Ready4H2

How can the gas distribution grids help the energy transition?

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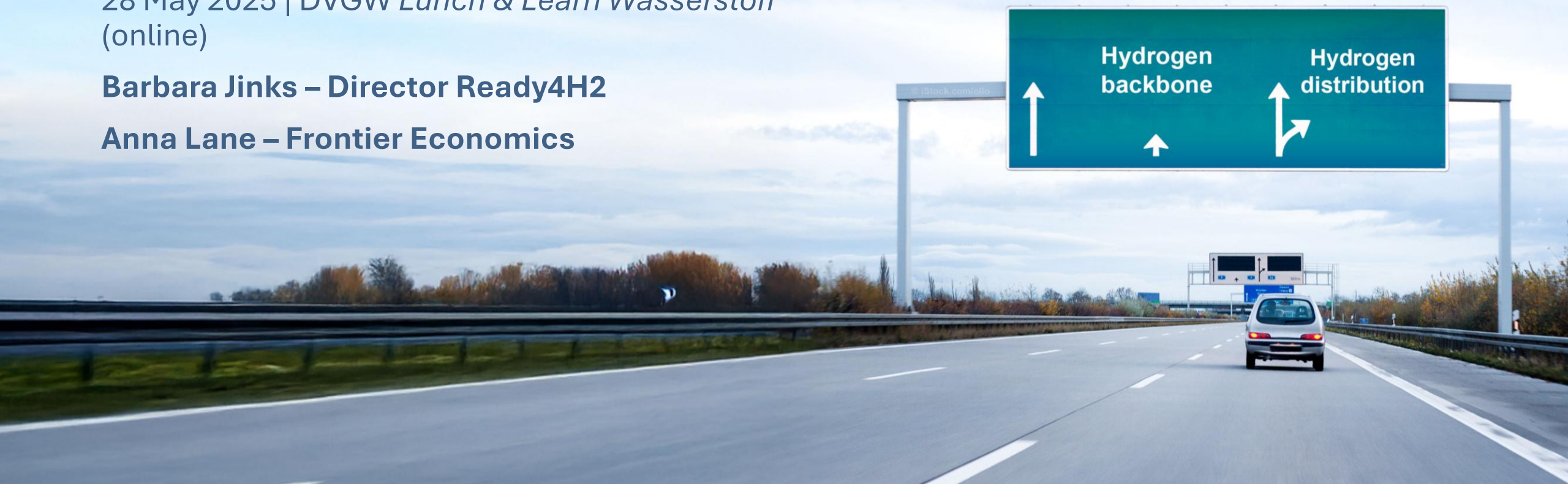

Ready4H2 - the only European initiative focused on hydrogen distribution *DVGW is a member

The **Ready4H2** project consists of more than **70 European gas distribution operators (DSOs) and national organisations in 10 countries** in Europe working together to support a hydrogen market for future energy delivery, through the transformation of gas distribution networks to deliver hydrogen.

Gas distribution is an essential part of Europe's energy supply; more than 99% of industrial and commercial customers that are connected to gas are served by distribution networks**. We operate 1.6 M km distribution pipelines (including 55% of Europe's total).**

We serve 90 M gas consumers in all sectors including power generation, industry, transportation and heating, which need hydrogen to decarbonise.

We are getting ready to deliver hydrogen, with over 50 projects underway.

We are united in our goal **to support Europe towards net-zero** and believe that DSOs are crucial to accelerating the **use of hydrogen** to achieve a future energy-independent Europe: **by transforming local gas distribution networks, the major benefits of a hydrogen economy can be facilitated.**

Hydrogen Europe · ERIG · eurogas · GD4S · GEODE · GERG · marcogaz

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Ready4H2 activities have developed with the needs of the members

2020

Phase 1

Reports on gas networks getting ready to convert and the value of gas distribution in a decarbonised EU.

- Established community
- Established knowledge sharing platform
- Member survey

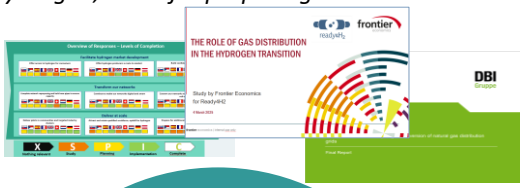
Phase 2

Roadmap for local gas distribution networks to transform to hydrogen

- Published 2 brochures on role of distribution grids
- Published Transformation Roadmap
- Policy Talk event in Brussels

Phase 3

Studies on the role of distribution grids in delivering hydrogen, cost of repurposing and DSO readiness



- Brussels-based organisation
- Structured knowledge sharing
- **Confirmed role of DSOs**
  - **Geospatial study**
  - Repurposed grid cost study
  - **Transformation Roadmap survey**
  - Project database
- Strategy workshop in Prague

Phase 4

2025

- Targeted advocacy
- Knowledge sharing
- Liaison with TSOs
- Deep dives into factors affecting the business case for conversion to hydrogen
- Gas Package implementation
- Policy Talk event in Brussels

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Ready4H2 Transformation

*DVGW DSO members can use this Roadmap

The **Ready4H2 Transformation Roadmap** was developed in 2022 to assist gas DSOs understand better the steps to becoming “hydrogen ready“, ie *able to accept hydrogen into the distribution system without operational or commercial constraints.*

Facilitate hydrogen market development

- Offer access to hydrogen for consumers
- Offer hydrogen producers a route to market
- Build confidence in hydrogen

Transform our networks

- Complete network repurposing and undertake targeted new build to ensure capacity
- Continue to make our networks digital and smart
- Convert our networks to net zero based on detailed roll-out plans

Deliver at scale

- Deliver pilots in communities and targeted industry clusters
- Attract and retain qualified workforce, upskill for hydrogen
- Prepare for additional roles and responsibilities

www.ready4h2.com/reports

In 2024 a survey of members’ progress along the Roadmap was conducted.
This year we are making deep dives into some of the areas to assist DSOs progress.

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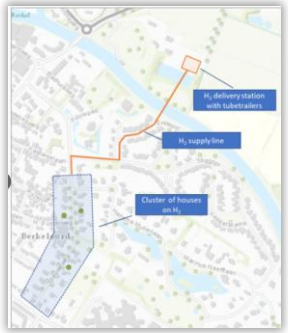
Ready4H2 Project database

Demonstrating it is feasible to deliver hydrogen at scale using gas distribution grids



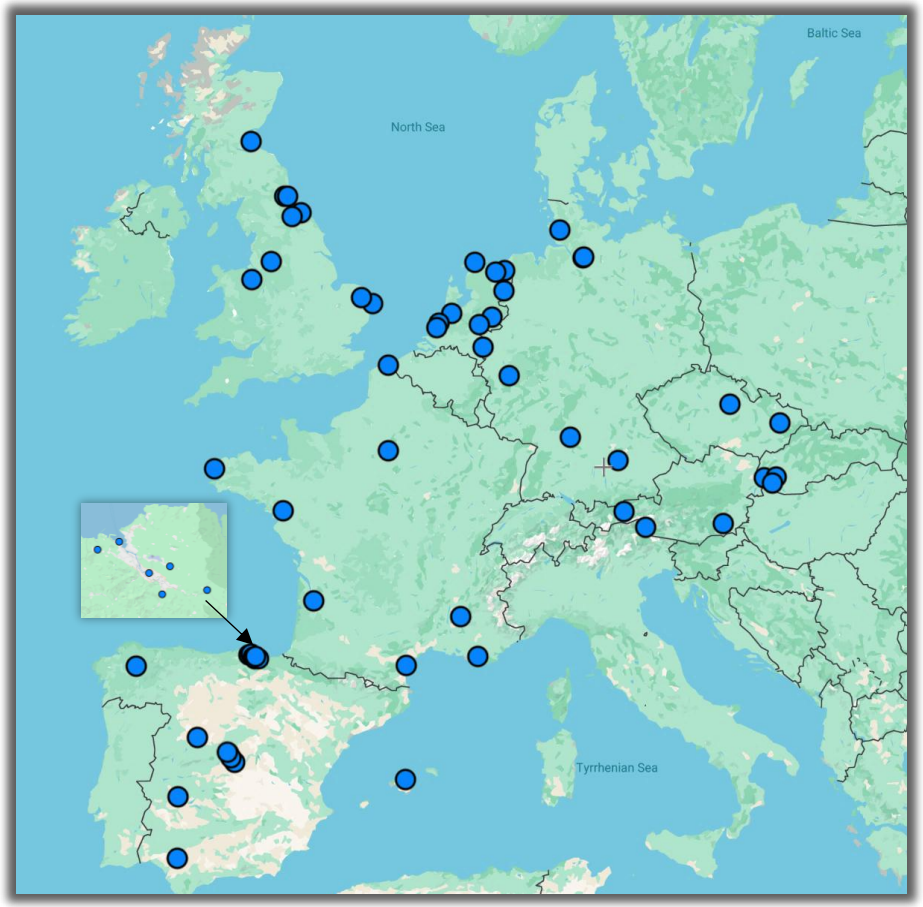
74% repurposed networks

68% pure H2

79% field projects
- ½ will scale up
- Rest is studies

58 projects

32% completed projects



Hydrogen distribution project in Ready4H2 countries

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Geospatial study on role of DSOs to deliver hydrogen

(Frontier Economics) Visualisation of the need for distribution grids

9 COUNTRIES

Where are there gaps between transport infrastructure and demand?

TIME

- Mapped consumption and supply infrastructure for years:
  - 2030
  - 2040
  - 2050
- H2 sources from EHB and remote production.
- NUTS3 regionalisation (150-800k population areas).

How does the role distribution networks play change over time?

DECARBONISATION SCENARIO

- Decarbonisation scenarios used to define supply over time, based on **TYNDP 2024**: "**distributed energy**" (more elec) and "**global ambition**".
- Takes into account potential **biomethane** production.
- Rely on assumptions on **technology** innovation, **policy** and economic developments, etc on both sector and country level.

How does the need for distribution networks change based on decarbonisation scenario?

SECTORS

- Hydrogen consumption estimated on sector-level for each region, time and decarbonisation scenario.
- Sectors included are **Large Industry**, **Small & Medium industry**, **Transport** (Road and river), **Households & Buildings** & **Energy** (power, efuels, methanation) .

What sectors will drive the need for DSOs?

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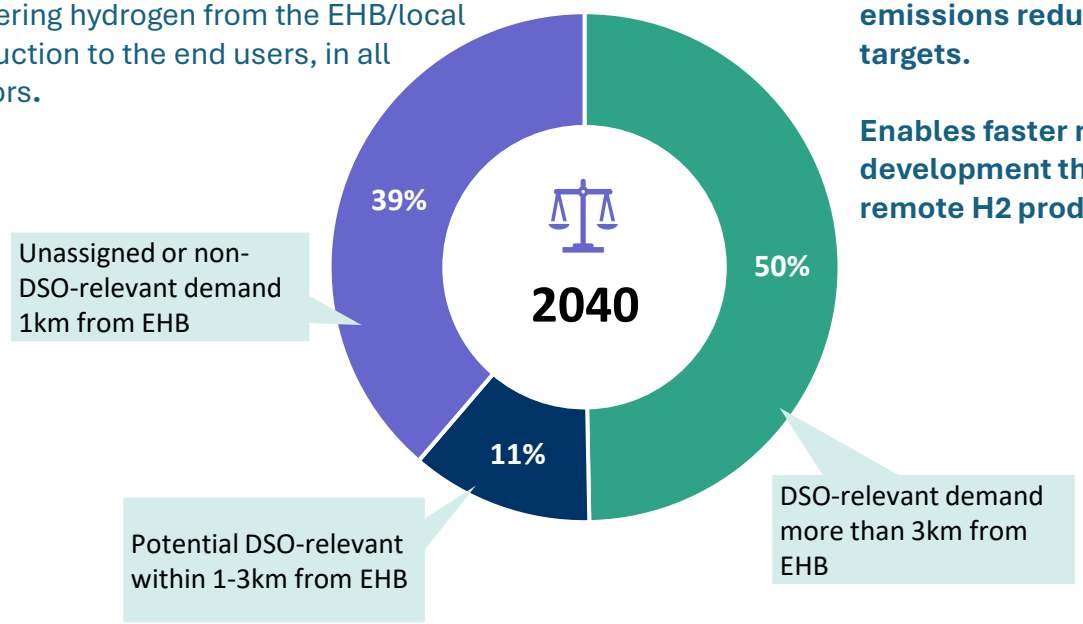
The need for H2 to be supplied by distribution grids grows strongly over time across all sectors, driven by the geographical dispersion of consumers

At least 44-50% of H2 demand in the small & large industry, transport and household & buildings sectors will be supplied hydrogen by a distribution pipeline in 2040

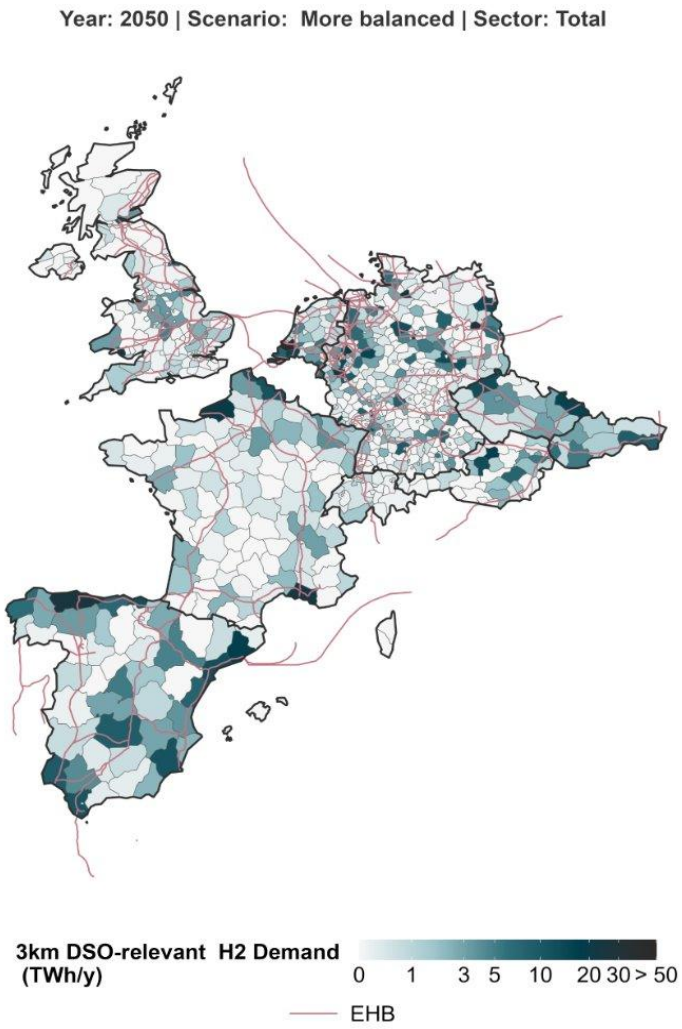
The results demonstrate the essential role that distribution grids play in delivering hydrogen from the EHB/local production to the end users, in all sectors.

Without it, Europe will not be able to reach its emissions reduction targets.

Enables faster regional development through remote H2 production.



More Balanced scenario, volumes based on TYNDP Global Ambition (exceptions: France source GRDF, Spain source New Deal)



Country	DSO-relevant demand (TWh/yr)
DE	318
UK	122
NL	107
ES	72
FR	50
AT	48
CZ	27
SK	19
CH	6

Some sectors are modelled by TYNDP as having less demand in 2050 than 2040 due to increases in efficiency – this may show in the maps as some regions showing lower demand in 2050 and 2040.

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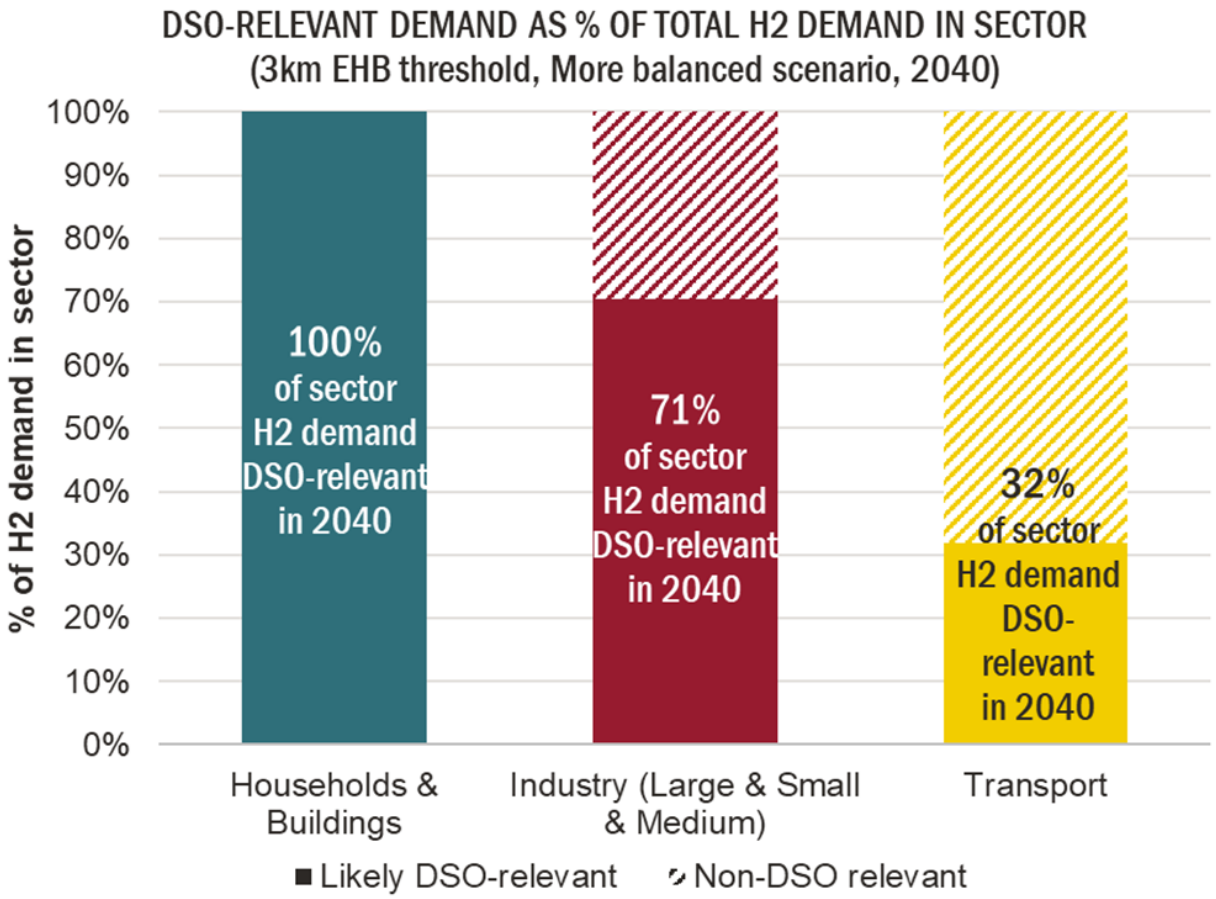
Disclaimer: This analysis is not intended to reflect and may deviate from network development plans. It is based on national hydrogen demand predicted by TYNDP and public regionalisation data, such that it may not reflect actual future regional hydrogen consumption or current natural gas consumption.

Distribution grids are essential to deliver hydrogen in all sectors
- delivering at least 44-50% of hydrogen demand by 2040



>70% of hydrogen demand from industry will be supplied by through a distribution pipeline. Lead markets (steel, chemicals, refineries) dominate demand.

Large Industry: > 60% of large industry demand > 3km from the EHB, and **90% from facilities > 1km**.

Small & Medium Industry: 80-104 TWh H2 for process heat.

Transport 32-46% of sector H2 demand will be DSO-relevant in 2040 depending on scenario and threshold for distance from EHB assumed.

Energy: Significant uncertainty around which demand will be DSO-relevant, fulfilling strong demand for methanation and e-fuels could require DSO transportation.

Households & Buildings: In some countries H2 will be used directly for space heating. Demand ramps up from **~40TWh in 2030 to ~100-200 TWh in 2040** depending on scenario - needs to be supplied exclusively by DSOs due to low pressures/volumes.

75% electrolysers > 3km from EHB: even when accounting for on-site production, DSOs will transport 27-39% total demand across all sectors.

More Balanced scenario, volumes based on TYNDP Global Ambition (exceptions: France source GRDF, Spain source New Deal)

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Conclusion from Ready4H2 project research

Hydrogen distribution through the distribution grids is feasible and necessary for Europe to reach its decarbonisation targets

- The energy transition in Europe is **not achievable without the use of gas distribution grids.**
- Need to plan an **integrated DSO-TSO network** to enable demand to be met.
- **Significant savings** can be made by repurposing the gas grids for hydrogen and expanding grids for all green gases.
- Repurposing gas distribution grids in areas where biomethane is not foreseen offers **flexible delivery** of renewable and low carbon gases throughout Europe.
- DSOs offer **faster regional development** by connecting green hydrogen production sites.
- The prerequisites for gas DSO transformation to hydrogen are in place but **supporting regulatory and financial frameworks are needed** to enable the transformation.

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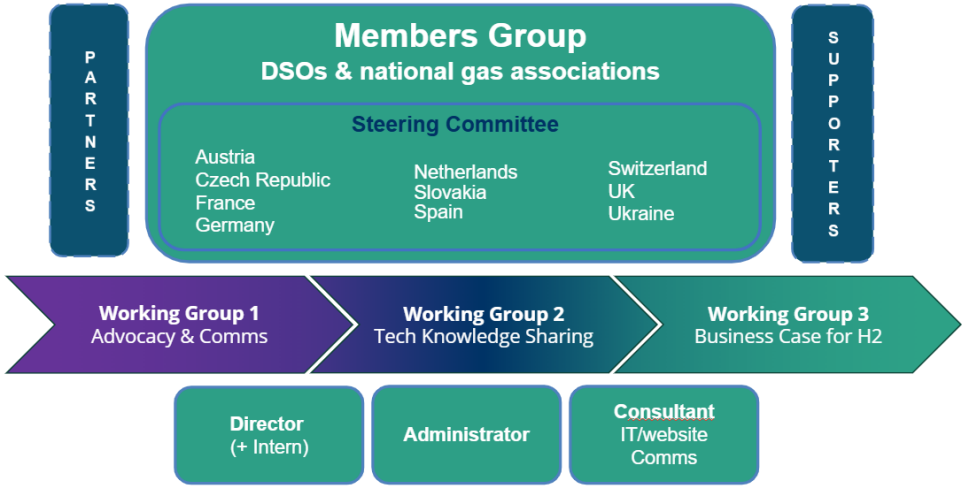
Ready4H2 continues in 2025 – content is driven by members

*DVGW DSO members can be part of the project and join/lead WGs

Structured organisation based in Brussels



Established network

	Eurogas		GD4S	Marcogaz	ERIG	HE	GERG	GEODE
Common membership with Ready4H2	DVGW		Cadent	DVGW (Board)	DVGW (Pres)	DVGW		
	GRDF		GRDF (President)			GRDF	GRDF	
	Thüga (Chair Distrib'n)	Nedgia	Nedgia	SVGW (Vice Pres)	SVGW (Board)	Thüga	Nedgia	
	Enexis	Naftogaz	Enexis	ÖVGW	ÖVGW (Board)	AGGM	SGN (President, H2 Chair)	
	SPPD	E.ON	Alliander (Chair H2 WG)	SPPD (SK GasOil Asso)	VSG	E.ON		
	CGA/Gasnet (Chair Distr)	Netze BW	Stedin					

Working groups

WG1 Advocacy & Comms

- Comms plan, Stakeholder mapping, advocacy content

WG2 Technical knowledge sharing

- Identify gaps in members' technical knowledge and seek to fill those gaps - deep dives, webinars, site visits ***make a request**
- Project database and lessons learned

WG3 Business case for H2 distribution

- Identify external drivers for development of a gas DSO delivering hydrogen – deep dives eg financial, regulatory, public perception
- Track policy and regulatory developments ***survey of feedback on Decarb Gas Reg/Directive**
- Identify areas of DSO transformation that are most critical (outcome of Phase 3 Transformation Roadmap survey)

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