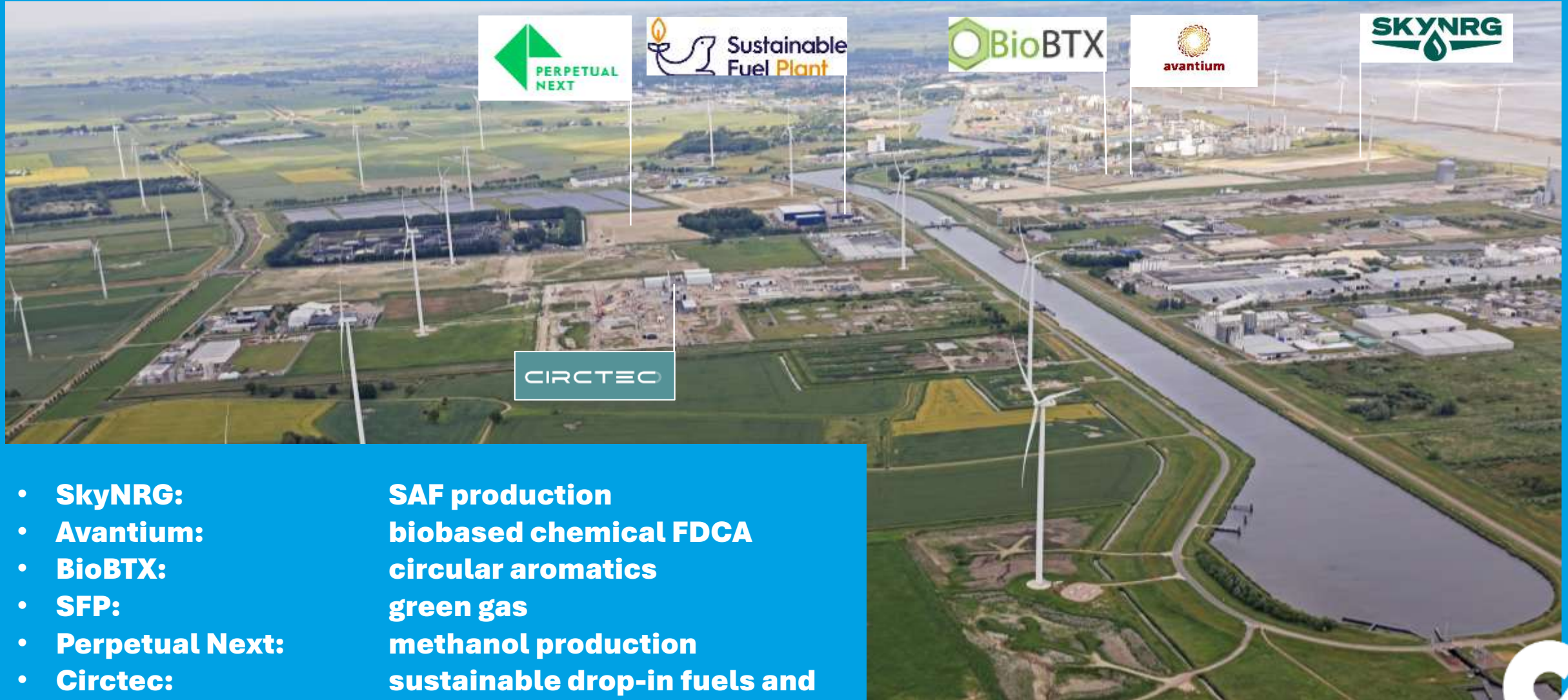
OFFSHORE WIND

CHEMISTRY

CIRCULAR

INNOVATION

Port of Delfzijl: Green chemicals and circularity



- **SkyNRG:** SAF production
- **Avantium:** biobased chemical FDCA
- **BioBTX:** circular aromatics
- **SFP:** green gas
- **Perpetual Next:** methanol production
- **Circtec:** sustainable drop-in fuels and circular chemicals





Contitank
Tankstorage

Sustainable
Fuel Plant

north
water

GIGA
TERRESTRIAL

avantium

CHEMPORT
INNOVATION
CENTER

eew
Energy from Waste

CIRCTEC

GRONINGER BEARPORTS
SUN
WIND

Building activities and plans Delfzijl

Circulands, the new innovative circular industrial park



Circular materials

Circular companies

Circular chain

Chemport Innovation Center (CIC)



Promotor of green chemistry
CIC drive scale-ups from TRL-6 towards TRL9
Chemical and innovative companies to advance their sustainable ideas and technologies.



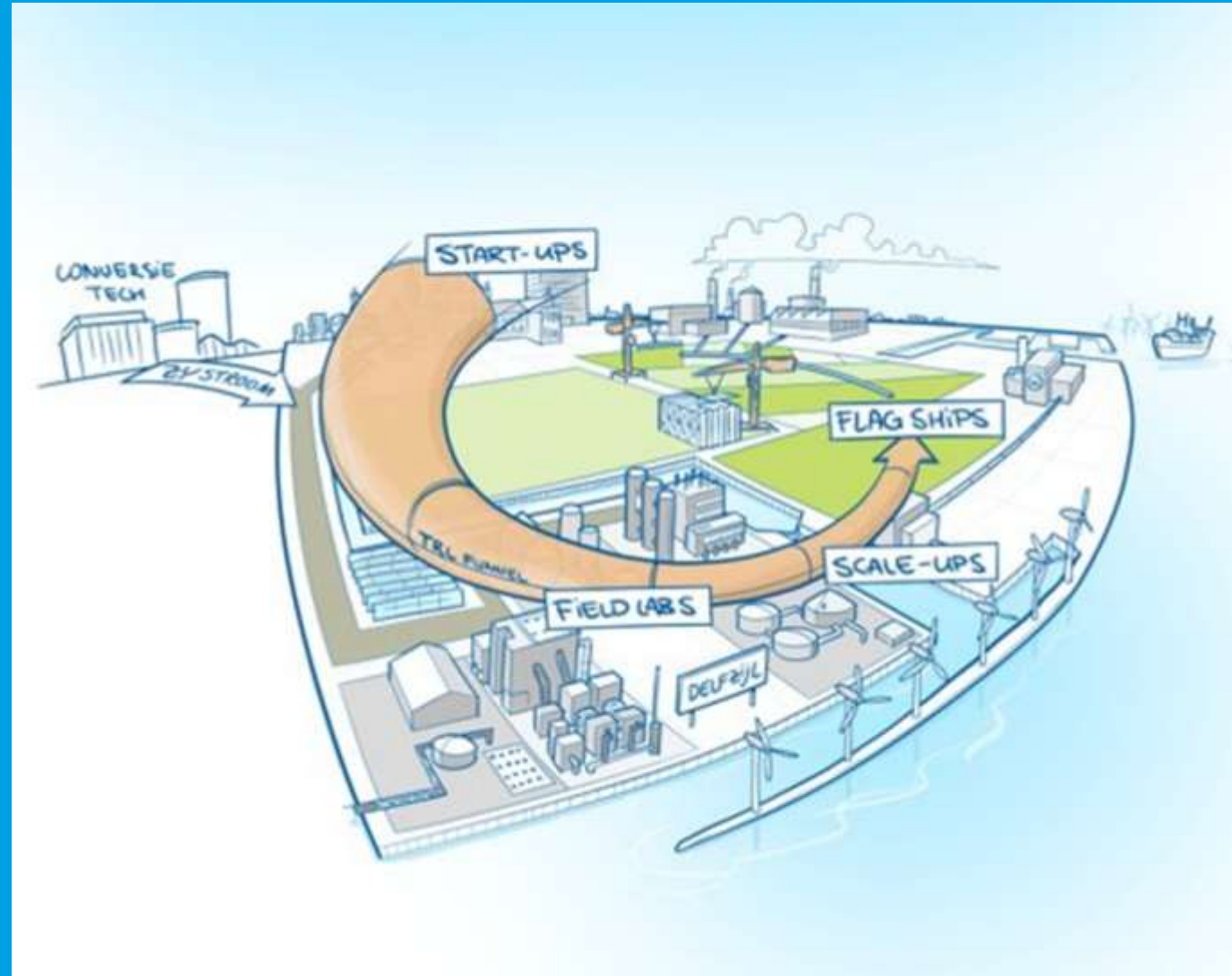
Integrated approach to CCU-development

Northern Netherlands as a leader in the carbon transition

The Northern Netherlands is actively committed to the carbon transition by stimulating the upscaling of innovative technologies to the demonstration phase:

- **Filling the TRL funnel with both regional and international technologies**
- **Accelerating development in the Field Lab at the Chemport Innovation Center, where CO₂ is available for testing purposes**
- **Scaling up to a flagship project on the Groningen Seaports site**

With this integrated approach, the Northern Netherlands offers the ideal environment for the development and implementation of CCU technologies.





Eemshaven



Energy port of Europe: 8+GWe producing power & balancing power



Power Generation in [GW]	
<i>Stable 6,2</i>	
ENGIE	1,9
RWE Magnum	1,3
RWE Coal	1,6
See Cables	
NorNed	0,7
CobraCable	0,7
<i>Volatile 2,5</i>	
Offshore Wind	1,4
Solar Energy	1,1





H2

EemsEnergyTerminal

RWE

Google

TKF CONNECTIVITY SOLUTIONS

DHSS

BUSS

Route Right

RelyOn Nutec

EX

Jan De Nul GROUP

equinor

Tennet
Taking power further

Port Eemshaven



Leading datacenter location

Google

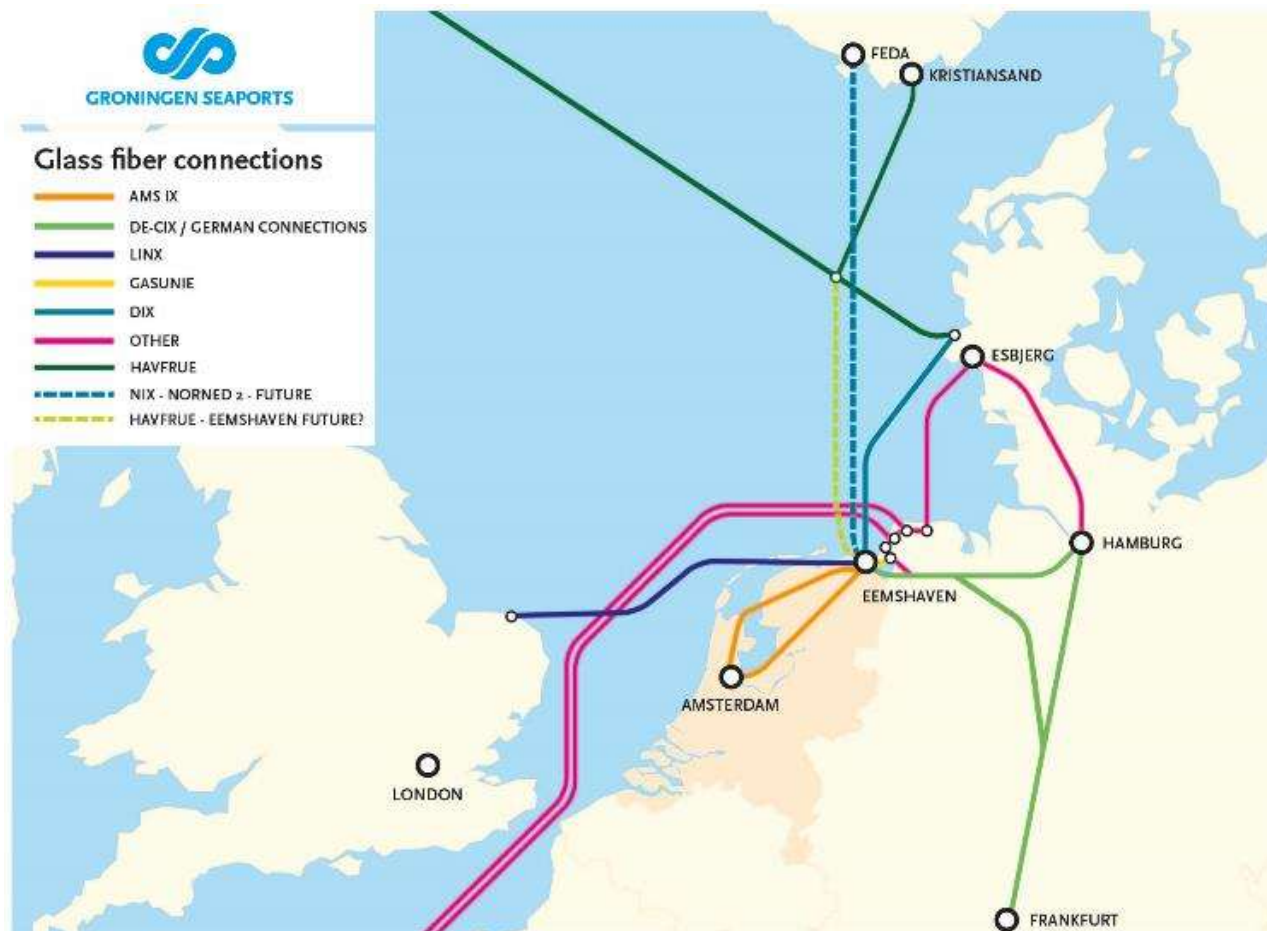


Strong position for storage (e.g. batteries)



Glass fiber connections

- AMS IX
- DE-CIX / GERMAN CONNECTIONS
- LINX
- GASUNIE
- DIX
- OTHER
- HAVFRUE
- - - NIX - NORNED 2 - FUTURE
- - - HAVFRUE - EEMSHAVEN FUTURE?



International glass fiber

Gas / Wind

- GAS
- WIND
- ENERGY
- - - 220 KV ENERGY
- - - 110 KV
- - - 380 KV
- GASUNIE



Landing point green power/H2

1. Electrolyzers (approx. 450 MW)
(70 GW wind at sea in 2050)

Oostpolder
 ± 600 hectare

2. Datacenters, H2 production, batteries, automotive, etc.

3. TenneT 60 ha for 8 GW

Expansion area Eemshaven

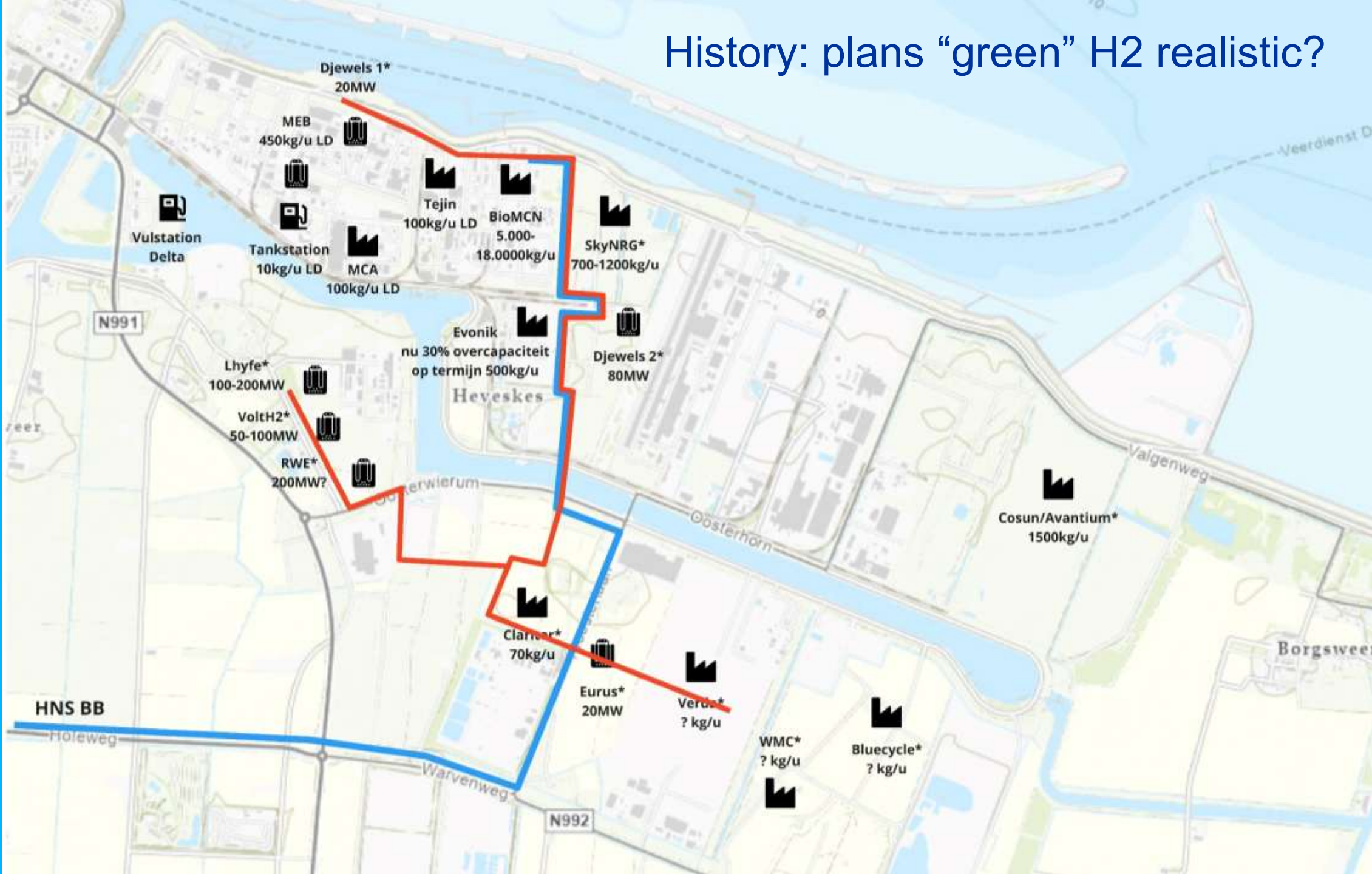
Developments



Why hasn't hydrogen been built everywhere already?



History: plans “green” H2 realistic?



Key figures:

Cost assumptions for **commodities**

- Natural gas price: €40/MWh
- Electricity price: €80/MWh
- ETS CO₂ price: €80/ton CO₂
- CCS price: €50/ton CO₂
- CO₂ capture from powerplants:
depends on CO₂ concentration
Biomass/coal-like streams (12–15% CO₂):
~€75/ton CO₂
Low-concentration streams (≈5% CO₂):
~€130/ton CO₂

Resulting cost levels hydrogen:

- Grey: €1.8/kg or €54/MWh
- Blue: €3.5/kg or €105/MWh
- Green: €6.2/kg or €186/MWh

Market prices:

Methanol €375/ton or €68/MWh

Kerosene €850/ton or €71/MWh

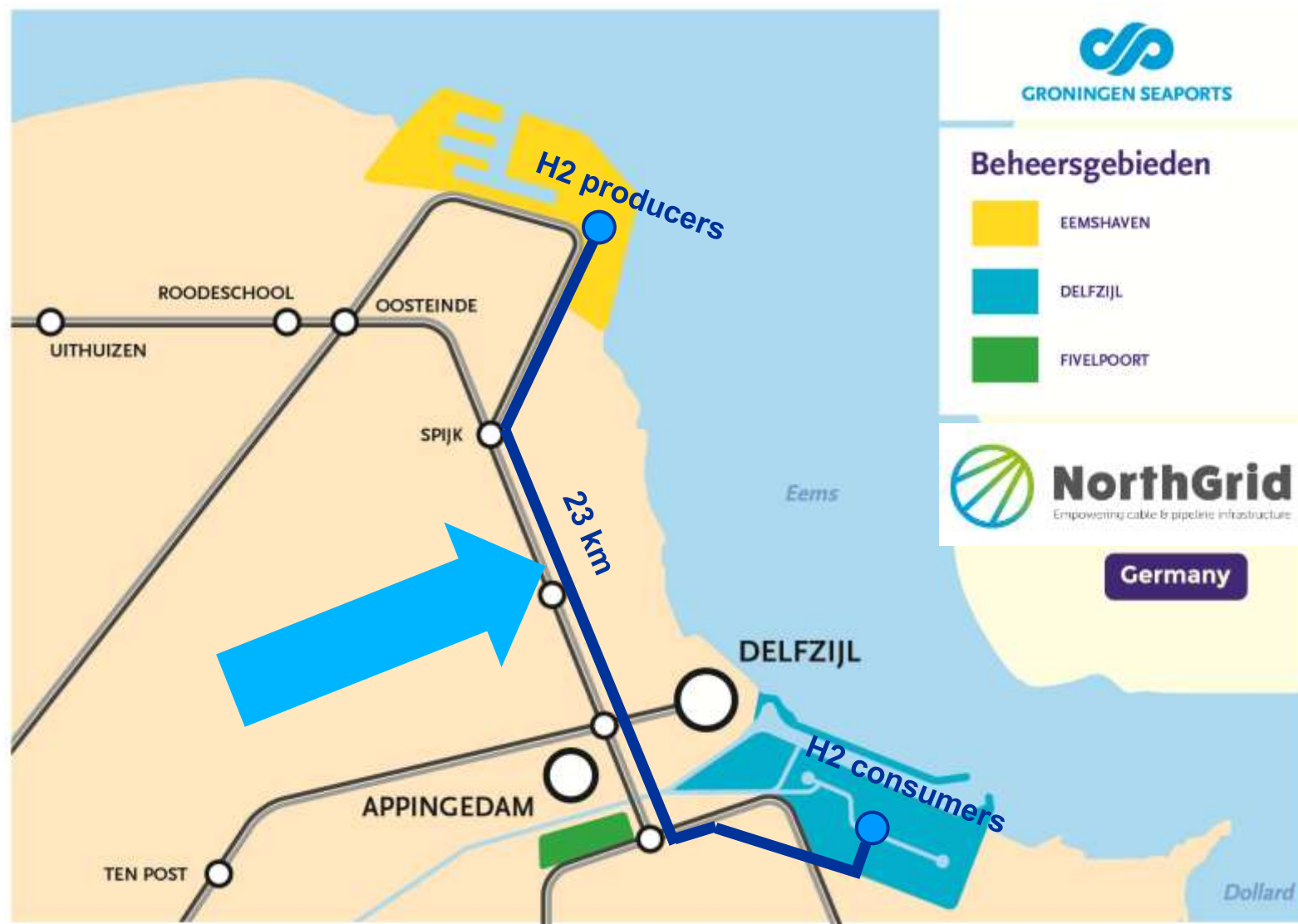
Green version:

E-methanol €200 per MWh

E-kerosene €250 per MWh

<< Could this be a reason?





- Kickstarter (investment €21 million; contribution JTF subsidy = €4.4 million)
- Connection <16 bar
- Production in Eemshaven by RWE 50 MW + 100 MW
- Consumption in Delfzijl (7 potential consumers)
- 2 flexible 6" pipelines equivalent 150 MW H₂ or 9.000.000 kg H₂ / year

New Pipelines for Hydrogen



Revolutionising the way energy is transported

SoluForce H2T (Hydrogen Tight)

Unique in the world of hydrogen transport and a global first.

SoluForce®



- Certified for hydrogen applications up to MOP 42 bar/ 609 psi at maximum operating temperature of 65°C
- Based on proven and existing technologies
- The only Reinforced Thermoplastic Pipe for hydrogen applications available today
- Available in diameters of 4 inch/ 101,6 mm and 6 inch/ 152,4 mm (ND)



"Reusable and with a significantly lower CO2 eq. footprint compared to alternatives"

Main advantages:

- Operating pressure of 42 bar
- No permeation
- Fully certified
- Non-metallic fitting system

Main advantages compared to steel:

- Up to 4x lower CO2 eq. footprint
- No hydrogen embrittlement or corrosion
- Fully flexible
- Easy and quick to install



Durable, corrosion-free solution



Fast installation



No hydrogen embrittlement



Reusable



Maintenance-free



400-metre lengths per coil



Extremely robust



Professional installation training

**THANKS FOR
YOUR ATTENTION
QUESTIONS?**



HENDRIK VAN DER PLOEG

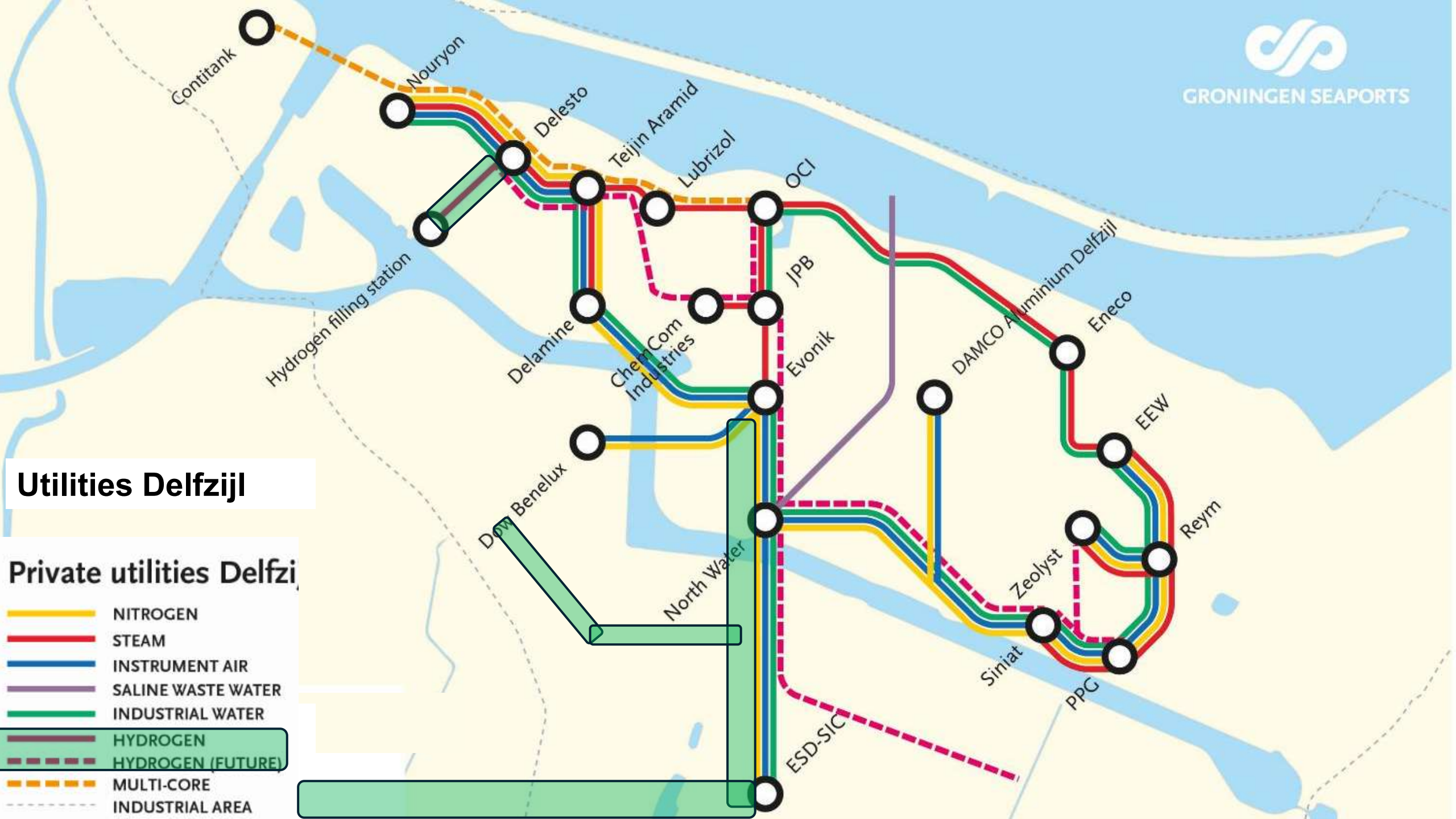
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Utilities Delfzijl

Private utilities Delfzijl

Hydrogen network in the Netherlands in 2030 (Gasunie)

