

The Belgian Hydrogen Ecosystem

Outline

- How are we organised:
 - WaterstofNet – Waterstof Industrie Cluster – Belgian Hydrogen Council
- Belgian and regional hydrogen strategies
- Plans and realisations

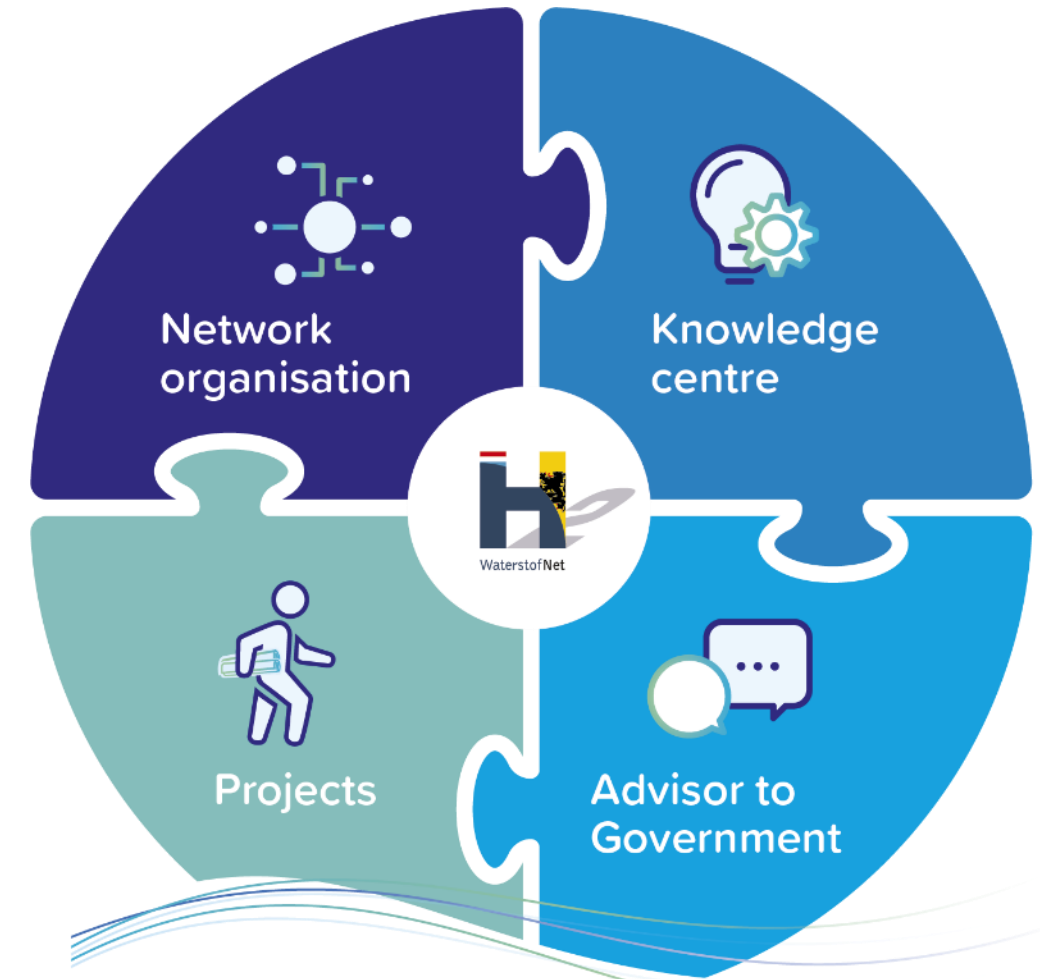
How are we organised?

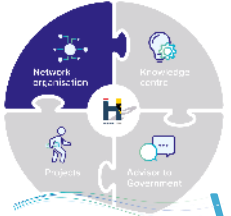
WaterstofNet – Waterstof Industrie Cluster – Belgian Hydrogen Council

WaterstofNet

> 15 years of H2 experience

- Knowledge and collaboration platform on hydrogen
- Focus on Flanders / Belgium / Netherlands / Benelux
- Nonprofit / 13 employees
- Offices in Turnhout (BE) and Helmond (NL)





Waterstof Industrie Cluster (WIC)

Network organization: knowledge building, projects



PRODUCTION



INFRASTRUCTURE, DISTRIBUTION AND STORAGE



TECHNOLOGY



ENGINEERING & SERVICES



END USER

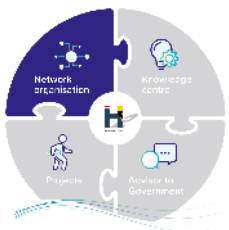


RESEARCH



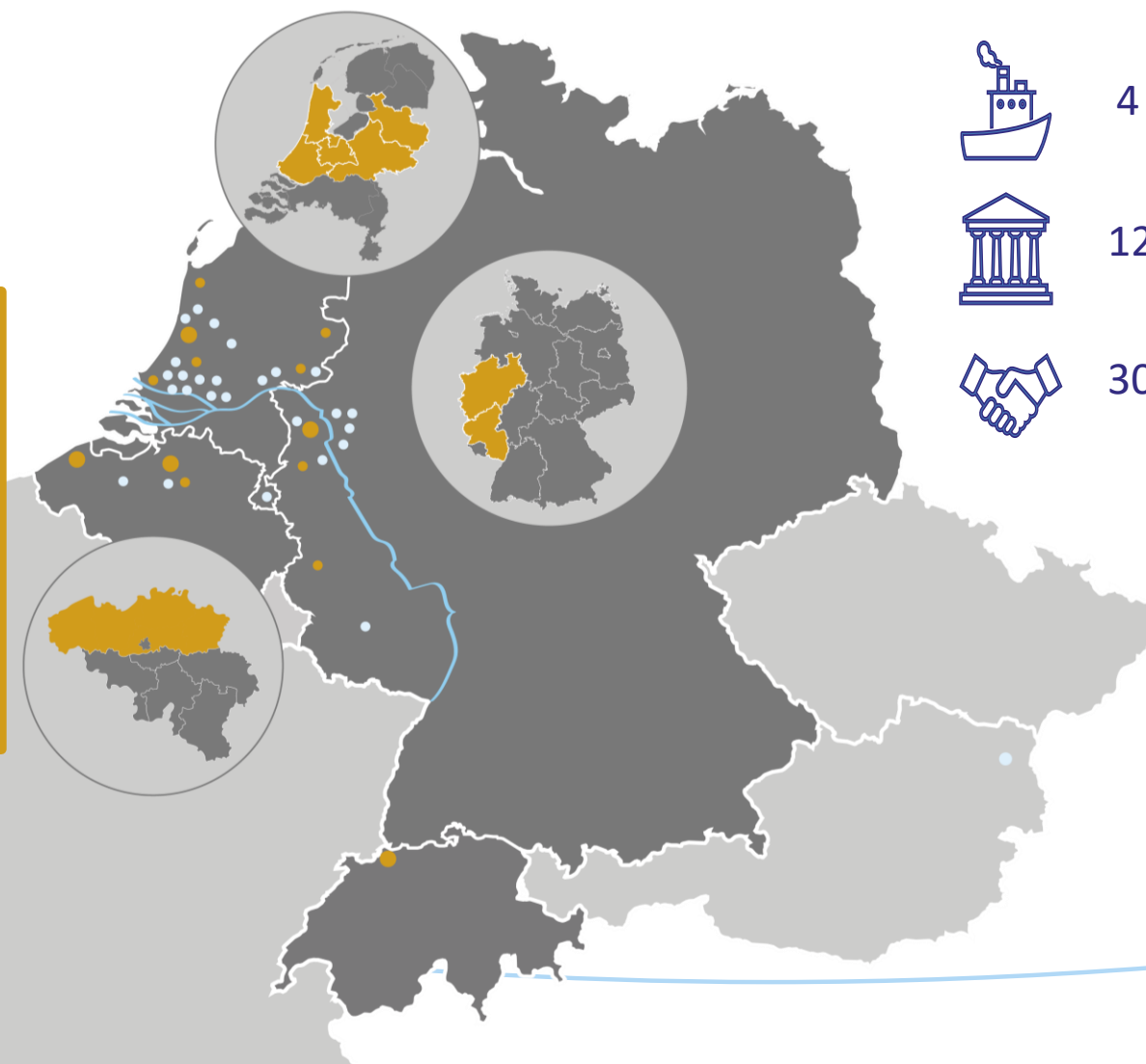
FACILITATORS





RH2INE – Inland shipping

Program office: policy, projects



4 ports

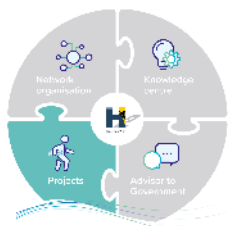


12 governments



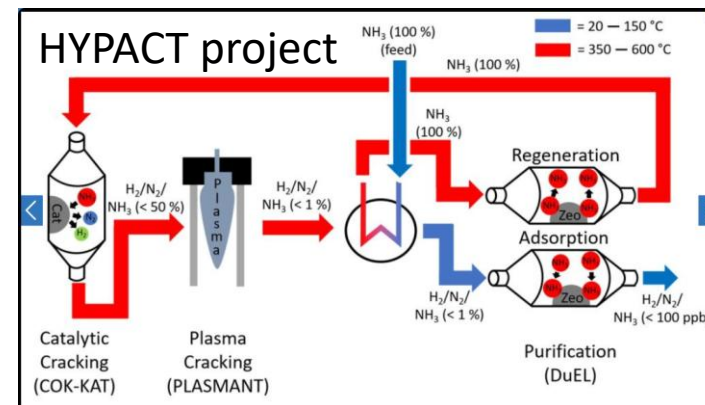
30+ partners

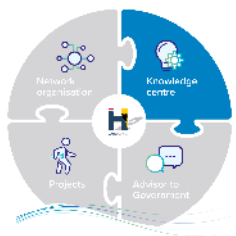




Projects

Identifying and facilitating 'next step' projects





Knowledge centre

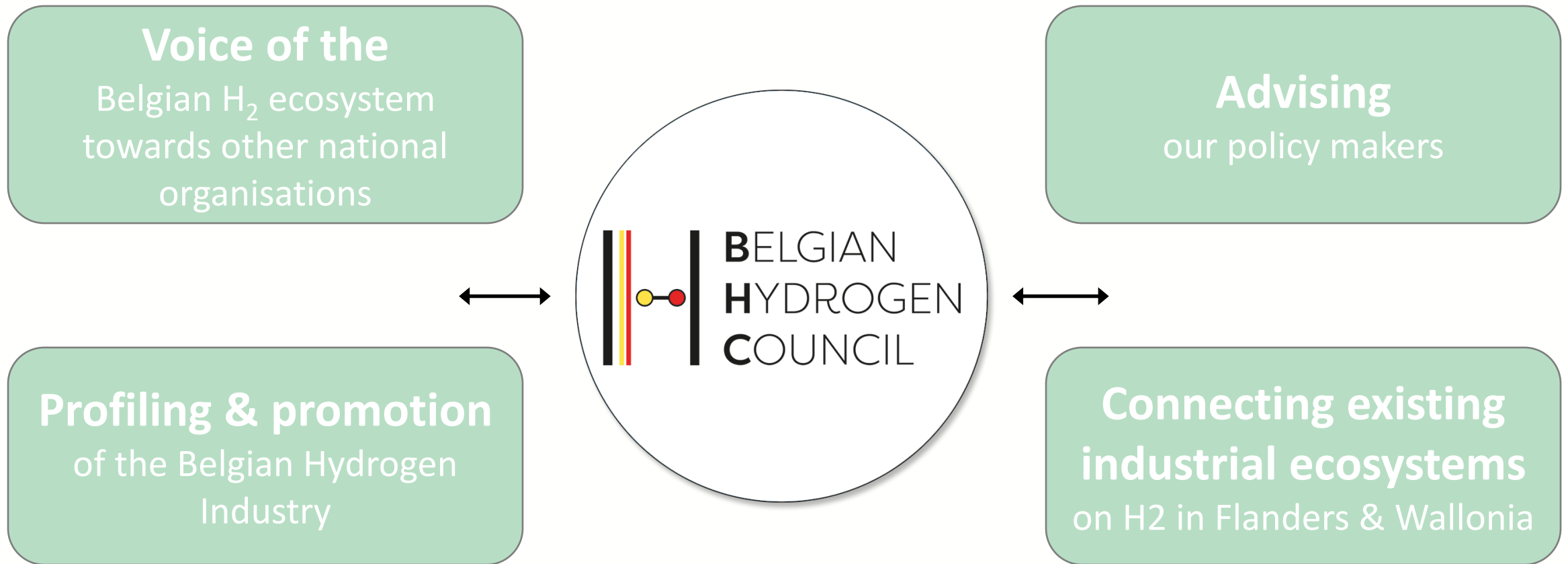
Studies, conferences, hydrogen academy, public awareness



Two existing clusters in Belgium work together



Scope of the Belgian Hydrogen Council



Voice of the
Belgian H₂ ecosystem
towards other national
organisations



Profiling & promotion of the Belgian Hydrogen Industry



Advising our policy makers



Joint Statement by the Chairs of Belgian Hydrogen Council NLHydrogen German National Hydrogen Council


25 February 2025



Belgian Hydrogen Council Position Paper Negotiated 3rd Party Access to Hydrogen Terminals EU Hydrogen and Decarbonised Gas Market Package


31 May 2025



Memorandum for hydrogen *Recommendations for the 2024-2029 legislature*


Authors: Stefan Van Laer & Isabel François (Belgian Hydrogen Council)



Renewable Energy Directive III *Key considerations for the implementation of the RFNBO sub-targets in Belgium*


Authors: Stefan Van Laer, Michel Honselaer & Isabel François (Belgian Hydrogen Council)



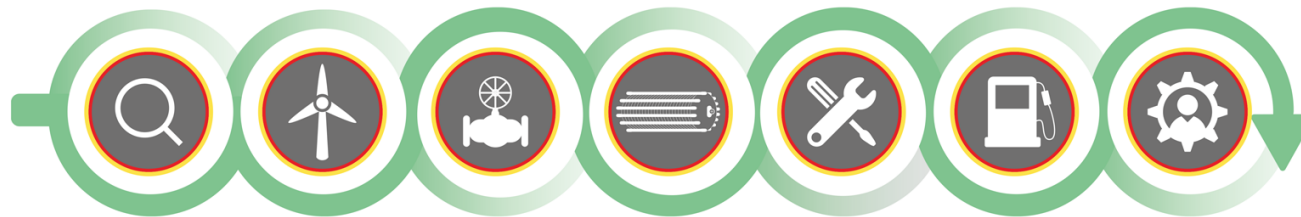
Joint Letter by the Chairs of Belgian Hydrogen Council NLHydrogen German Nationaler Wasserstoffrat



Belgian Hydrogen Council A Belgian H2Global auction window for a clean and competitive industry


13 March 2025
Internal

Connecting existing industrial ecosystems on H2 in Flanders & Wallonia



Research & Financing & Public bodies	Production	Transport, distribution & storage	Technology	Engineering & integration	Application	End User



© Belgian Hydrogen Council



Belgian & regional hydrogen strategies

Regional & Belgian hydrogen strategies



- **Flemish Hydrogen vision (end of 2020) – update 2026 in progress**

- Production of H₂ & priority for use in industry & heavy duty transport
- Support Research & development & innovation in Flemish industry

<https://www.ewi-vlaanderen.be/sites/default/files/bestanden/5fad5387b328e9000c00018b.pdf>



- **BE Hydrogen Strategy 2021- Updated in 2022 – update 2026 running**

- Focus on import of H₂ (limited domestic production)
- Infrastructure, use in industry & heavy duty

<https://economie.fgov.be/sites/default/files/Files/Energy/waterstof-visie-en-strategie.pdf>



- **Wallonia Strategic plan (2024)**

- Ambition for ‘hydrogen valley’
- Research & innovation
- Infrastructure

https://energie.wallonie.be/files/%c3%89nergies%20vertes/hydrog%c3%a8ne/20240523_PlanStrategiqueH2RW.pdf

Renewable Energy Directive

- RED III targets:



Sub-goals for specific “hard to abate” sectors:

- 42% green H2 in industry by 2030
- 60% green H2 in industry by 2035
- 1% RFNBOs in transport in 2030

Belgium:

Industry obligation:

- Chemical industry struggling
- Cost gap green <-> grey too large
- BE government position : Allow low carbon H2 to count for targets

Transport obligation :

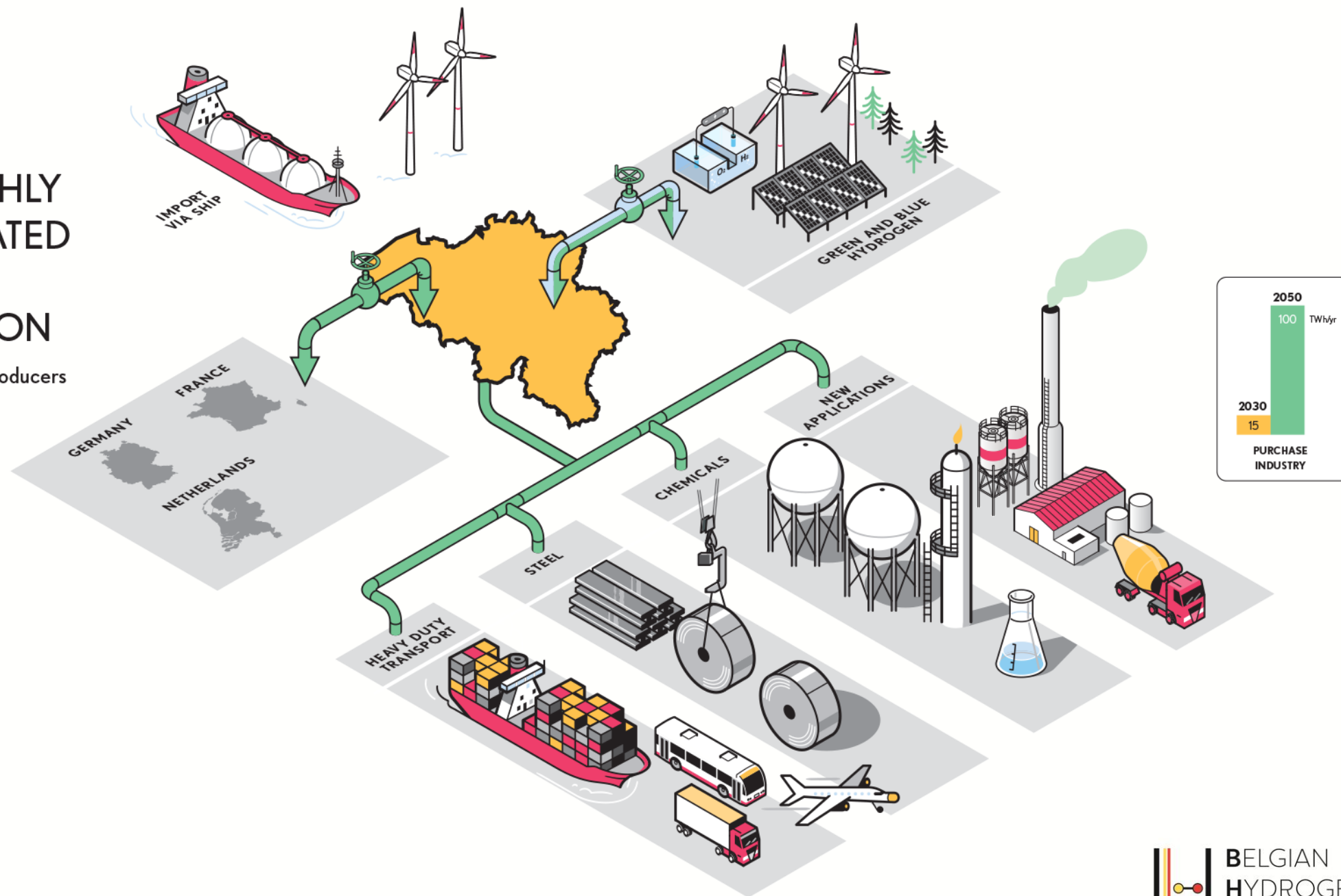
- 2 big refineries in BE
- ‘Refinery route’:

Green H2 to produce fossile fuel

Main pathway in BE (4-8%)

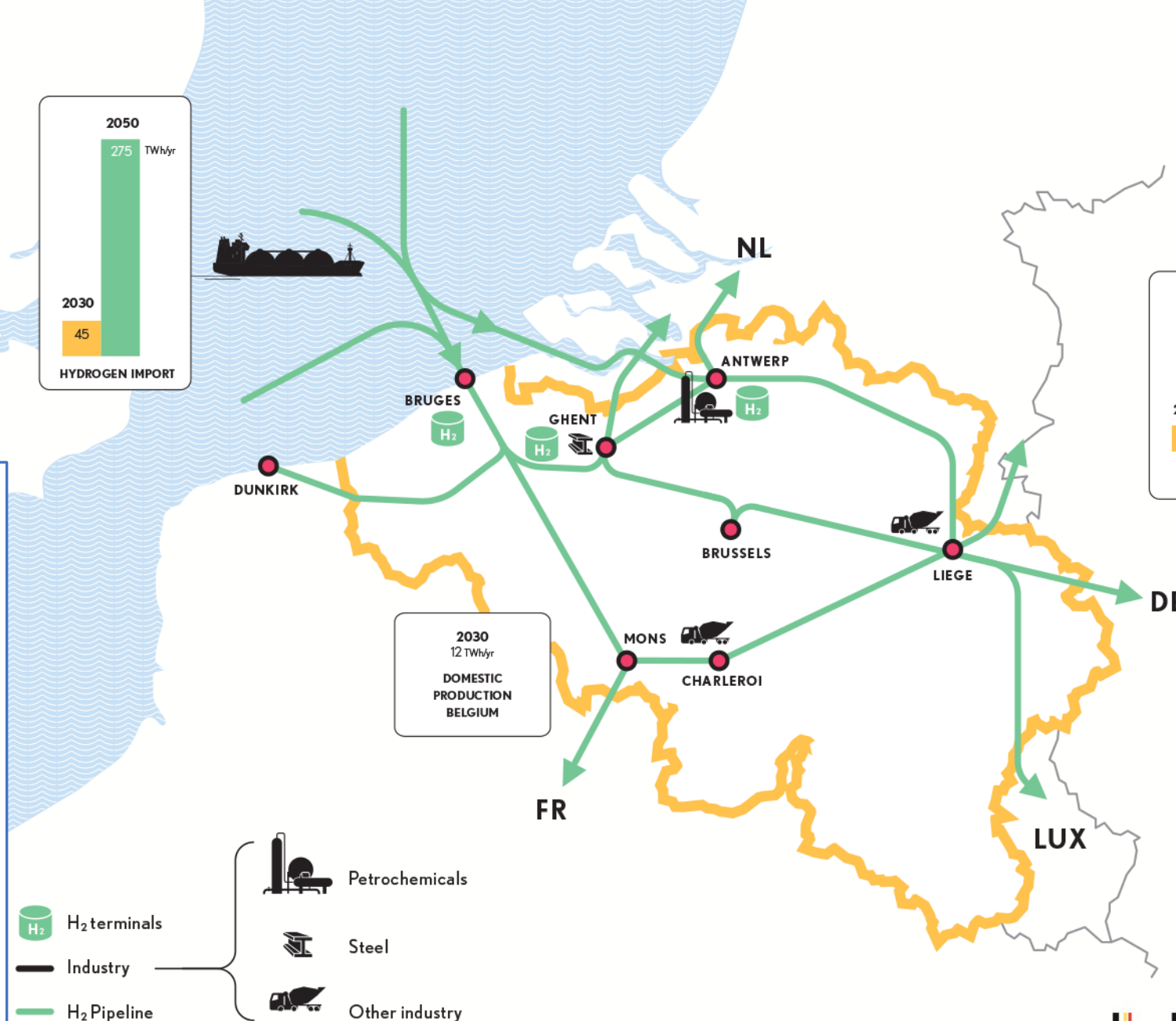
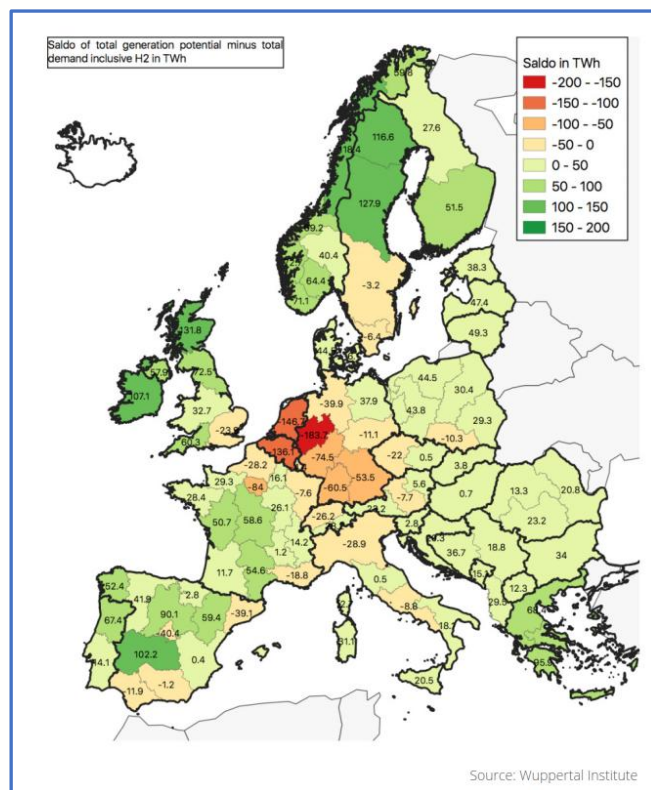
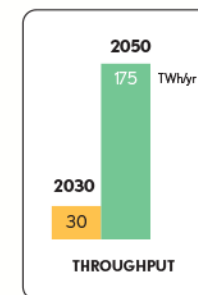
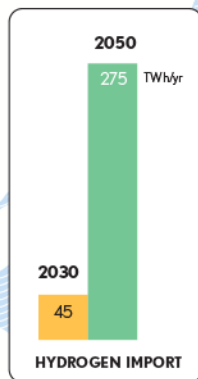
LARGE & HIGHLY CONCENTRATED HYDROGEN CONSUMPTION

& innovative pioneering producers



HUB FOR IMPORT AND THROUGHPUT OF HYDROGEN

Central location in EU



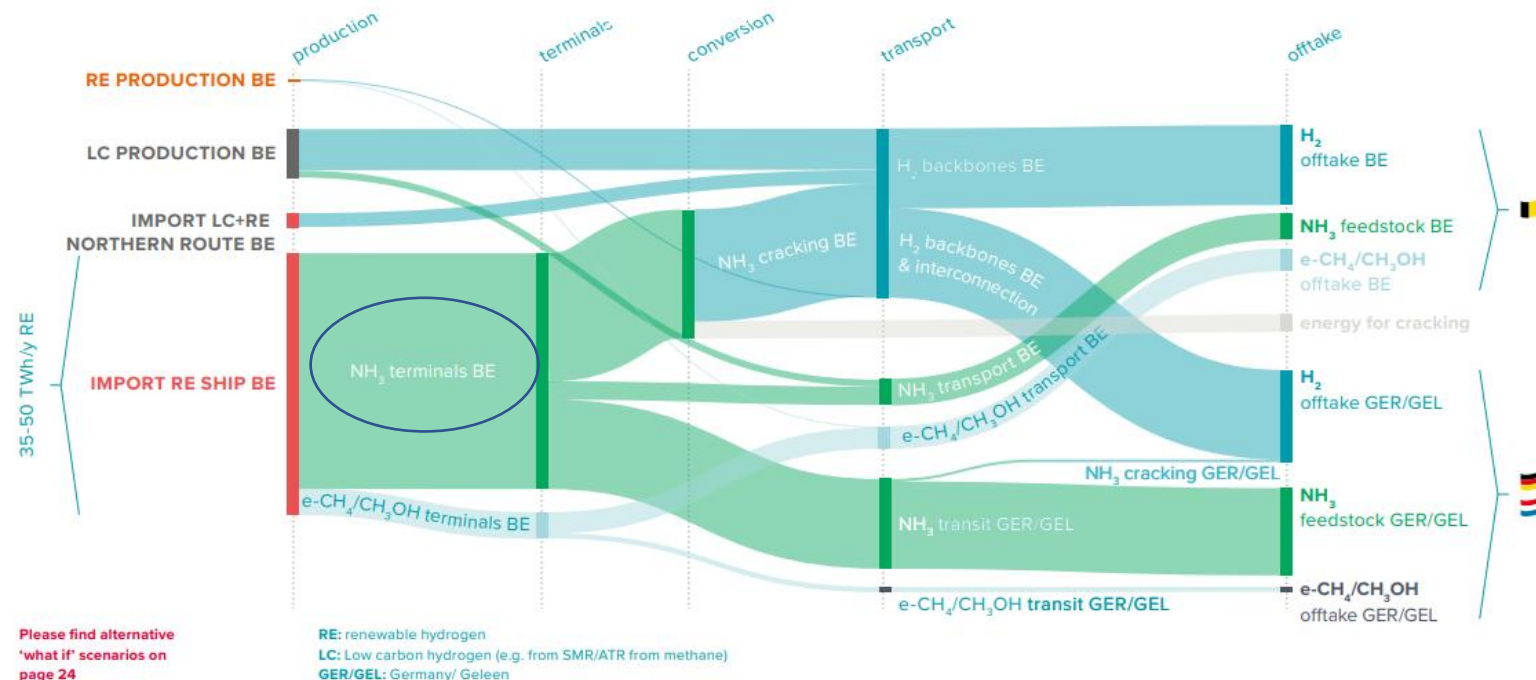
Import study – roadmap (2019-2023)



Short term focus on ammonia as H₂ carrier

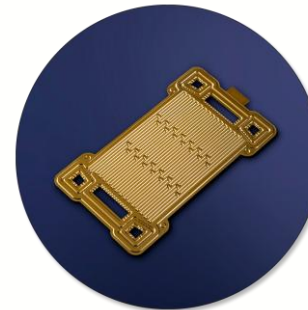
Via Port of Antwerp-Bruges

https://www.waterstofnet.eu/asset/public/H2Importcoalitie/Belgium-as-a-hydrogen-import-hub_web_singlepage-presentation.pdf





HYDROGEN TECHNOLOGY CHAMPIONS



Innovation - research



<https://www.belgianhydrogencouncil.be/research/>

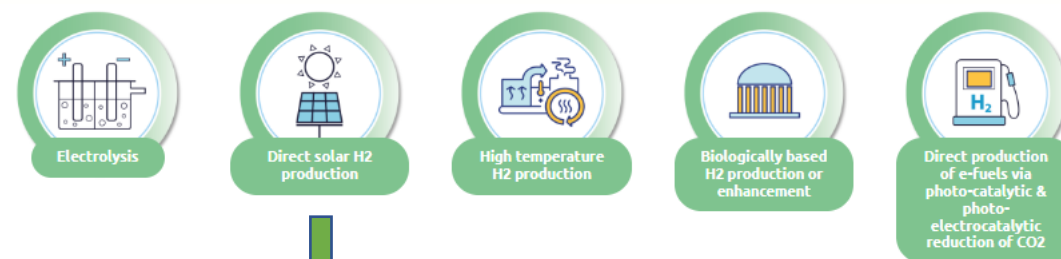


Photo-catalytic (PC)

Photo-electrochemical production (PEC)

Design & synthesis of photocatalysts

Design & synthesis of light harvesting and electro-catalytic materials, porous electrodes & MEA's

Solar production of hydrogen from sea water or waste streams

Design of innovative photo-electrolyzers, focused on membrane-less designs

Integration of thin film photo-voltaic devices with electrochemical cells

Hydrogen panels producing hydrogen from sunlight and water from air



Centre for Surface Chemistry and Catalysis (COK-KAT)

Ammonia synthesis and cracking (also plasma-based), Development of low cost and efficient electrodes, membranes and MEA's, Hydrogen panels producing hydrogen from sunlight and water from air, New catalysts (e.g. for the Haber-Bosch process or plasma catalysis ammonia), Storage of hydrogen in clathrates

KU Leuven: Centre for Surface Chemistry and Catalysis [...]

Interactive map BE H2 activities



Plans & realisations

H2-infrastructure projects since 2011



H2 in mobile/logistic/utility applications



VDL fuel cell truck -> Colruyt



Port of Antwerp-Bruges & CMB.TECH launch the Hydrotug 1, world's first hydrogen-powered tugboat



Reach stacker dual fuel
CMB-> test ATS PoAB



Van Hool bus-> 1 year test Brussels

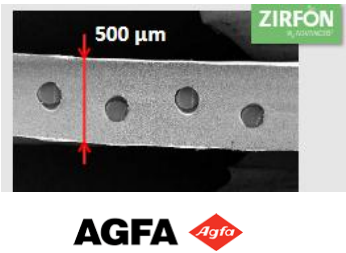
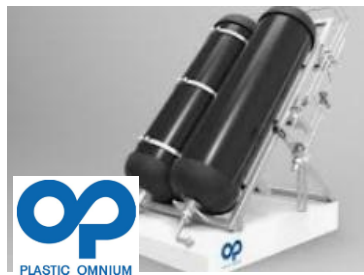


E-trucks waste truck in Antwerp



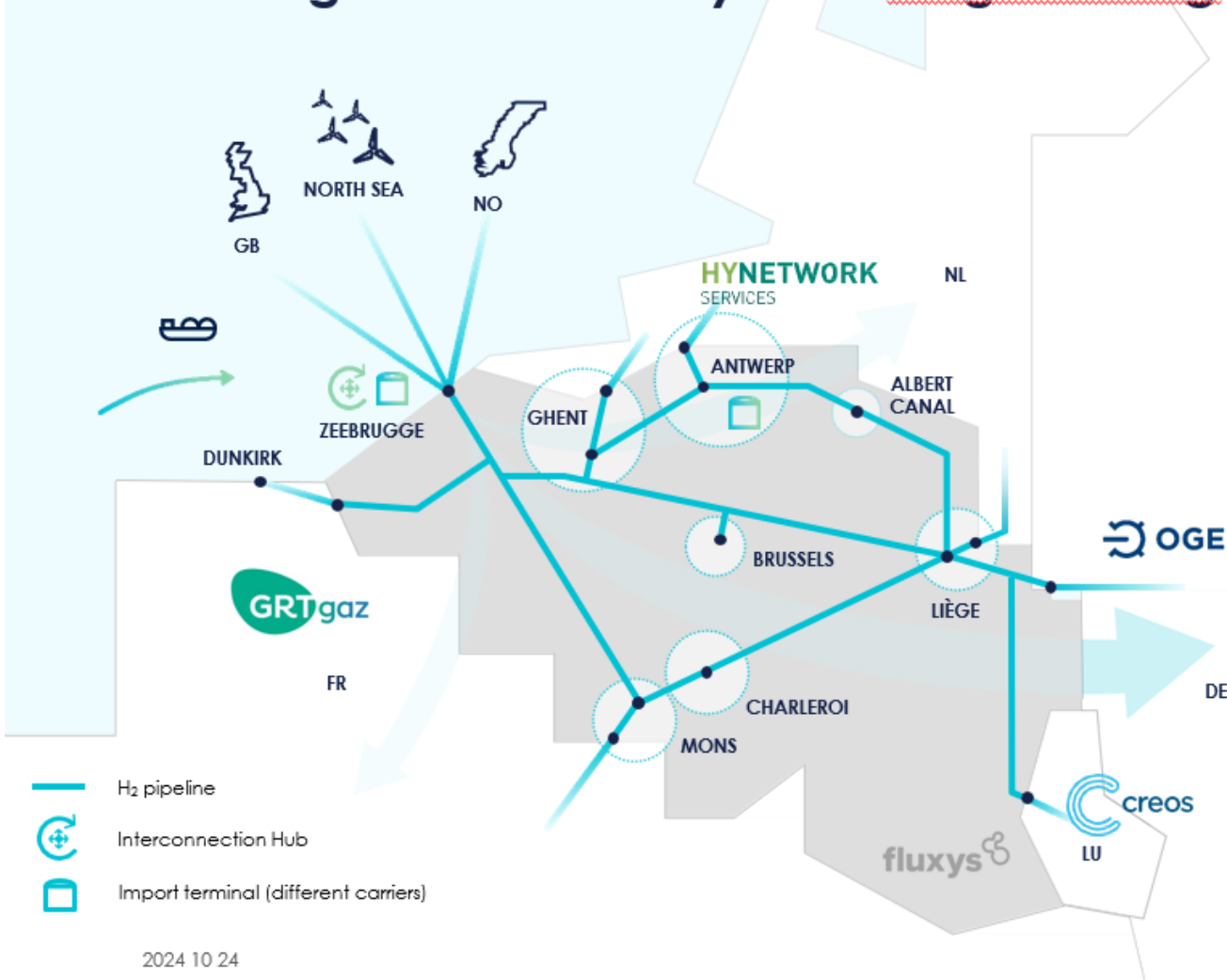
Excavator dual fuel CMB

Status H₂ in Flanders: technology development



The hydrogen backbone in Belgium

Phased development of hydrogen backbone connecting industrial valleys and neighbouring countries



Ghent-Antwerp part under construction

- Close cooperation with all stakeholders to build capacity in line with market demand
- Ambition to offer 30 TWh/y transmission capacity by 2030
- Aim to have first capacity ready 2026
- Facilitating and developing import facilities
- Working on multiple cross-border connections to achieve economies of scale



Hydrogen roadmap 2030: infrastructure under development

Further expand existing terminal capacity & build-out pipeline and cracking capacities



fluxys **ADVIRIO** Construction of an open access ammonia terminal and cracker in Antwerp (2028)

fluxys (open-access) hydrogen pipeline in development
From Antwerp (2026) connecting to Germany (2028)

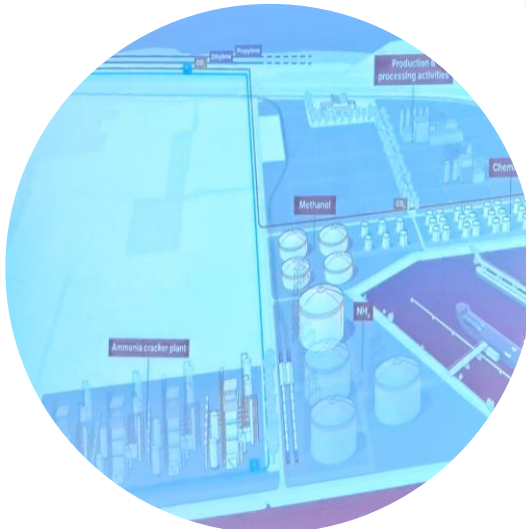
pipelink (open-access) ammonia pipeline in development
In the Antwerp port area (2028)



vtti AmplifHy project for open-access ammonia terminal and cracker in Antwerp (2029)



Redeveloping a refinery plot into Vopak Energy Park Antwerp, focusing on clean molecules, cracking and industrial processes (2029).



Commissioning of a first Ammonia Cracker in Antwerp (2024), First commercial scale cracker by 2028.

Hyoffwind project Zeebruges - Virya



PRODUCTION (BE)

Virya Energy, in partnership with HyoffGreen and Messer, have reached the final investment decision in July 2024. Construction works have started and the first molecules are expected to be produced in 2026. Using renewable electricity, the production site will produce hydrogen for industry, transport and for injection as green gas into the Belgian gas network. The project is one of Belgium's flagship projects.

ZEEBRUGES - Hyoffwind (BE)

Production process:

- Water electrolysis (25 MW)

Product:

- Gaseous hydrogen
- High purity: 99,97% (ISO 14687, Fuel Cell Quality)
- RFNBO compliant & Low-Carbon

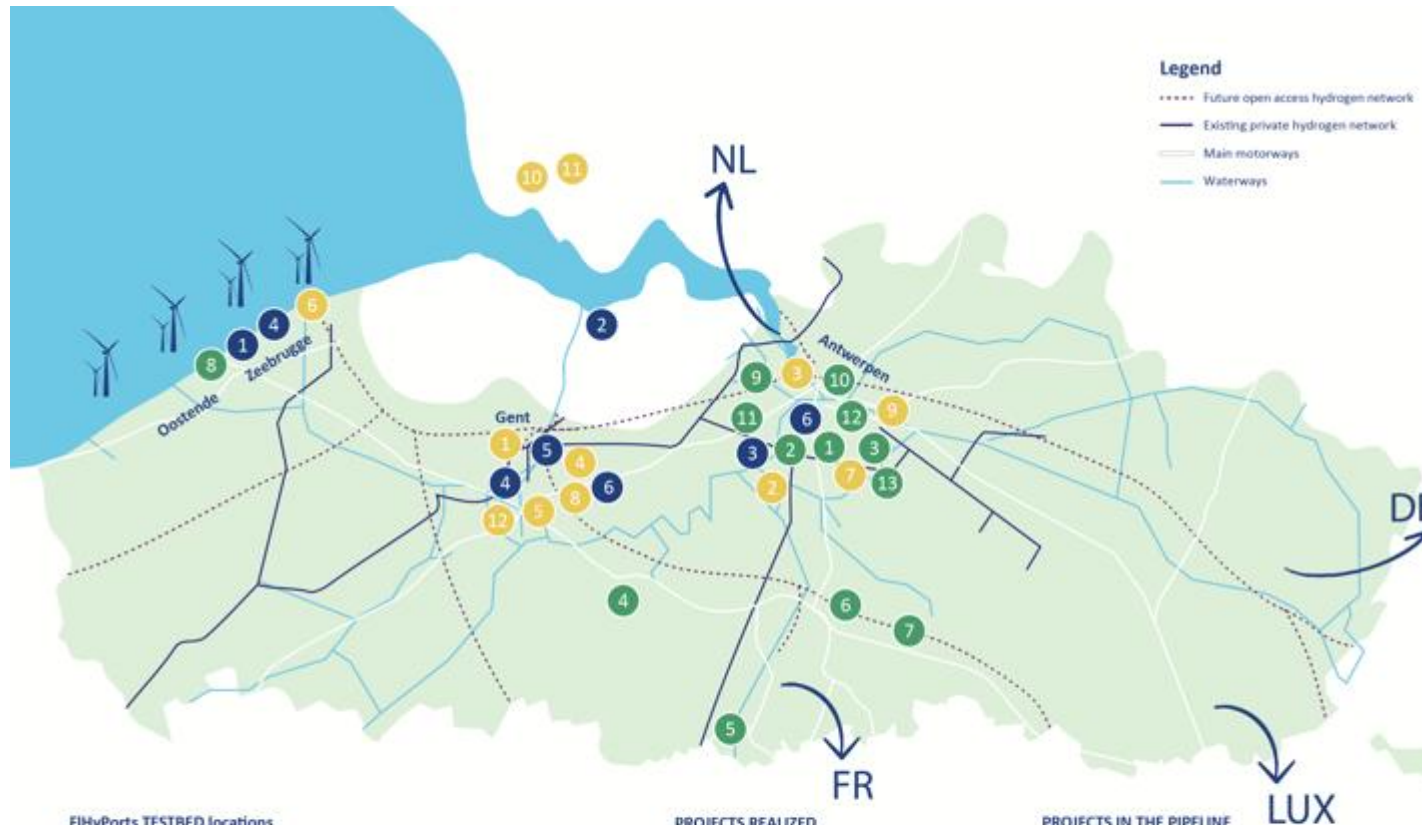
Planning:

- Start of commercial operations: Q4 2026

Transport mode:

- Tube trailer at 380 bar
- Pipeline (Belgian Hydrogen backbone): connection expected in 2030

Hydrogen valley Flanders: FIHyPorts



FIHyPorts TESTBED locations

- 1 Electrolyser "HyOffwind" 25 MW; filling point; mixing station 2027
- 2 Electrolyser "VolH2" 25 MW; filling point 2027
- 3 Port equipment, straddle carriers, empty container handler, mobile HRS
- 4 Genset "Boluda"
- 5 Inland shipping
- 6 Industry

PROJECTS REALIZED

- 1 By-product hydrogen "INEOS" 13000 t/y
- 2 HRS "CMB Antwerp"
- 3 HRS "DATS24 Antwerp"
- 4 HRS "Dats24 Erpe-Mere"
- 5 HRS "Dats24 Halle"
- 6 HRS "Airliquide, Zaventem"
- 7 HRS "DATS24, Leuven"
- 8 HRS "Parkwind, Oostende"
- 9 5 Buses "High V.LO-City"
- 10 2 Refuse trucks "Revive"
- 11 Tugboat
- 12 Ammonia cracker "Air Liquide Antwerp"
- 13 Hydroville

PROJECTS IN THE PIPELINE

- 1 Electrolyser "North-C-Hydrogen" 67 MW
- 2 Electrolyser "PlugPower" 100MW
- 3 Industrial heat for chemical industry "Ineos" 10MW
- 4 DRI steel
- 5 HRS "Air Products"
- 6 HRS "Air Products"
- 7 Low carbon "Kairos Antwerp"
- 8 Low carbon "H2BE Ghent"
- 9 Ammonia terminal "VTI / ATPC Antwerp"
- 10 Ammonia terminal "Vesta"
- 11 Ammonia terminal "LBC Vlissingen"
- 12 5 Heavy-duty H2-ICE trucks "DFDS"

Objectives:

- Production of > 500 tons of clean hydrogen using new hydrogen production capacity
- Use of the clean hydrogen produced several applications in several sectors via testbeds, including sector coupling and maximizing integration of renewable energy
- Implementation of certified RFNBO tracing system
- Monitor performance of testbeds during at least 2 years to provide data for technic-economic assessments
- Demonstrate the financial viability after 2 years of operation and provide scalability analysis
- Demonstrate the replication of the results to other port-areas ...

Multiplication ports



Conclusions & outlook

- Focus Flanders / Belgium on
 - Hydrogen import hub function for NW Europe (Ports) => infrastructure
 - Ammonia (and methanol) carrier
 - Technology development
- Renewable Energy Directive III implementation will define updated strategies
 - Volumes
 - Refinery route
 - Role of Blue
- Smaller scale applications of H2 - role in energy system (e-grid congestion)