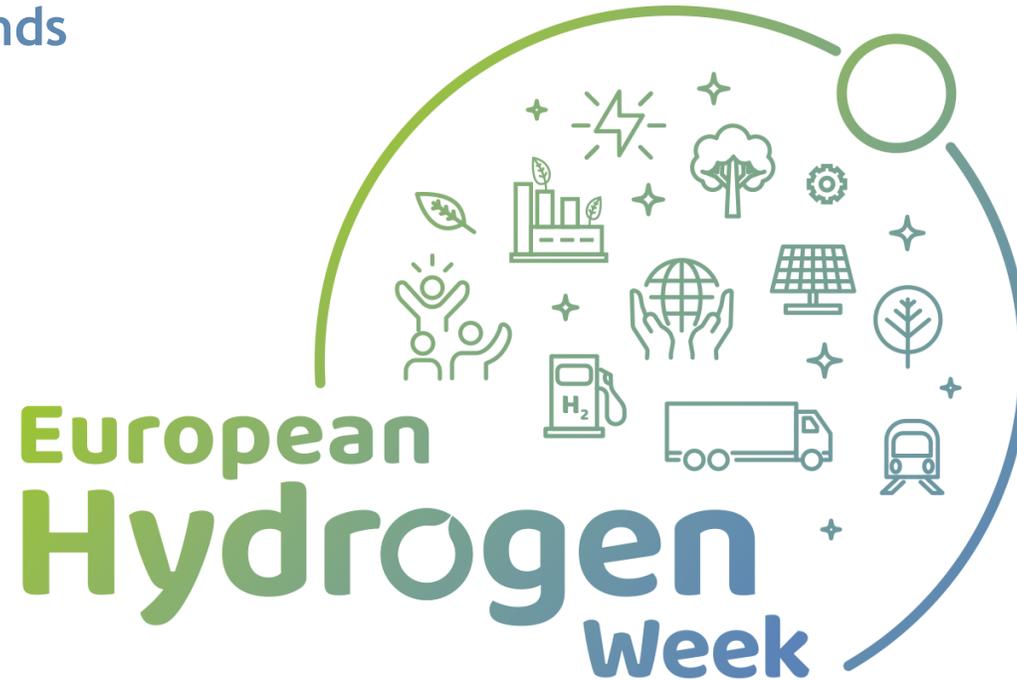


HEAVENN

H2 Energy Applications (in) Valley Environments (for) Northern Netherlands



Patrick Cnubben

New Energy Coalition

<https://www.newenergycoalition.org/en/>

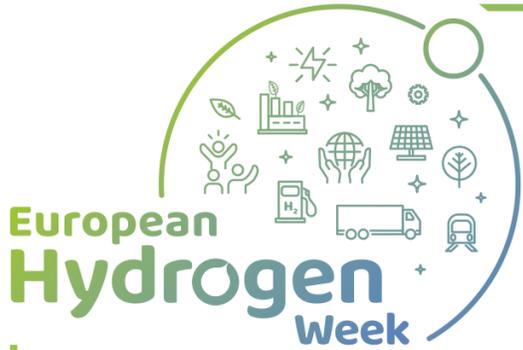
green-hydrogen-economy/

new website under construction

p.cnubben@newenergycoalition.org

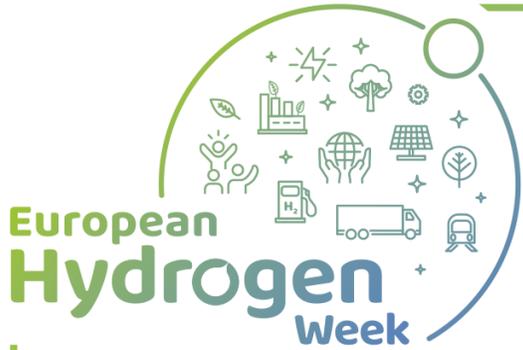
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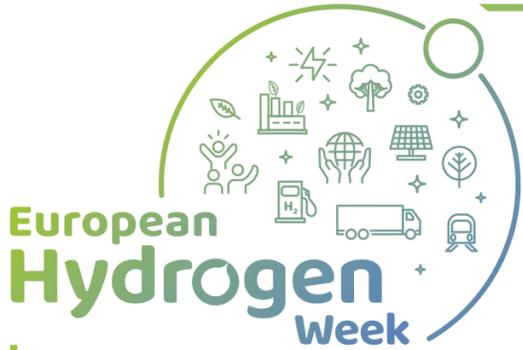
Project Overview

- Call year: 2019
- Call topic: FCH-03-1-2019: H2 Valley
- Project dates: 01/01/2020 - 31/12/2025
- % stage of implementation 01/11/2019: 15 %
- Total project budget: approx. 83.000.000 €
- FCH JU max. contribution: 20.000.000 €
- Other financial contribution: 20.000.000 €



Project Overview

- Partners: Gasunie, Nouryon, Engie, Groningen Seaports, Emmtec, Green Planet, Qbuzz, Total, Shell, NAM, EBN, Qbuzz, Lenten Scheepvaart, Municipality Groningen, Municipality Emmen, Municipality Hoogeveen, HyEnergy Transtore, Energy, Bytesnet, H2Tec, UVO Vervoer, Rijksuniversiteit Groningen, NPRC, Hinicio, Aragon Hydrogen Foundation, European Maritime Center, EWE, Hydrogen Valley Denmark, Hydrogen Ireland, European Research Institute for Gas and Energy Innovation

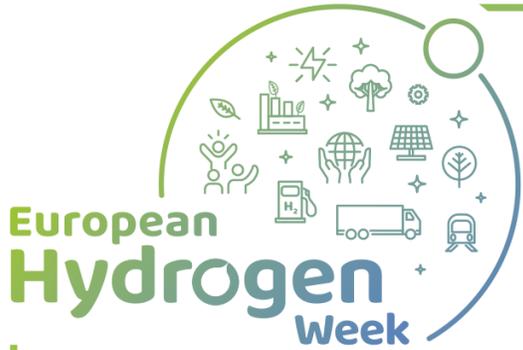


Project Summary

Main Objectives

Strategic Objective

- Establishing a H2 ecosystem in NN region, integrating H2 initiatives in a systemic approach, to demonstrate sector coupling and FCH uses cases at a regional level
- 100% Green H2 production
- Integrating in total eleven FCH applications from four sectors
 - Industrial demand initial 2.800 tpa rising to 7.200 tpa
 - Heat and power demand: 315 tpa rising to > 500 tpa
 - Mobility demand: 350 tpa rising to > 700 tpa

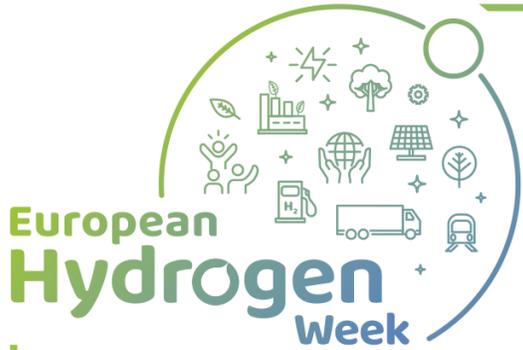


Project Summary

- Ensuring deployment of appropriate infrastructure for distributing H2 to local end-uses across the region and integrating H2 supply with industry, mobility and energy (i.e. heat and power)

Socioeconomic and environmental

- New jobs - regional development - it is estimated that HEAVENN has the potential to create a minimum of 15,000 jobs in the region
- The large scale H2 hub is economically viable and operated after the end of the funded project
- Reducing 50% GHG emission

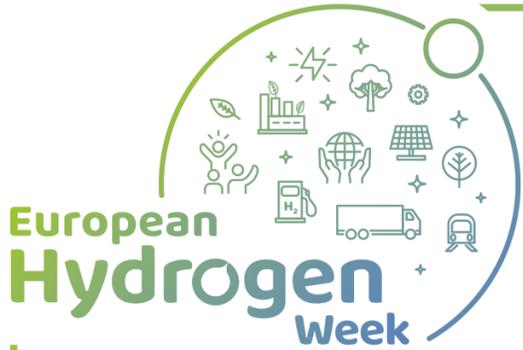


Project Summary

Global positioning vs international state-of the art

- The HEAVENN project offers a robust approach to construct a regional Hydrogen Valley model.
- Analysis in the context of the **Mission Innovation Hydrogen Valley Platform*** shows that HEAVENN is positioned in the top 5 tier of Hydrogen Valleys globally: <https://www.h2v.eu> (launch December 2020)
- HEAVENN is collaborating with other European Hydrogen Valley projects like Big Hit and the upcoming Green Hyslands project.

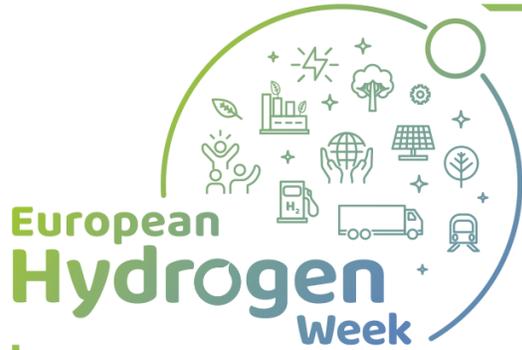
**The Hydrogen Valleys Platform has been prepared for the Fuel Cells and Hydrogen 2 Joint Undertaking. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme, Hydrogen Europe and Hydrogen Europe Research.*



Project Summary

Application and market area

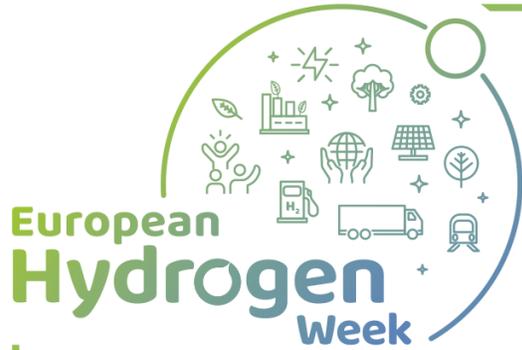
Industry, domestic and industrial process heat, back-up power transport (cars, light duty and heavy duty vehicles, coaches, refuse trucks, inland water boats/barges including HRS)



Synergies With Other Projects And Programmes

Interactions with projects funded under EU programmes

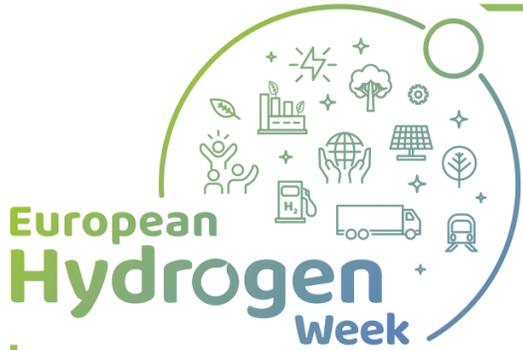
- Big Hit: www.bighit.eu
- TSO2020: <http://tso2020.eu/>
- Highvelocity: <http://highvlocity.eu/>
- JIVE/JIVE2: <https://www.fuelcellbuses.eu>
- CertifHy: www.certifhy.eu
- Djewel: <https://djewels.eu/>
- ITEG: <http://www.emec.org.uk/projects/hydrogen-projects/iteg/>
- SEREH: <https://sereh.eu/sereh>
- Store and Go: www.storeandgo.info
- Green Hyslands: under construction



Synergies With Other Projects And Programmes

Interactions with national and international-level projects and initiatives

- Smart Specialisation European Hydrogen Valleys Platform: <https://s3platform.jrc.ec.europa.eu/hydrogen-valleys>
- Mission Innovation Hydrogen Valley Platform: <https://www.h2v.eu>
- Ara Ake: <https://www.araake.co.nz/>
- Hydrohub Megawatt Test Centre: <https://ispt.eu/projects/hydrohub-megawatt-test-centre/>
- Hyways for Future: <https://www.hyways-for-future.de/>
- Several IPCEI initiatives



Project Overview

Call year:
2019

Call topic:
FCH-03-1-2019:
H2 Valley

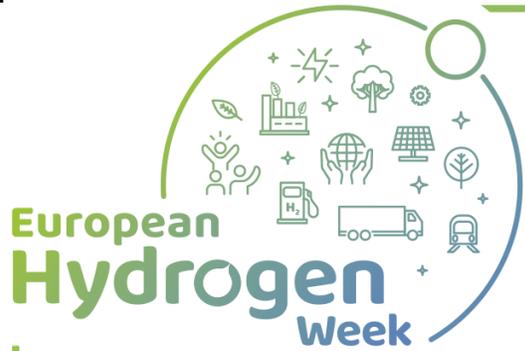
Project dates:
01/01/2020-31/12/2025

Total project budget:
83.000.000 €

HEAVENN

15% stage of implementation
01/11/2020

FCH JU max. contribution:
20.000.000 €
Other financial contribution:
20.000.000 €

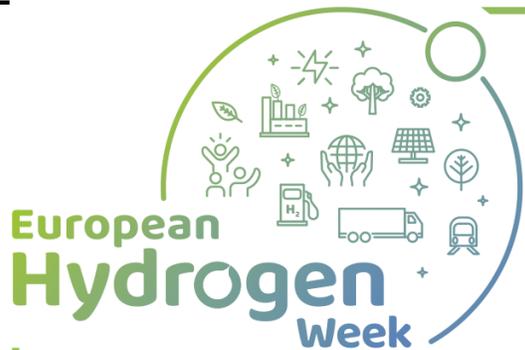


We are we located

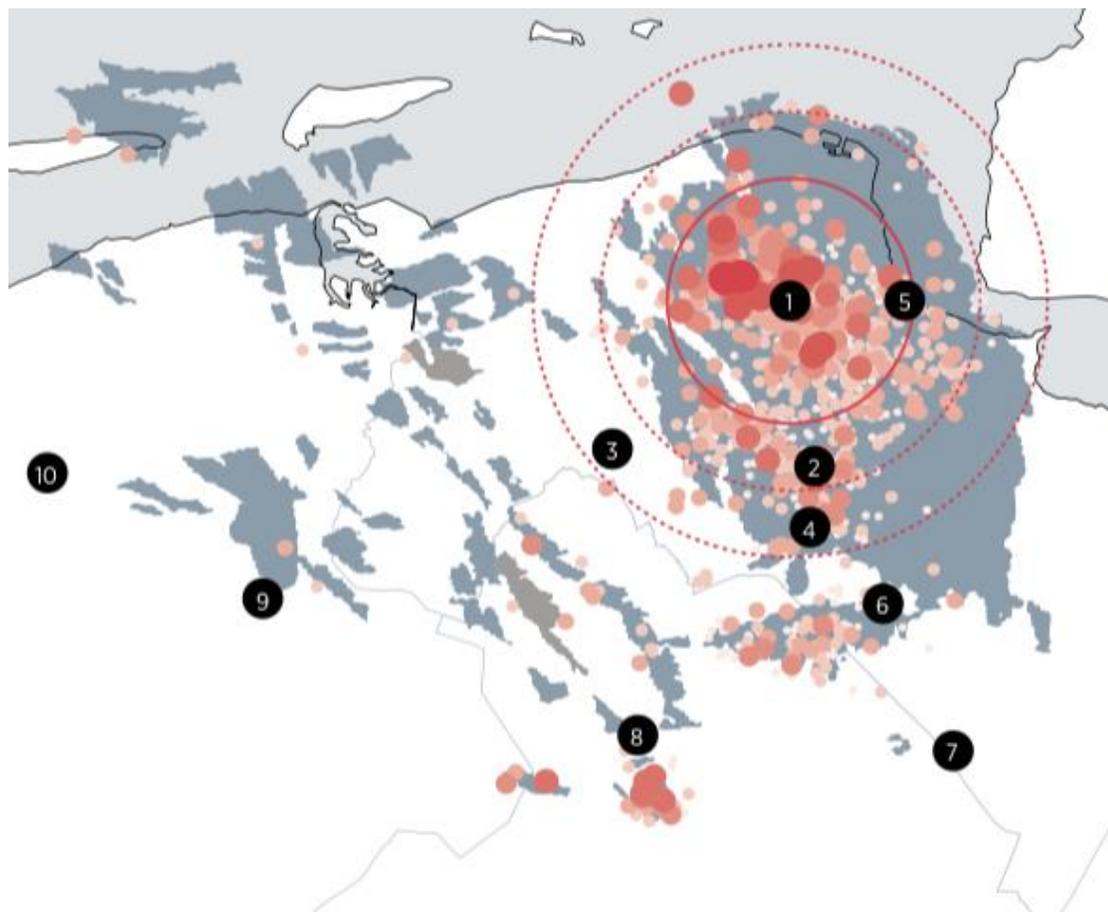


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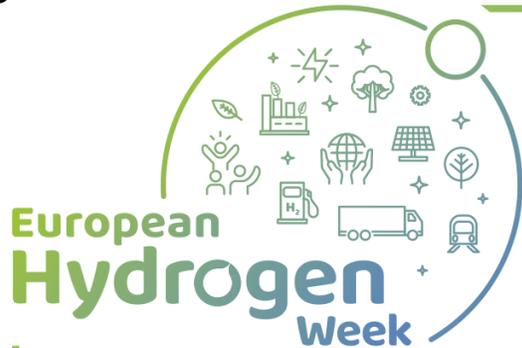


Situation in the Northern Netherlands

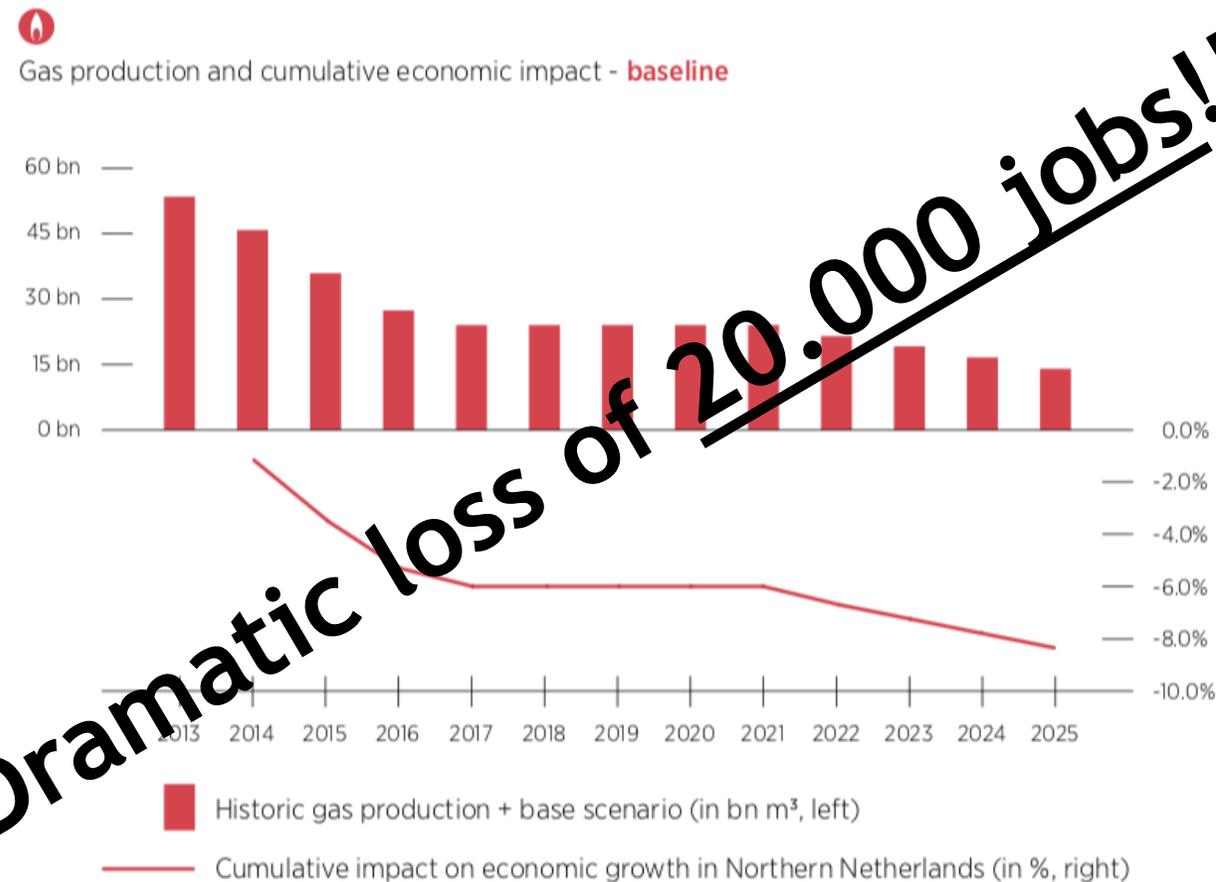


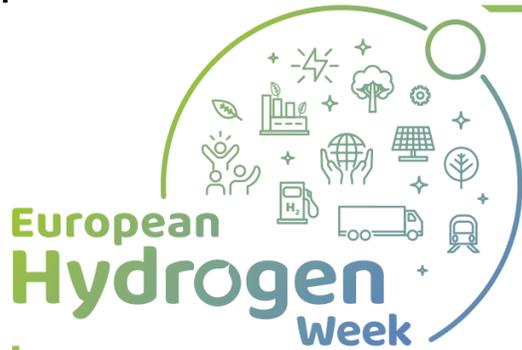
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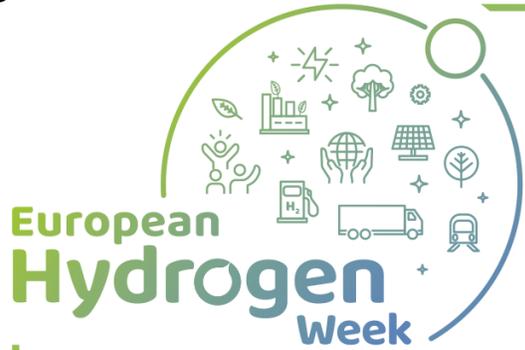
Situation in the Northern Netherlands





We need a plan

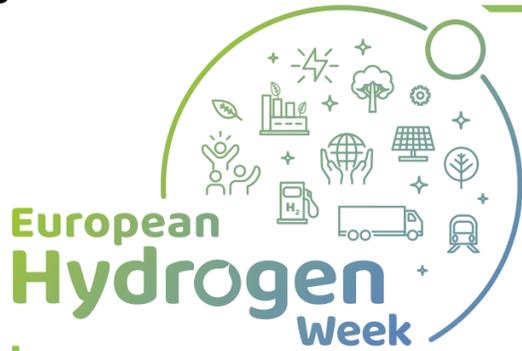
Green Hydrogen Economy in the Northern Netherlands



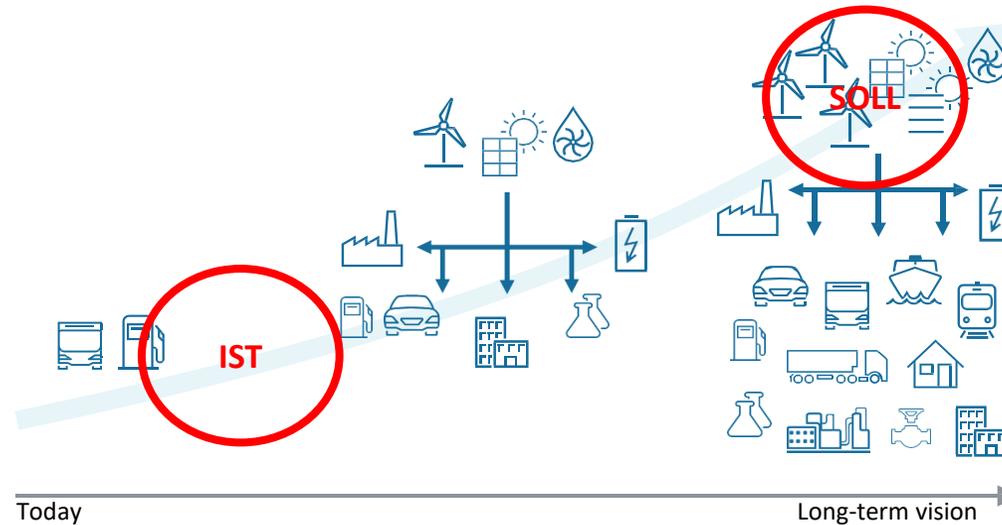
H2 fits the region as a glove

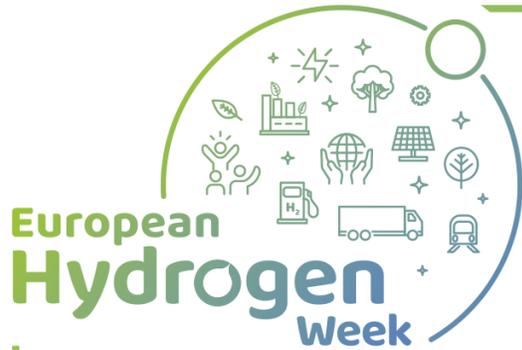
The region is perfectly positioned and willing to develop an integrated green H2 economy, due to:

- Existing gas infrastructure
- Existing and growing offshore wind power potential
- Two large chemical industrial areas aiming to become more sustainable
- Decarbonisation of urban mobility, partly driven by local emission reduction goals
- Regional ambition (business and political) to become an integrated hydrogen economy



Becoming an Integrated Hydrogen Economy





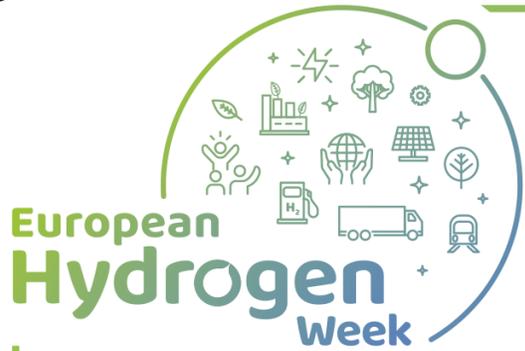
HEAVENN consortium

The consortium

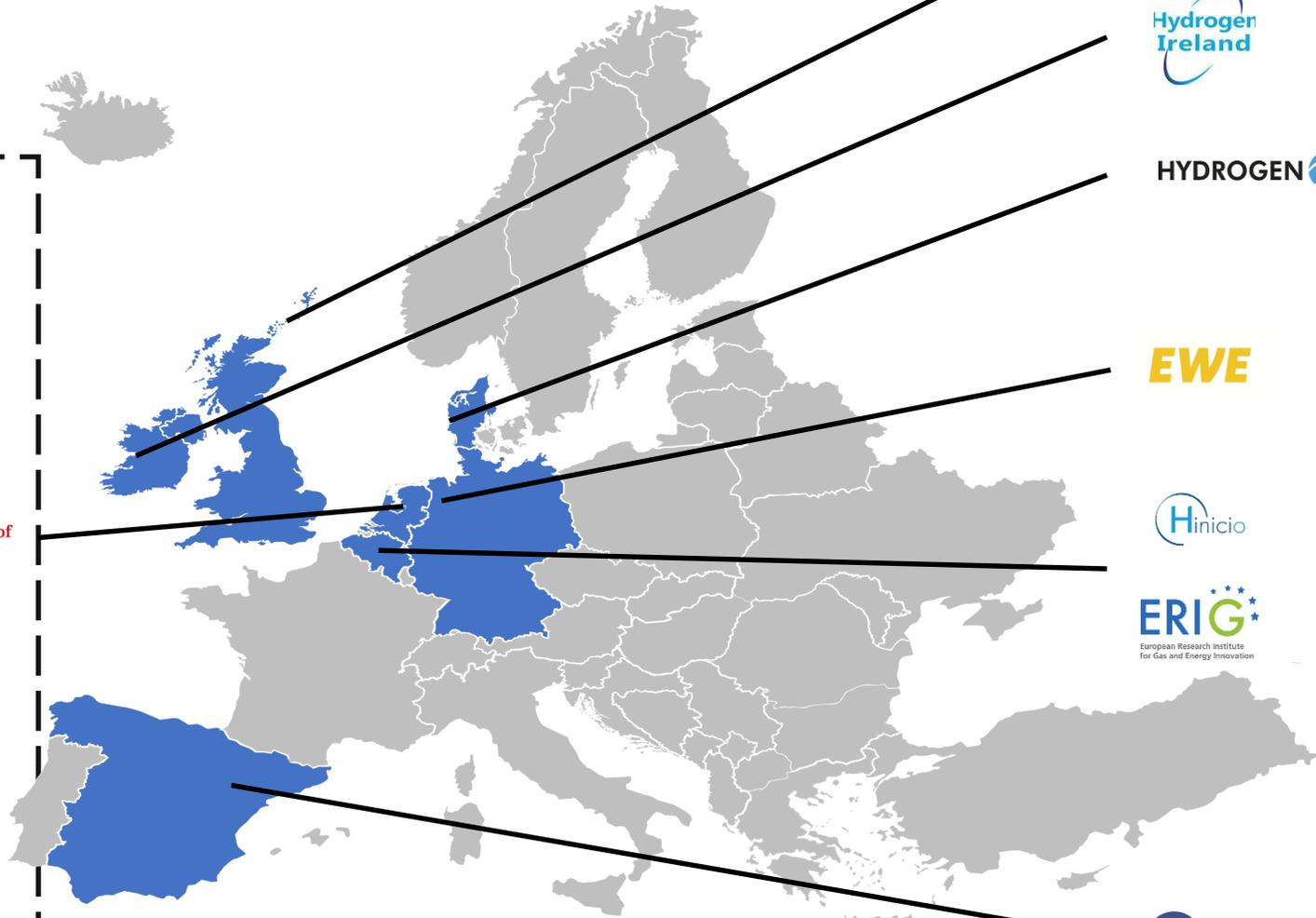
- New Energy Coalition
- 28 entities from 7 EU countries (NL, D, DK, B, UK, ES and E)
- Parties are: businesses (large, mid-sized and small), associations, knowledge institutions, expert advisories, regional development institutions

Broad national and international support

- Over 60 parties from over 12 countries have given their support to the project by means of a Letter of Support
- The project can also rely on broad political support covering the whole political spectrum - nationally and at EU level

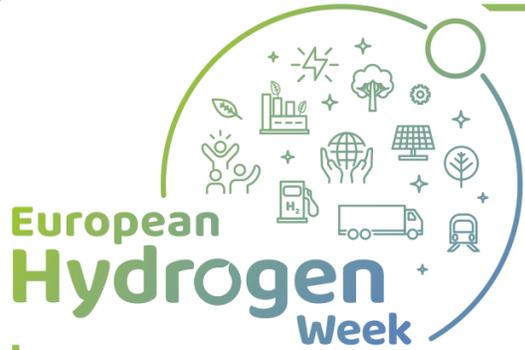


Partners



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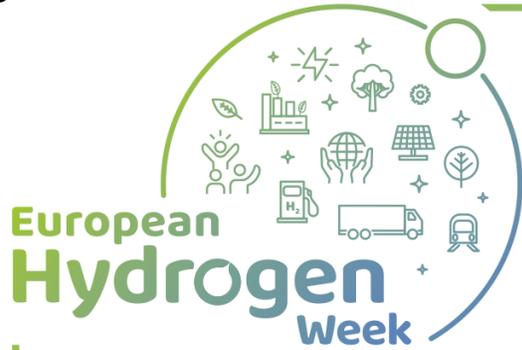




Industrial feedstock

- Facilitation of supply of green H₂ to 'green' methanol production process, full output 20 MW (Delfzijl)
- Facilitation of supply of green H₂ to produce renewable "drop-in" e-fuels for transport applications, full output 40 MW (Delfzijl)

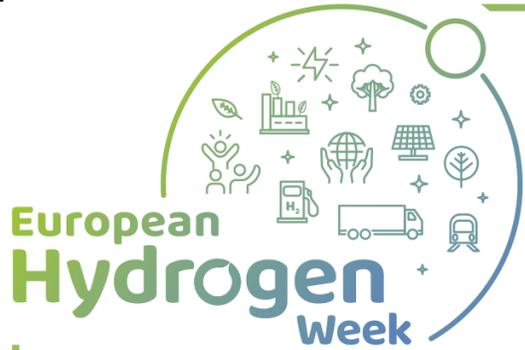
Total initial industrial H₂ demand estimated at 2.800 tpy, going up to > 7.000 tpy by 2022



Heat & Power

- Heat for residential (100 and 250 houses in Hoogeveen) and municipal building (Groningen)
- 4 (-10) MW Electrolyser for industrial heat (Emmen)
- Back-up power data centre 100 kW fuel cell supply based on green H2 (Groningen)
- On-shore auxiliary power 100 kW fuel cell for inland barges (Delfzijl)

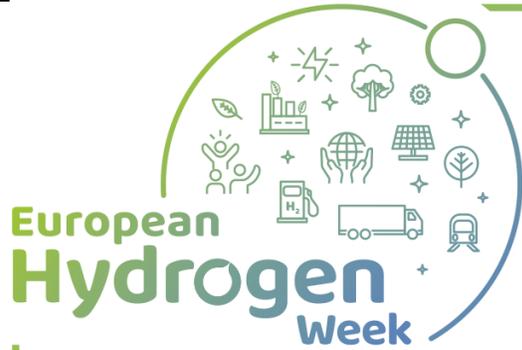
Total heat & power H2 demand: expected to increase to > 500 tpy



Mobility

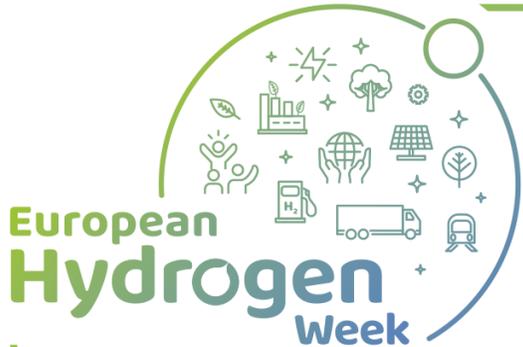
- Passenger and light duty: 105 FC passenger cars and 8 vans
- Heavy duty : 4 garbage trucks and 8 heavy goods vehicles
- Qliner coaches, crafters, etc.
- 4 H2 Refuelling Stations (2 x 350 bar, 2 x 700 bar)
- H2 inland salt barge

Total mobility H2 demand: estimated 680 tpy

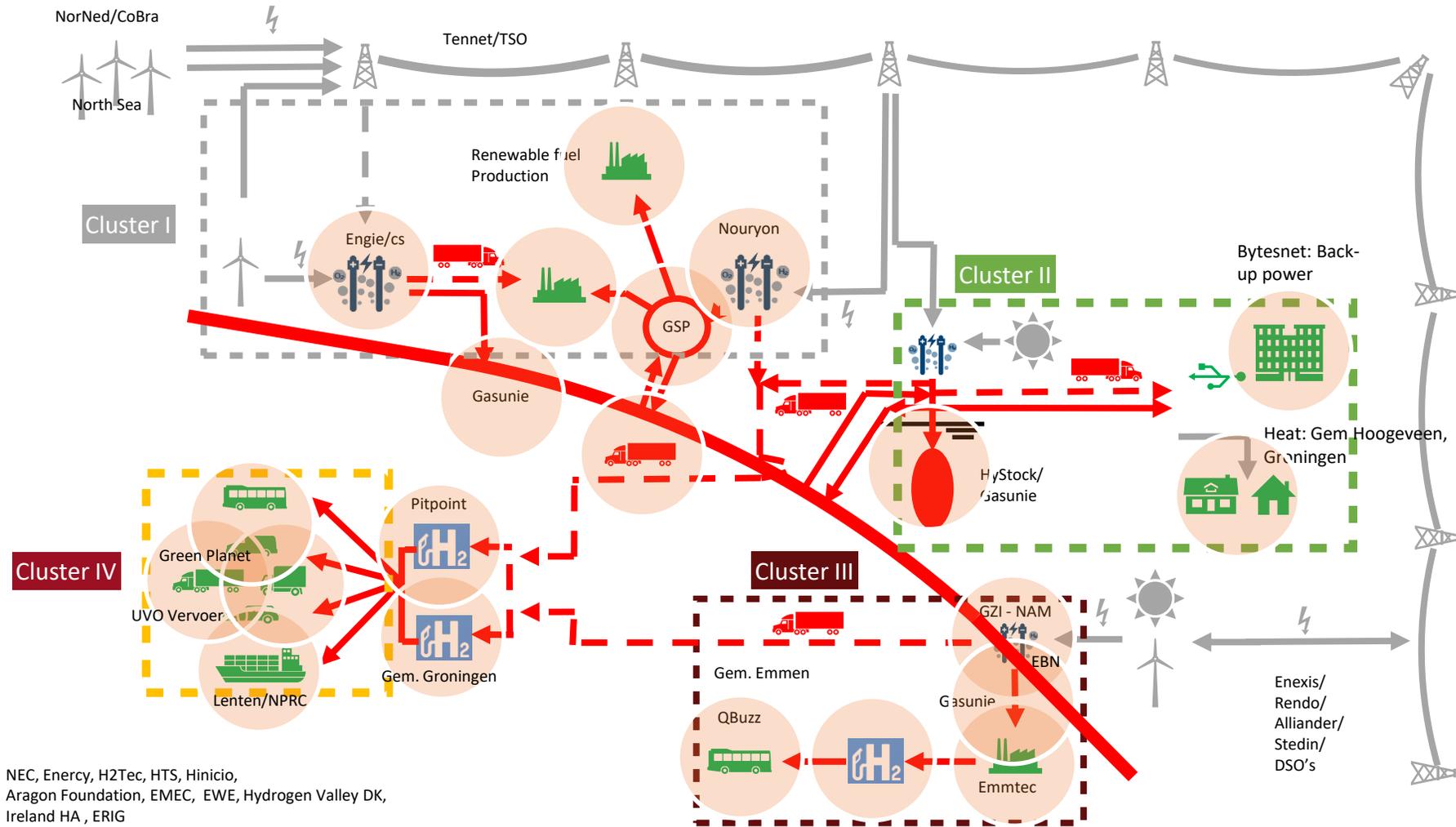


Storage & Infrastructure

- Deployment of underground gas storage system
- Studies & preparatory work for the deployment of repurposed and new H2 pipelines
- Realisation of (polymer-based) pipeline connections on the Delfzijl Chemical Park connecting supply and demand
- Deployment of new H2 pipeline between GZI site and the Emmtec Industry Park
- Distribution of H2 across the region via trailers



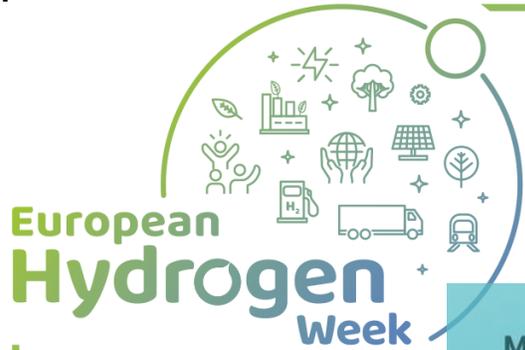
HEAVENN



NEC, Energy, H2Tec, HTS, Hincio, Aragon Foundation, EMEC, EWE, Hydrogen Valley DK, Ireland HA, ERIG

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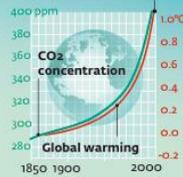




More than HEAVENN: roll out!

Moving towards 2030 and 2050 with hydrogen

The earth has warmed up by 1.1°C since 1850

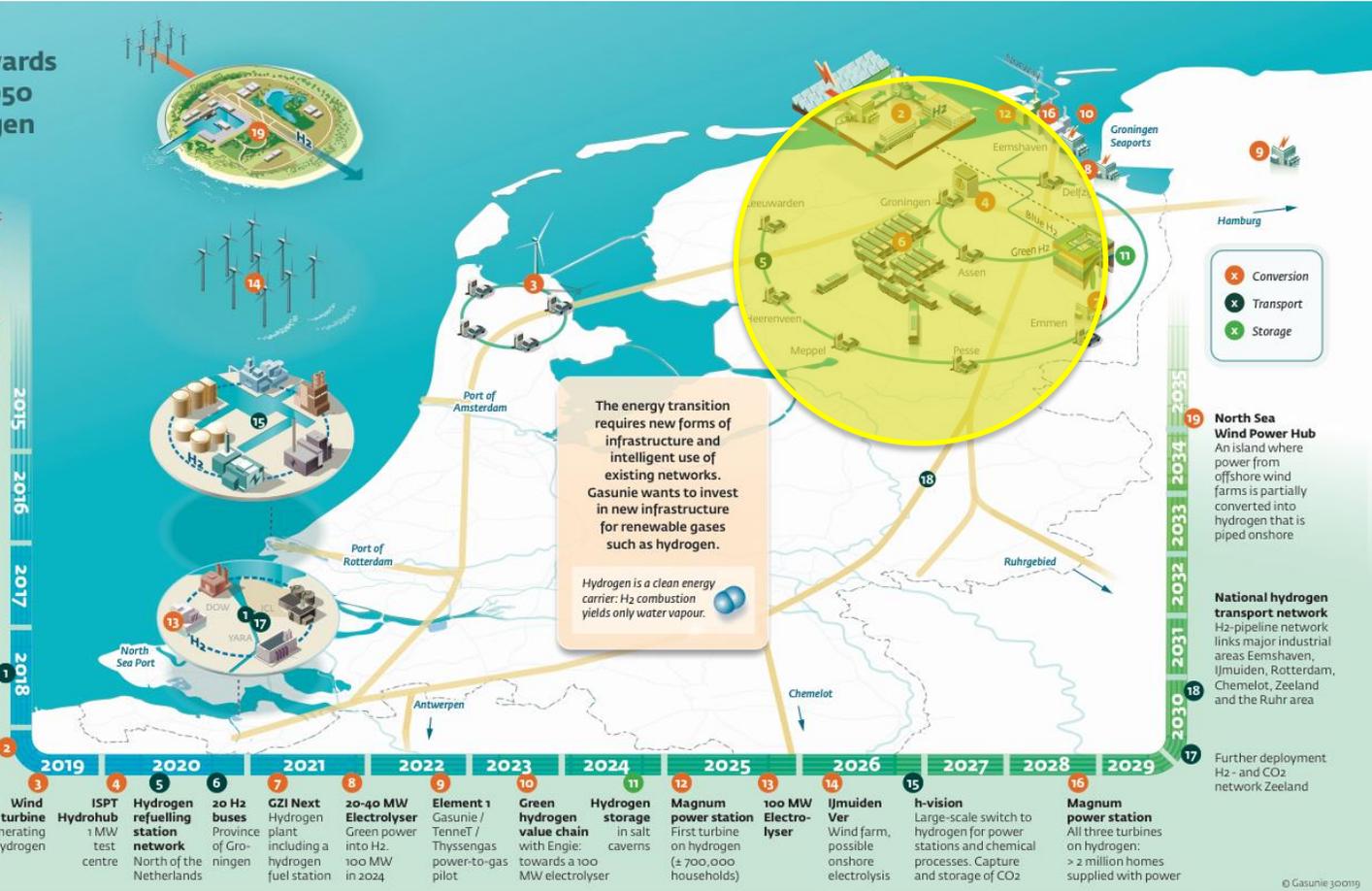


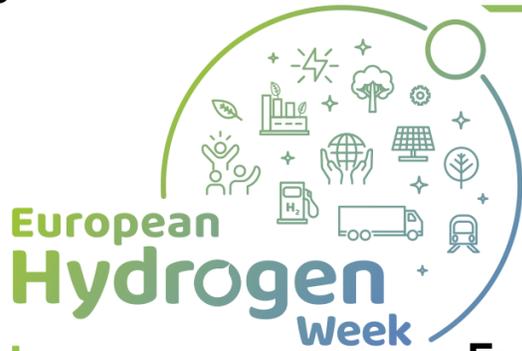
If we do nothing the global temperature will rise by another 4°C by 2100

22 April 2016 Paris Agreement
Global warming set at a max. 2°C. This requires CO₂-reductions in the Netherlands of:
• 40-50% by 2030
• 85-100% by 2050
Hydrogen as a fuel and as a raw material can help to achieve CO₂-reduction targets

Hydrogen pipeline
Linking hydrogen industries in Zeeland and the Delta region

Pilot project HyStock
Converting solar energy into hydrogen in Zuidwending





Just Transition Fund

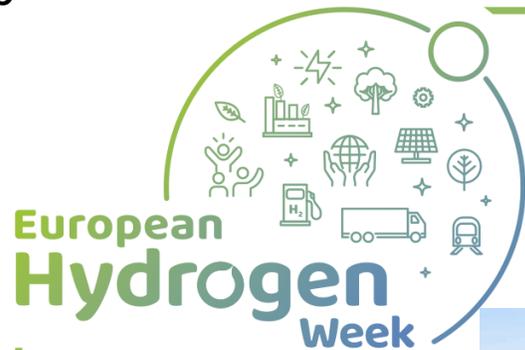
Energy transition poses challenges

- Large energy intensive cluster
- Exit Natural Gas extraction
- Greenhouse gas emission reduction challenges

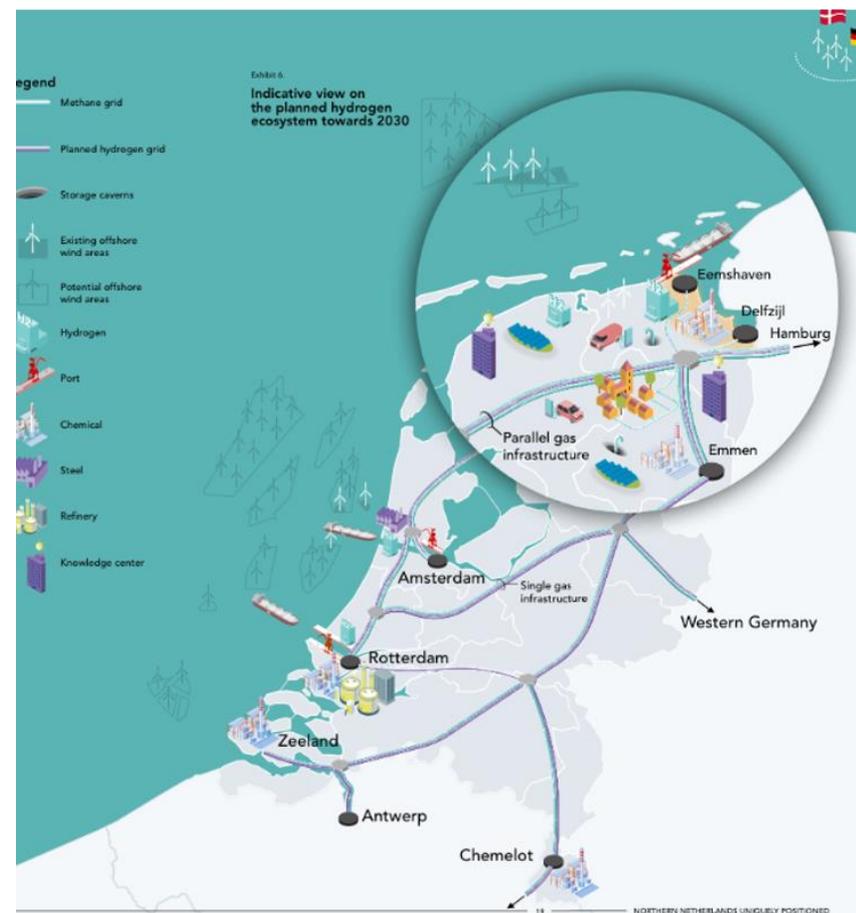
Dramatic loss of 20.000 jobs!!!

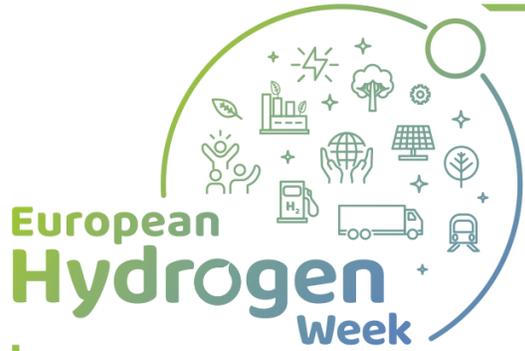
Target region for Just Transition Fund

- Research and Innovation → advanced technologies
- Deployment → Clean and renewable energy, efficiency, GHG reduction
- Upskilling and reskilling of workers



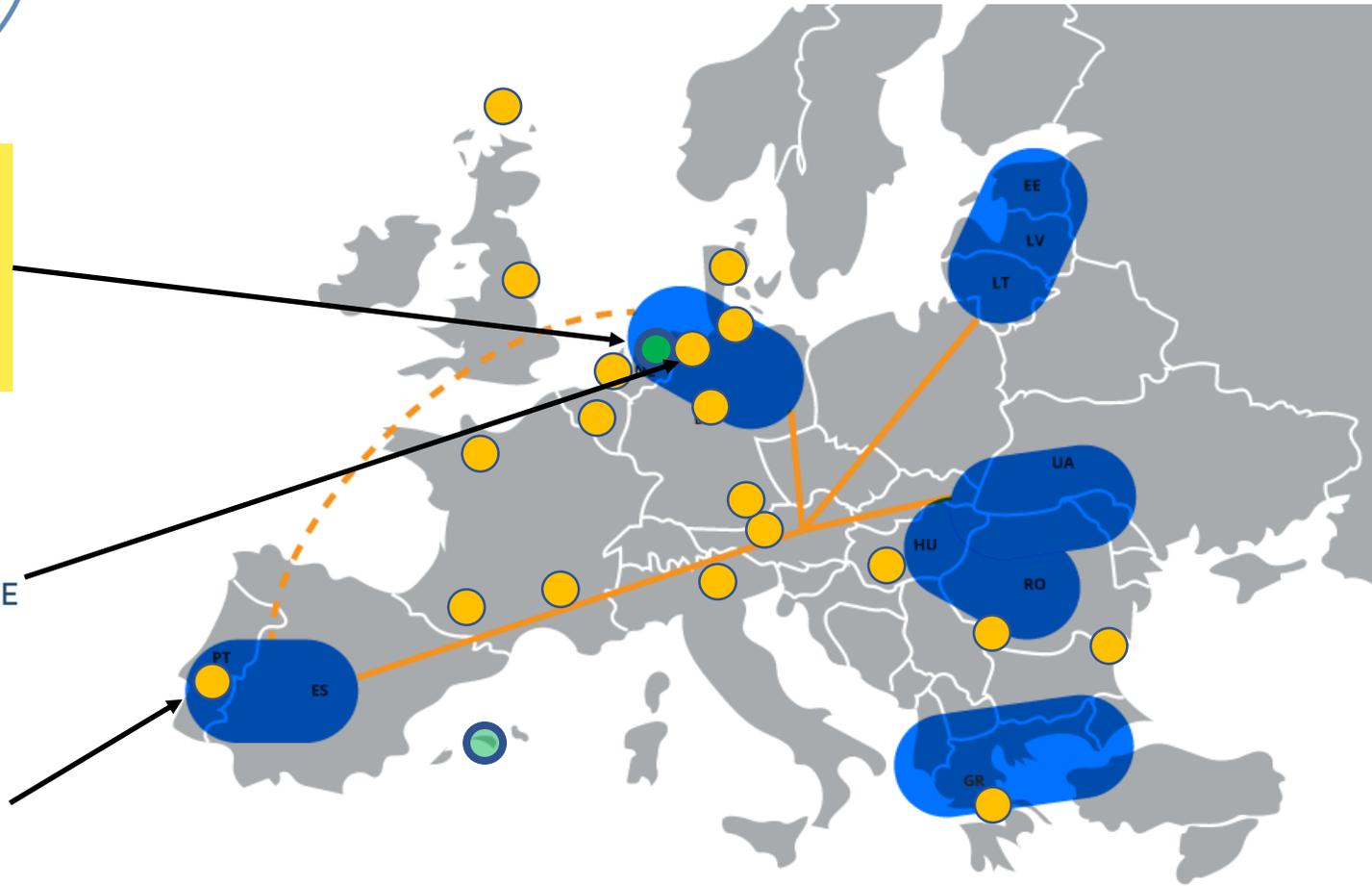
Hydrogen Investment Plan 2.0



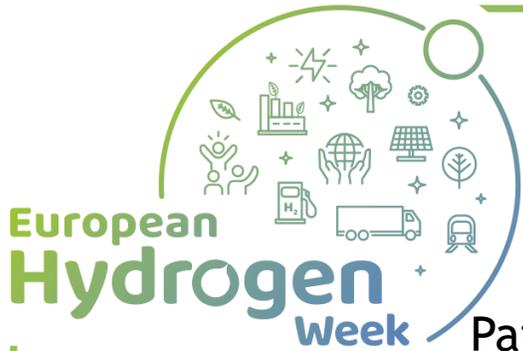


Connect Hydrogen Valley's

New Energy Coalition



- Others:
- Big Hit
- Green Hyslands
- Blue Danube
- Zero Emission Valley
- ...
- ...
- ...
- ?



Join us in HEAVENN!

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Gerbren Andringa

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“This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 875090. This Joint Undertaking receives support from the European Union’s Horizon 2020 research and innovation programme and Hydrogen Europe and Hydrogen Europe Research”

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