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TOGETHER - DELIVERING SUSTAINABLE ENERGY INFRASTRUCTURE

Energy Transition Committee

Committee Chair: Andy Ball



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The Committee

Chairman: **Andy Ball**

Members

- **Giacomo Bonfanti**
- **Doug Bailey**
- **Gian Marco Dondi**
- **Saji Khoury**
- **Mustafa Kopuz**
- **Leon Richards**
- **Bruno Pomare**
- **Paolo Zoni (Sicim)**
- **Dario Camozzi (Bonatti)**



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KEY UPDATES

- **1. Monthly meetings**
 - 2023 last Thursday of every month @ 3pm UK GMT
- **2. Main representative for each region**
 - North America = **Doug Bailey**
 - East & Far East = **Leon Richards**
 - Europe Central = **Bruno Pomare**
 - Europe Eastern = **Mustafa Kopuz**
 - Europe Mediterranean = **Dario Camozzi**
 - Europe North West = **Andy Ball**
 - Latin America = **Giacomo Bonfanti**
 - Middle East & Africa = **Saji Khoury**



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INFORMATION SHARING AND EXCHANGE

Key areas of focus to be collated and stored for members reference on the IPLOCA website under

<https://www.iploca.com/committees/innovation/hydrogen/>

NOTE – The list below will also be an opportunity for members to promote their own “*green products & services*”

- **Policy & Standards**
 - Government policy, Standards & Specifications
- **Technologies & materials**
 - Welding
 - Equipment, Fittings, and Pipe
 - Plant and Machinery
- **Research & Development**
 - Skills development, and Education
- **Net Zero**
 - Net Zero construction
 - Net Zero projects

information is stored in 5 region **North & South America, Europe, East & Far East, Middle East & Africa and Latin America**







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Green Credentials and accountability (*SHE & Energy transition Group*)

New for 2023 “green Credentials Survey 2023“, which will lead to us issuing Certificates for 1 to 5 green leaves in 2023

1. Do you have a sustainable policy = Y/N 
2. Do you have Environmental, Social and Governance ESG policy / report = Y/N 
3. Do you adopt a minimum of 4 UN sustainable Goals SDG's = Y/N 
4. Do you measure Greenhouse gas protocol 1, 2 & 3 GHG = Y/N 
5. Do you have a roadmap to reduce carbon by 2050 or sooner = Y/N 



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- *This years Targets for the committee*
 - *2 Net Zero webinars*
 - *6 new corresponding members with a Net Zero focus*
 - *At least **one** key article from each region to be posted*
 - *Key note speaker for the convention – to be proposed*



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Why is hydrogen important as a future clean energy source?

- Hydrogen can offer a clean energy solution to parts of the economy that are difficult to decarbonise.
- Hydrogen can be extracted from fossil fuels and biomass.
- Hydrogen is emission-free at the point of use.
- Hydrogen is exciting because it can be used in several sectors.
- Hydrogen offers energy security.
- Hydrogen is storable.
- *And its not New !*



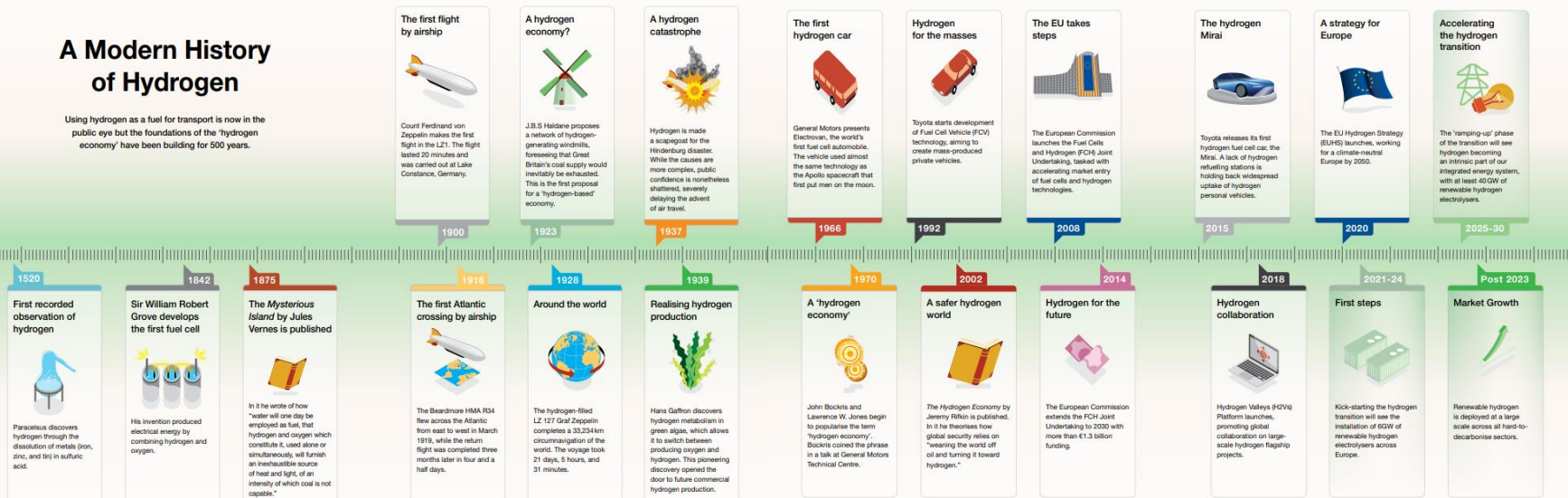


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A Modern History of Hydrogen

Using hydrogen as a fuel for transport is now in the public eye but the foundations of the 'hydrogen economy' have been building for 500 years.





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This is a great opportunity for Information sharing internationally

Our sister association PIG –UK have recently (*March 2023*), launched their own “**Net Zero**” Panel

As a sister association we will have access to this panel information and we too will share our information

The panel is headed up By Adam Knight of **Cadent** one of the leading Gas operators in the UK with a H2 focus

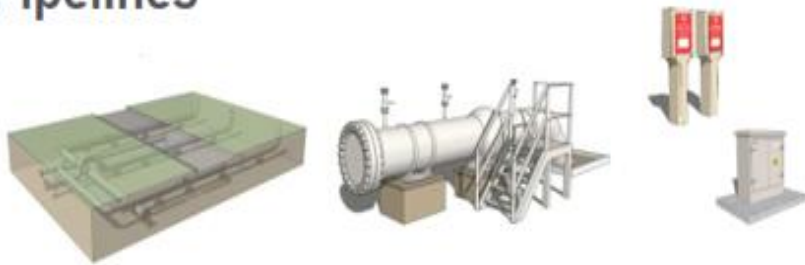
We also have a seat on this Panel represented by Andy Ball



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Pipelines



Below ground pipelines, above ground installations, cathodic protection systems, PIG traps and Protection Sleeves

Compressors



Gas Generators, Variable Speed Electric Drives, Compressors, Power Turbines, Starter Motors & Vent Systems

Valves



Valves, Scrubbers, Filters, Strainers, Preheaters, Pressure Reduction, AGI CP systems, etc

Electrical & Control



Standby Power Supplies, HV Switchgear, Transformers, LV Switchboards & Distribution, Standby Generators, site lighting and site electrical systems



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FutureGrid

An ambitious programme to build a hydrogen test facility from decommissioned assets at DNV's facility in Cumbria to demonstrate the National Transmission System (NTS) can transport hydrogen.



Gas Transmission
and Metering





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Offline hydrogen test facility



NTS assets of different types, sizes & material grades will be tested with 2, 20 & 100% hydrogen

Testing 3 concentrations of hydrogen:

2%

20%

100%

Understanding the impact on a range of key NTS assets including:



Steel Pipeline & Bends



Welds



Valves



Flow Control Valves



Pre-Heater and Regulators



Filters & Meter Streams

NTS hydrogen safety case review

Understanding the impacts of difference concentrations of hydrogen and develop our safety standards:



Procedure Review



Hazard Assessment of Transmission System (HATS)



Quantitative Risk Assessment (QRA)



Hazardous Area Impact

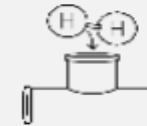


Overpressure Risk (OR)



NGGT Safety Case

Standalone hydrogen tests



Standalone hydrogen tests will provide key data required to feed into the main facility

Conducting a range of standalone hydrogen tests to feed into the main facility:

- Materials testing
- Pipe coating testing
- Fatigue testing
- Flange testing
- Asset leak testing
- Rupture testing



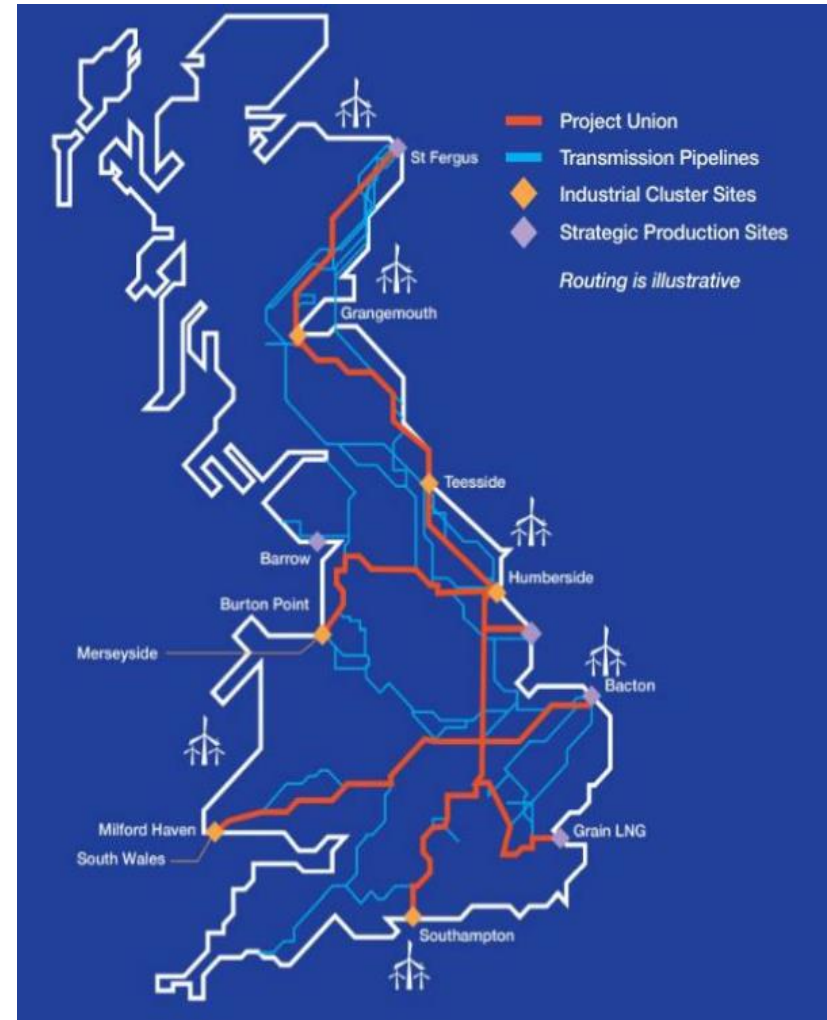
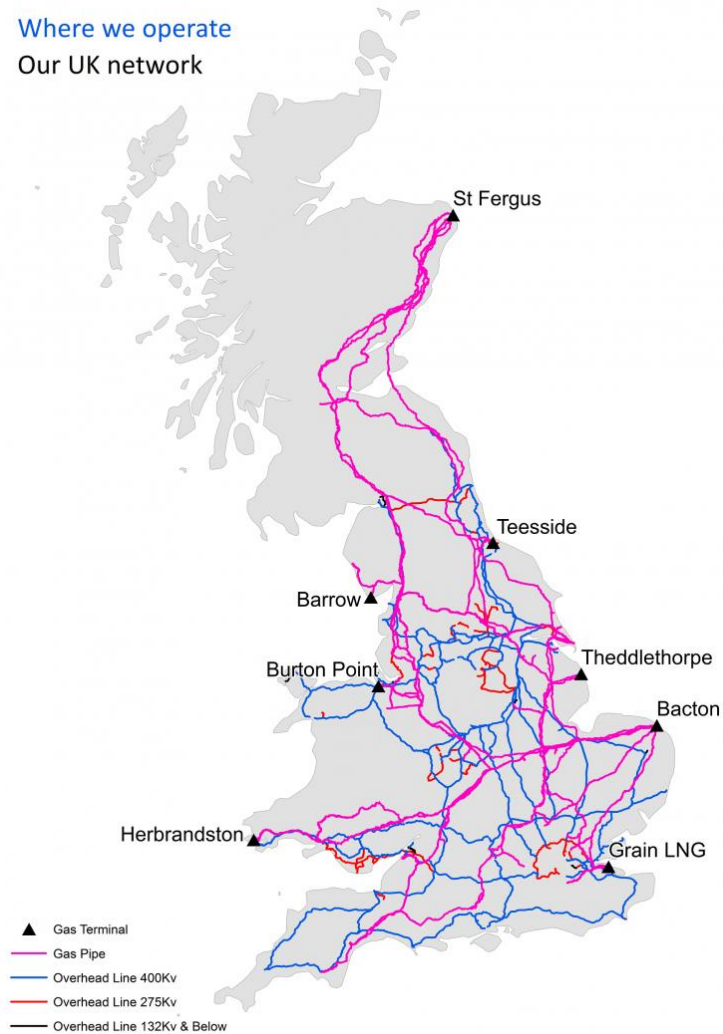


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Where we operate

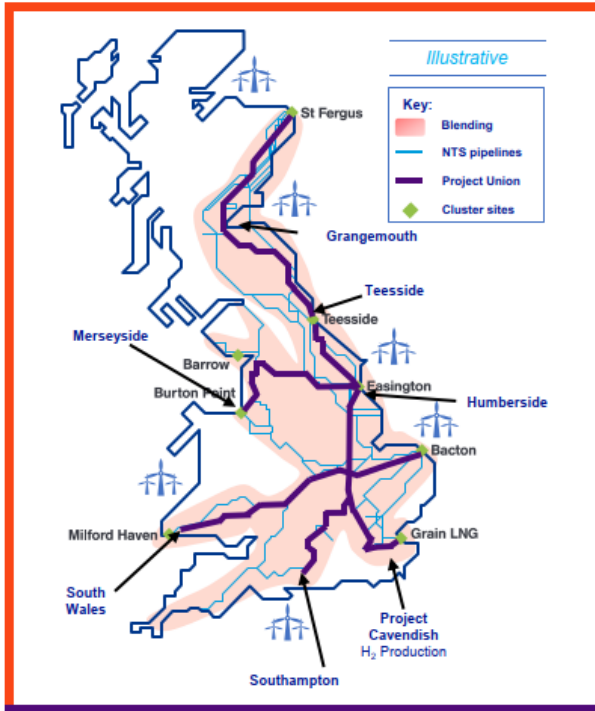
Our UK network





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Rollout of **blending** across the NTS

Strategic rollout of **100% pipeline** connections

Delivering a **Dual Pathway** to transitioning the NTS to hydrogen:

- ➔ In 2024/5 low level hydrogen blending will be facilitated on the transmission network
- ➔ From 2025 onwards blending could extend and increase up to 20% and greater if debinding technologies can be proven.
- ➔ In 2028/9 Project Union will deliver the first phases of 100% hydrogen transmission pipeline between the northern clusters
- ➔ By 2033 Project Union will have delivered a circa 2000km hydrogen backbone joining key production and use clusters
- ➔ Asset conversion continues to 2045 to deliver a complete 100% hydrogen network.

Net Zero 2050



Levelling up, Job Creation



Global Leader in Green Innovation

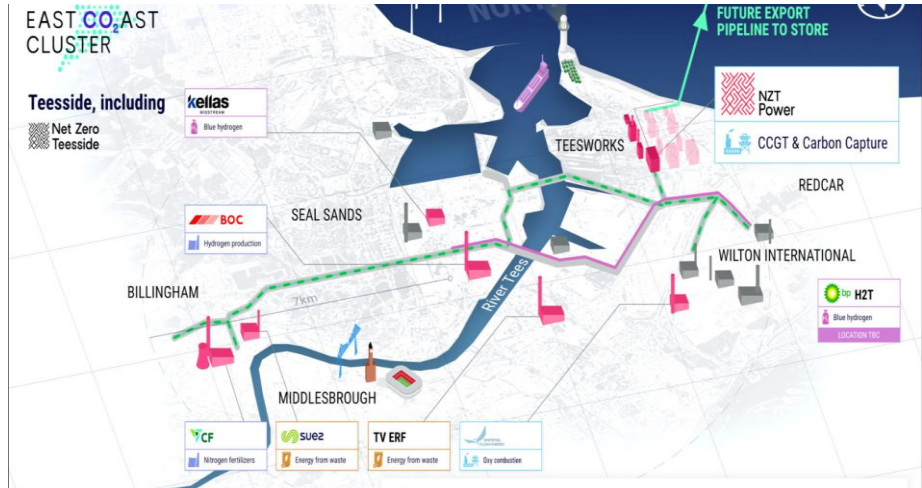
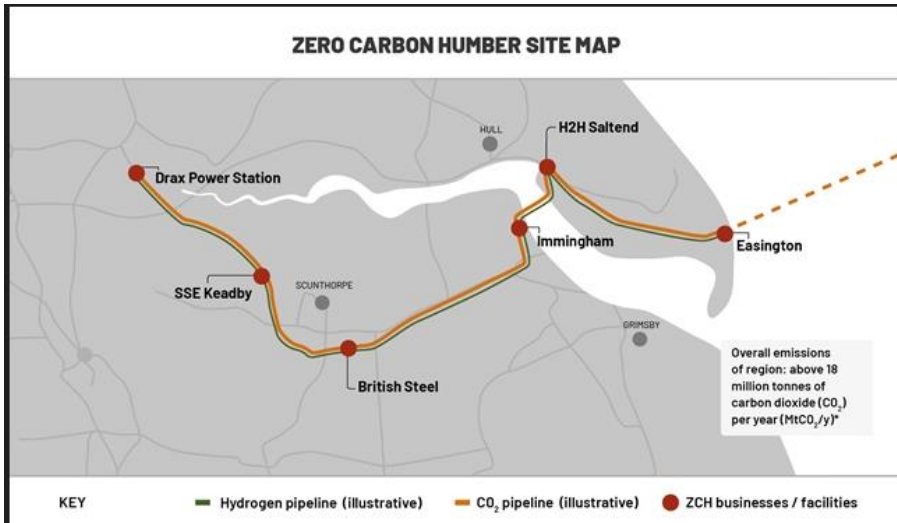
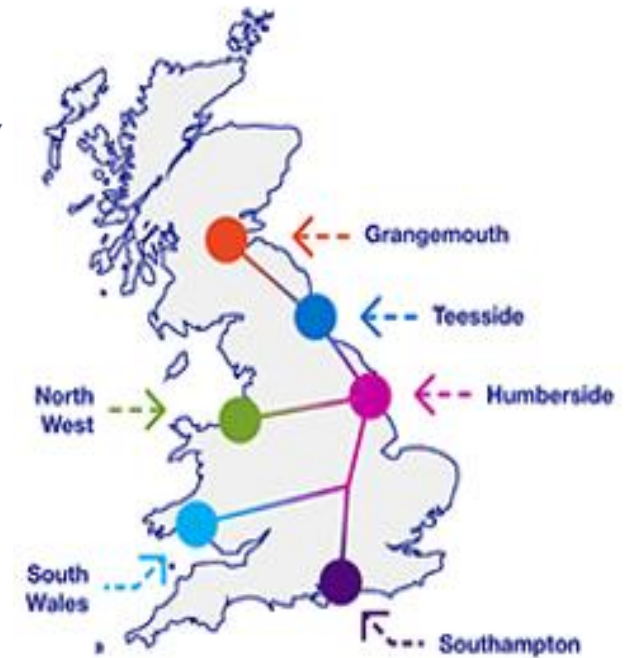
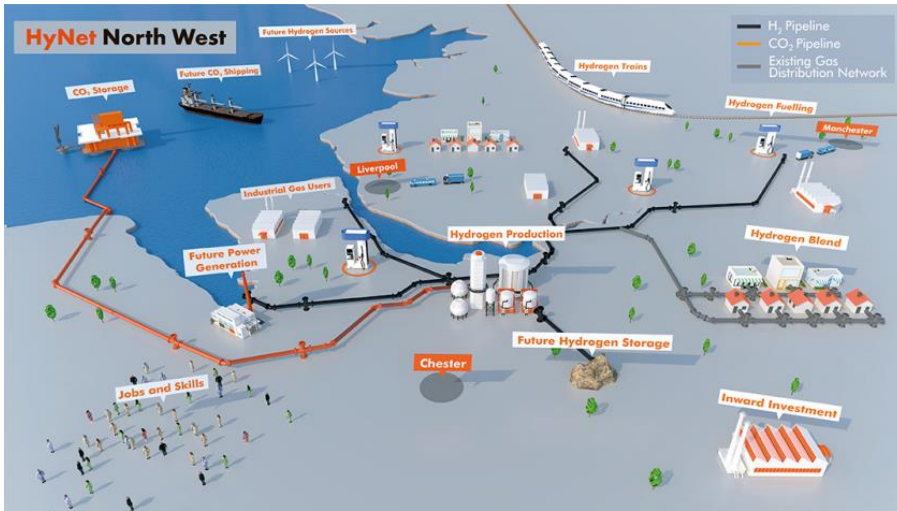


Providing flexibility and optionality

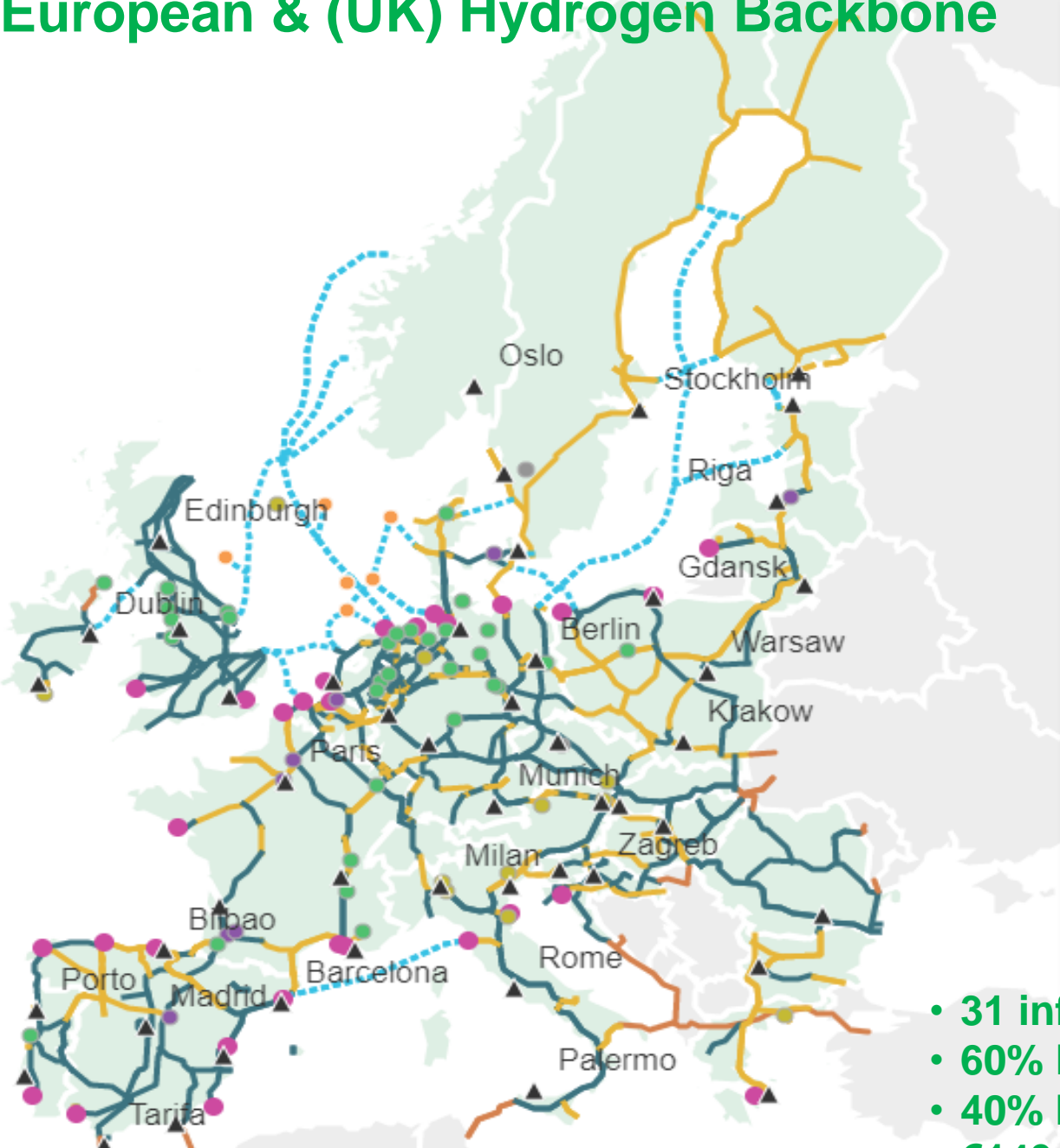


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European & (UK) Hydrogen Backbone



- ☑ ▲ City
- ☑ Storage
- Salt Cavern
- Aquifer
- Depleted field
- Rock Cavern
- ☑ ● Offshore (wind) hydrogen production 2030
- ☑ ■ Offshore (wind) hydrogen production 2040
- ☑ ● Gas-Import Terminals
- ☑ EHB 2030
- Repurposed
- New
- Import / Export
- Subsea
- UK
- ☑ EHB 2040
- Repurposed
- New
- Import / Export
- Subsea
- ☑ Countries European Hydrogen Backbone
- Countries within scope
- Countries out of scope

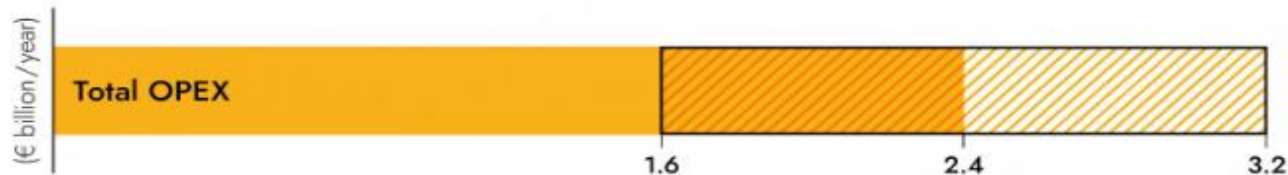
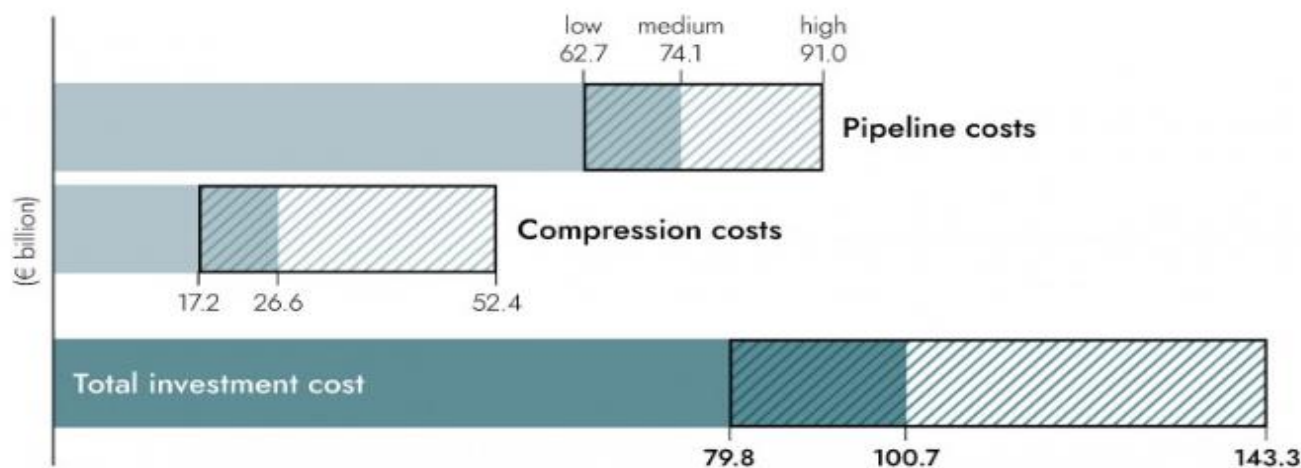
- 31 infrastructure operators
- 60% Repurposing
- 40% New build
- €143 billion

Estimated Investment & Cost

The 53,000 km European Hydrogen Backbone for 2040 as proposed in this report requires an estimated total investment of €80-143 billion, based on using 60% of repurposed natural gas pipelines and 40% new pipeline stretches.

This investment cost estimate, which is relatively limited in the overall context of the European energy transition[GLG2], includes subsea pipelines and interconnectors linking countries to offshore energy hubs and potential export regions such as Norway. Taking into account offshore pipelines, the levelised transport cost for the entire EHB amounts to €0.11-0.21 per kg of hydrogen when transporting over 1,000 km.

Investment cost



- Range depending on
- Input assumptions as described
- in Appendix A

Technical Potential for Producing Green Hydrogen





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Possible 31 NEW CORRESPONDING MEMBERS

Partners

Participating companies include Amber Grid, Bulgartransgaz, Conexus, CREOS, DESFA, Elering, Enagás, Energinet, Eustream, FGSZ, FlusSwiss, Fluxys Belgium, Gas Connect Austria, Gasgrid Finland, Gassco, Gasunie, GAZ-SYSTEM, Gas Networks Ireland, GRTgaz, National Grid, NET4GAS, Nordion Energi, OGE, ONTRAS, Plinacro, Plinovodi, REN, Snam, TAG, Teréga, and Transgaz.





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Thank You

and

Questions