




H2

VOR ORT

(„H2onSite“)

Making hydrogen usable
for everyone via the gas
distribution networks

 www.h2vorOrt.de

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Project partners



H2
VOR ORT



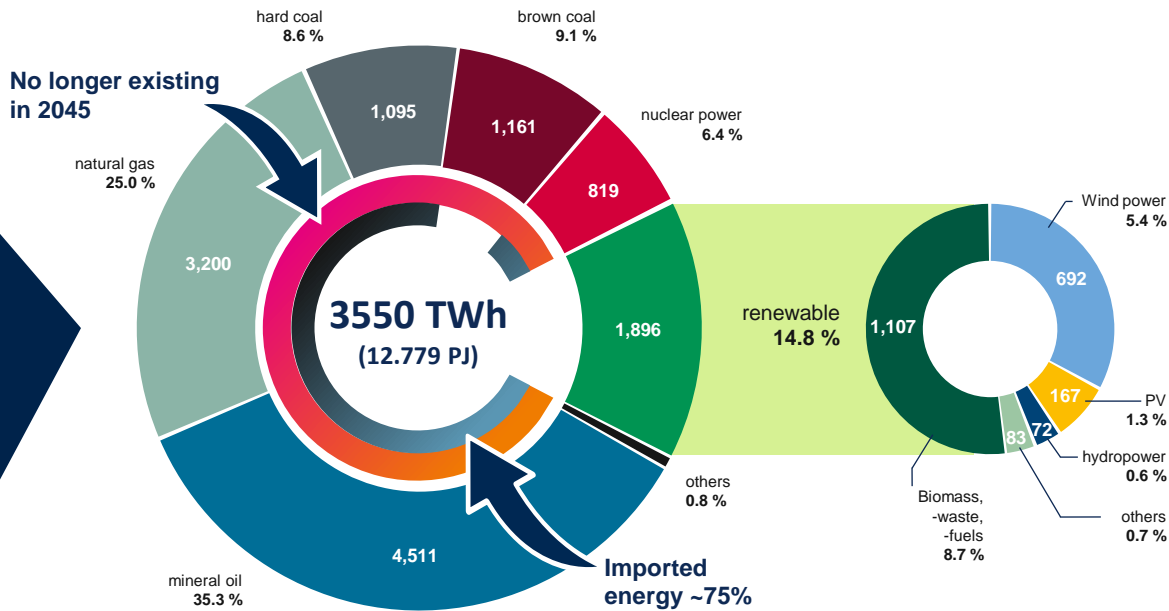
>50%

More than 50% of the 554,500 km of gas DSO network lines are operated by our project partners

The initiative has three main goals:

- ➔ Transformation of Gas DSOs to climate neutrality
- ➔ Climate-neutral gases in all sectors
- ➔ Preservation and expansion of regional assets and values

85% of primary energy must be substituted by climate-neutral energy or efficiency gains by 2045.



**German primary energy consumption
sorted by energy source**
Source: AGEB Sep. 2020

Hydrogen and other
climate-neutral gases ...

... can substitute significant
amounts of fossil fuels in the future.

Quick Win

Biomethane

- brings rapid success in decarbonization
- limited quantity

Core Strategy

Hydrogen

- Scalable as desired
- Political focus

Chance

RE-Methane (SNG)

- Easiest way for gas grids
- Future supply not clear

H₂-use in distribution
networks

Bledning

up to

10%

Already
reality

up to

20%

DVGW
technically
feasible &
safe

Transformation

100%

DVGW
technically
feasible &
safe



Lengths

Transmission 41,600 km
Distribution 554,500 km

— Deutsches Gasnetz
(dargestellt in der
Druckstufe > 4 bar.)

Transmission Networks		Distribution Networks
industrial and commercial end users	500	>1,800,000
Households supplied with gas	-	19,000,000
Feed out	199.5 TWh	741.6 TWh (of which 471 TWh in industry and electricity)

Source: Monitoringbericht der BNetzA (2021), BDEW „Wie heizt Deutschland 2019“

- Supply 50% of German households with heat
- Households, commerce and industry are connected to the same network
- High degree of meshing, present throughout the area
- Modern technologies and high quality materials.

The majority of German industry and households are connected to the gas distribution networks.

Making H₂ usable for everyone:
Why there is no alternative to
switching to H₂.

1



Security of electricity supply

Self-sufficiency through German RE power generation will not be possible by 2045.
H₂ can be imported in any quantities in the long run.

→ Hydrogen can help with power generation in times of low RE power generation.

2



Solution of the storage and transport problem

Unlike electricity, H₂ can be stored easily and for long periods of time.

The increasing power demand due to electrification is presenting the German power grids with almost insurmountable tasks.

→ Using existing gas infrastructure for distribution alleviates this problem at comparatively low cost.

3



The german heating sector is „hard-to-abate“



Ca. 50% of households are heated with natural gas, ca. 25% with oil.

Even with a 2% renovation rate (about 1% today), only 50% of homes will be renovated in 2045.

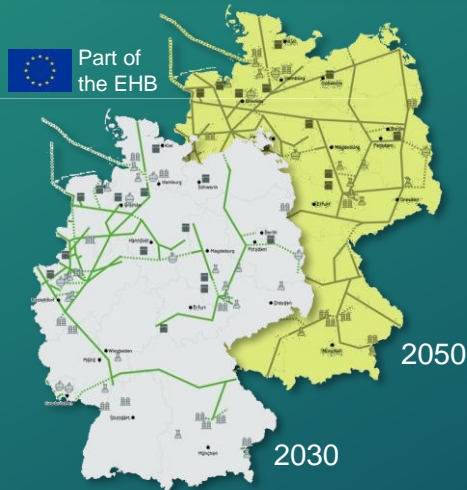
Substitution with carbon-neutral gases provides a much-needed additional pathway to meet the Paris targets in the building sector.



Also, electrification of the heating sector increases the supply and transport problem, turning problematic periods of time critical.

Our transformation path to climate neutrality

H₂ Backbone



The transregional supply of H₂ is secured via the TSO H₂ Backbone. It transports centrally produced and imported H₂ to the distribution grids.

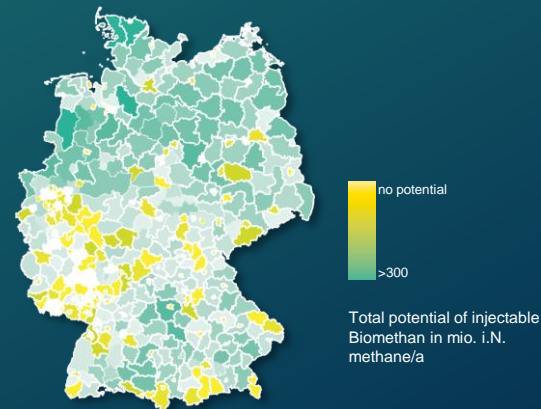
Decentralized H₂ production



A decentralized production of H₂ will lead to first local hydrogen networks independent of the expansion of the backbone

140 TWh potential

Bio- and RE-Methane



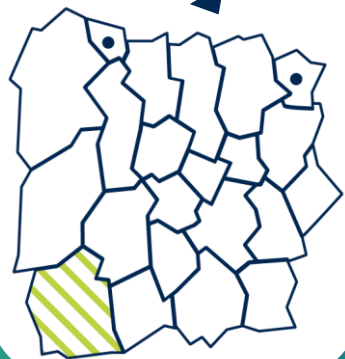
Bio-methane and RE-methane will also play relevant roles in decarbonization in the short and long term...

169 TWh potential

OUR PATH TO CLIMATE NEUTRALITY

The future of each distribution grid can be designed according to grid structure, the availability of renewable and decarbonized gasses and the development of the H₂ backbone of the german TSOs.

Hypothetical sectioned distribution grid



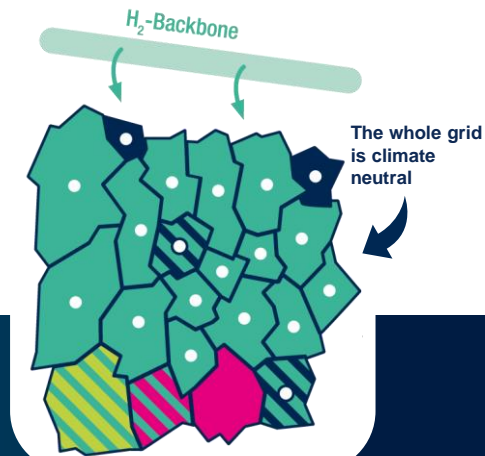
I. Current State
today



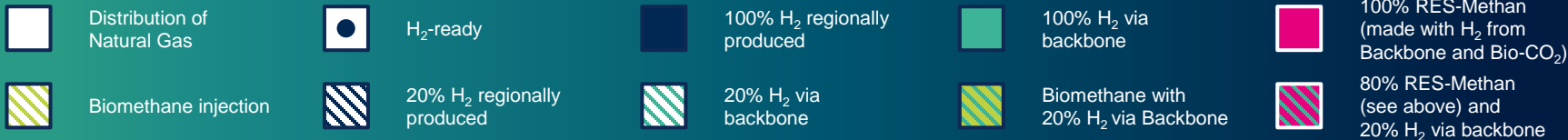
II. Initial Phase
starting now



III. Expansion Phase
from 2030



IV. Target State
at the latest by 2045

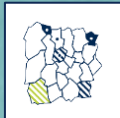


Sofort
1.+2.

2021
3.+4.



2025
5.



2030
6.



2040
7.

2045
8.



Our Commitment: The project partners...

1. ...are committed to regional value creation as local infrastructure operators and would like to make this possible in the long term and strengthen it sustainably.

2. ... will focus more on the **installation of H2-ready components** with immediate effect.

3. ...create the technical prerequisites for the necessary infrastructure transformation via the DVGW in 2021 (regulations 20% / 100% H2)



4. ...initiate a "**Gas Network Area Transformation Plan**" (GTP) in the DVGW

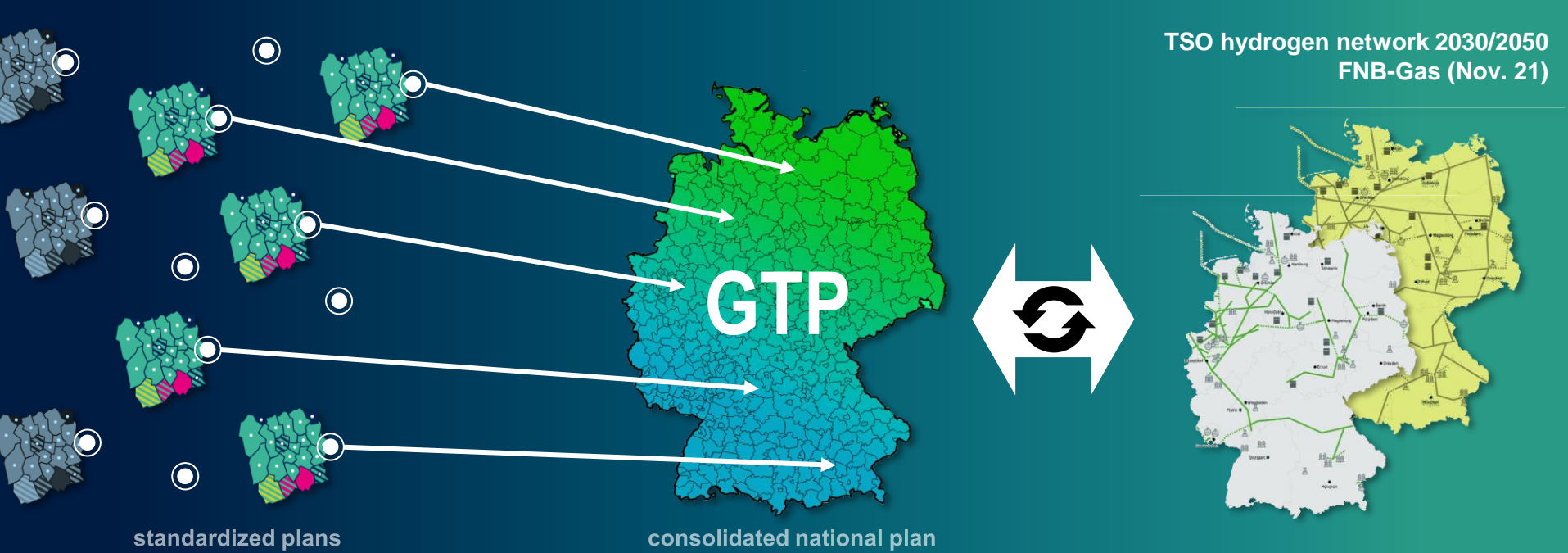


5. ... commit, to having created plans regarding the implementation of **H₂-Readiness** by **2025**.

6. ... intend to have implemented the first hydrogen-powered regional **pilot applications** in distribution grids by **2030**.

7. ...will ensure **comprehensive H₂ readiness** or climate-equivalent alternative concepts by **2040**.

8. ...will permanently ensure the **distribution of all climate-neutral gases** in the distribution grid **no later than from 2045** onwards.



The project partners...

5. ... commit themselves to creating **plans** by **2025** regarding the implementation of **H₂-Readiness**.

4. ...initiate a "The Gas distribution Transformation Plan" (GTP) in DVGW

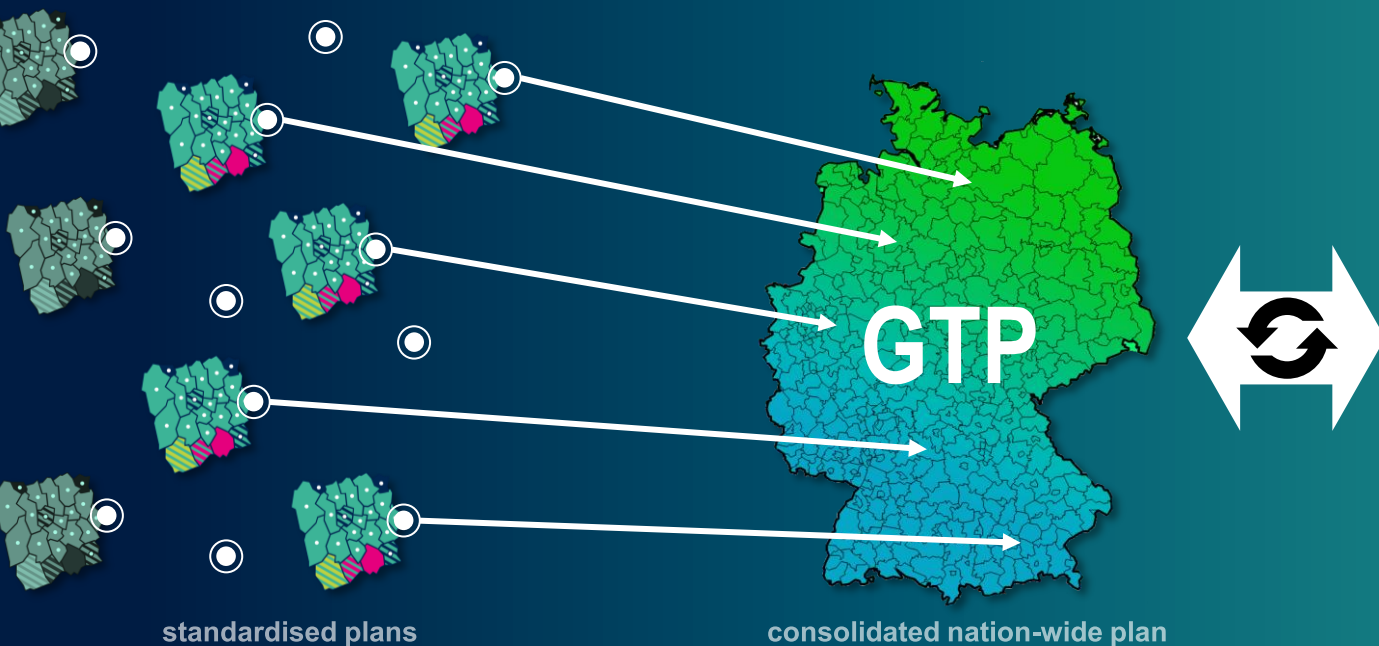
The **continuous exchange with TSOs** creates a coherent, evolving vision for the transformation of the German gas infrastructure to climate neutrality.

2021 2022 2023 2024 2025

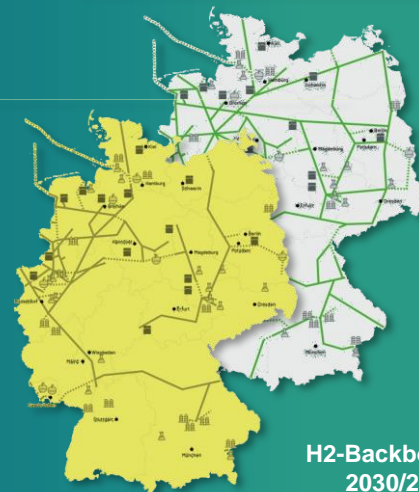
Making hydrogen available to all via the gas distribution networks

The GTP marks the beginning of the concrete elaboration of a coherent target picture of the climate-neutral German gas infrastructure.

2021 2022 2023 2024 2025



The ongoing exchange with TSOs creates a coherent, evolving target picture for the transformation of the German gas infrastructure towards climate neutrality.



H2-Backbone
2030/2050
TSO-Gas (Nov. 21)

The GTP has four central building blocks

Capacity Analysis

Customer Analysis

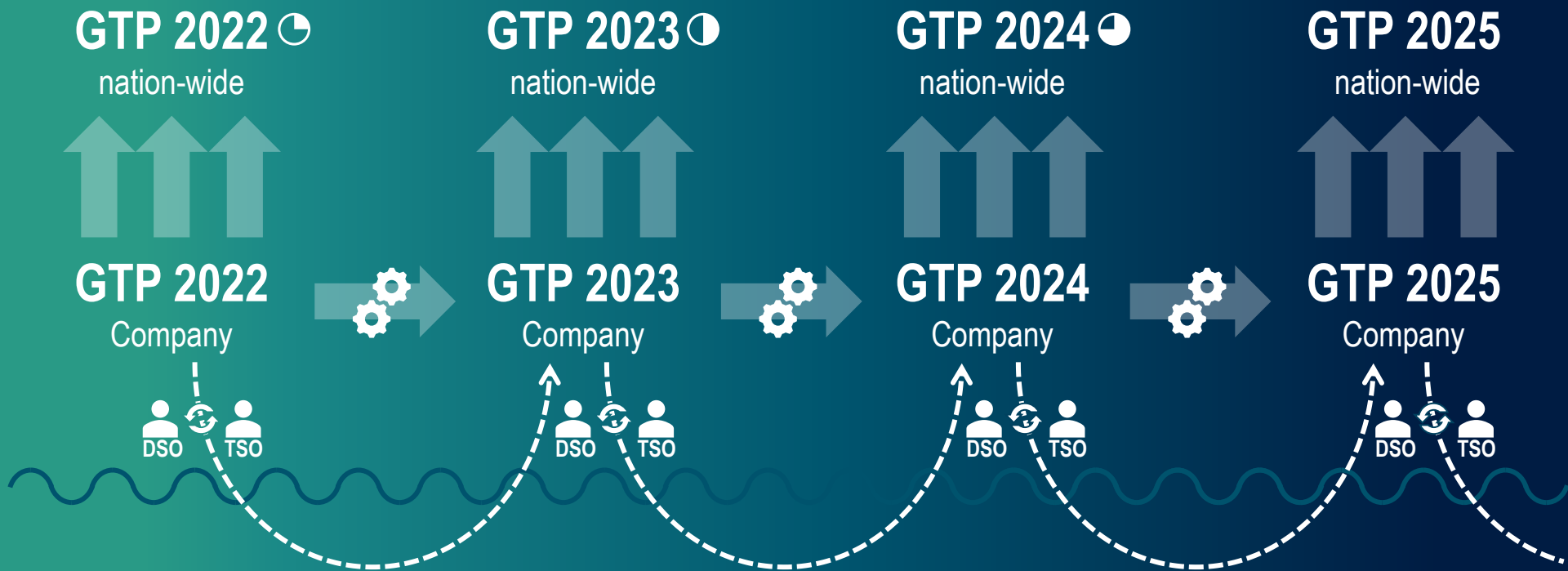
Injection Analysis

Technical Analysis



- ✓ May 2021: Start of work
- ✓ May 2021 to January 2022: weekly sessions, additional workshops
- ✓ January 2022: First draft
- ✓ January 2022 to February 2022: Review process release candidates 1-3
- ✓ 24 February 22: Decision to go ahead with publication by the steering committee
- ✓ **9 March 22: Bulletin by DVGW to members to do the GTP**

Development GTP



TSO-Talks & Development H₂-Backbone

The H2vorOrt project partners recommend to the political decision-makers ...

The existing unbundling rules for DSOs should be extended for hydrogen and not modified otherwise.

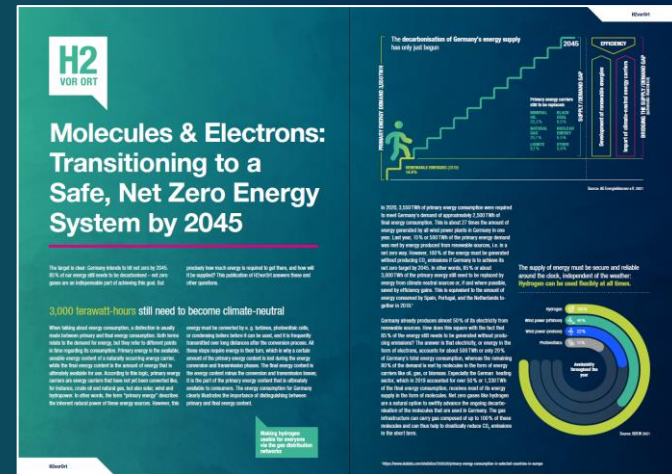
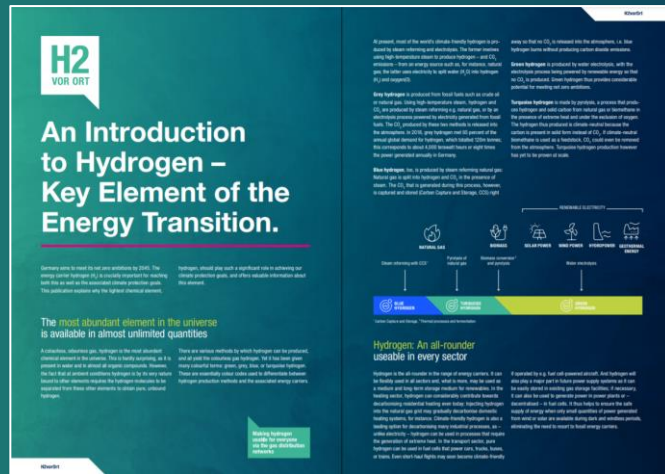
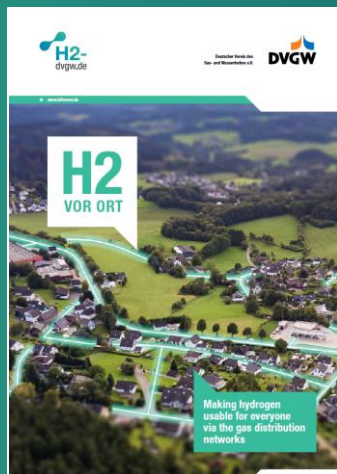
Vertical unbundling

The current unbundling rules in germany show, that they are sufficient for generating strong market competition.

Horizontal unbundling

DSO should be allowed to operate H₂ grids and gas grids in one company. This enables the step by step gas infrastructure transition on the DSO level, transforming **existing** natural gas distribution grids into hydrogen distribution grids.

- ✓ There is no alternative to using the gas distribution networks to achieve climate neutrality.
- ✓ The roadmap for transformation is in place
- ✓ We want to drive the energy transition forward with strong commitments.
- ✓ We recommend prompt action without discrimination of applications: **Make H₂ usable for everyone!**



Find further information
in our publications -
available online



The project partners are looking
forward to further dialogue.

www.h2vorort.de