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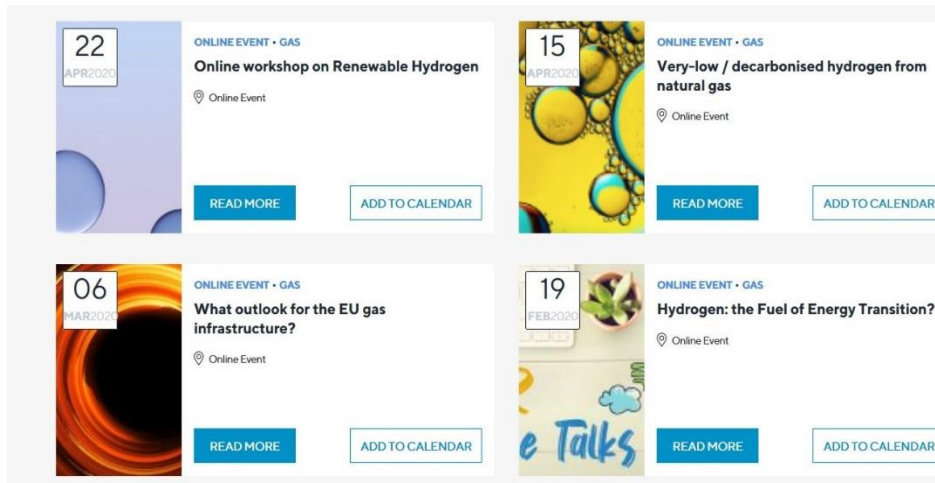
Regulating future hydrogen networks

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FSR's focus on decarbonisation of the gas sector



Participation in Policy Debate:

- ECH2A – 2 roundtables
- ENTSOG Future Gas Grids
- Hydrogen for Europe Study
- Energy Council H2 Conference (OIES)

Dialogue with:

- EU Parliament, Commission, ACER/CEER
- Energy associations/institutions
- Academia (MIT, UniGE, CSEI, etc)

Research

- Gas market design (EU and extra-EU)
- Role of gas(es) in Energy System Integration
- Gas Taxonomy
- Methane emissions
- Hydrogen technologies

Training courses: Clean Molecules (June 2021)

Publications



A «no-regret» approach, based on demand

H2 Infrastructure should follow a no-regret approach:

- built to meet foreseeable demand and then
- link hydrogen demand centres, or 'valleys' in the most effective and efficient way

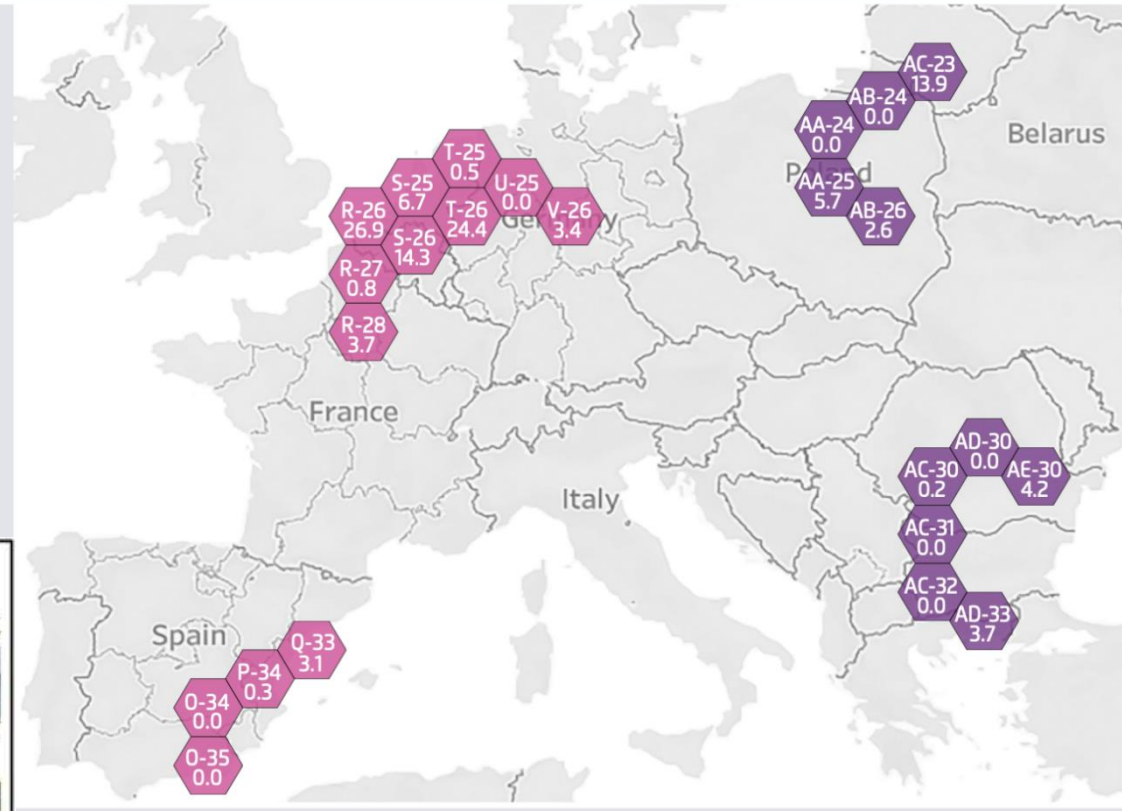
Sometimes **off-grid transportation** of H2 more efficient than pipelines

Clear 'no-regret' routes (hexagons contain the ID and the demand in 2050 in TWh)

Figure 19

- Clear "no-regret" (TSOs study – conversion)
- Clear "no-regret" (outside TSOs study – assumed new builds)

Source: AFRY, 2020



...but H2 demand still uncertain

Pathway	Range	Cost per km	Efficiency WTW	Example vehicle
Electric Road Systems 	60 km	19 ct/km	77%	
Battery 	48 km	20 ct/km	62%	
Hydrogen 	24 km	55 ct/km	29%	
Power-to-Gas 	17 km	70 ct/km	20%	

1) Including storage
Source: German Ministry of Environment

An evolving geography of consumption

H2 valleys (industrial districts) obvious demand centres for green H2.

Unsure *when* an EU-wide infrastructure will be needed.

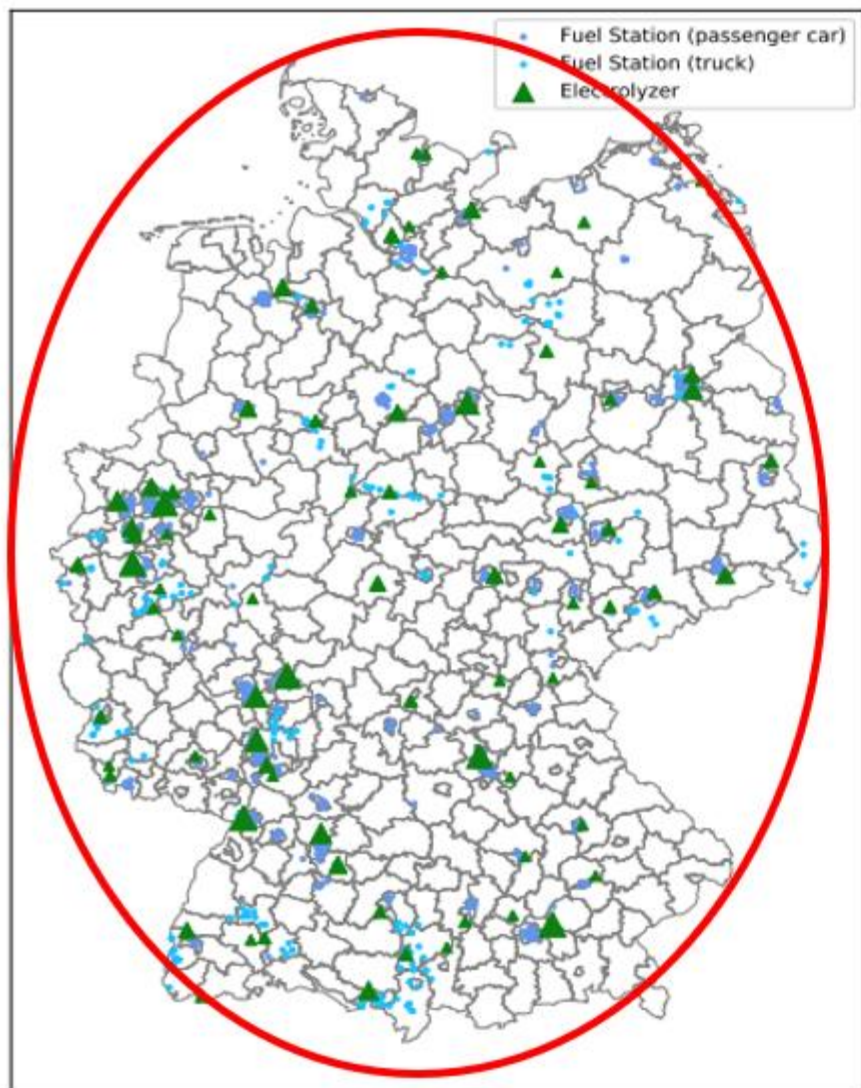
We recommend a **gradual approach**:

1. **Parallel development** of H2 valleys and re-purposing of existing pipelines connecting demand with consumption
2. If/when more valleys will be interconnected, and a backbone infrastructure be required, it should be **suitably regulated and operated by regulated entities** – H2 TSOs.
3. Until a backbone network is developed, to be considered the introduction of some form of TPA (e.g. negotiated TPA with regulatory oversight) on the existing “private H2 networks”, in order to enable competition even at the H2 valley level.

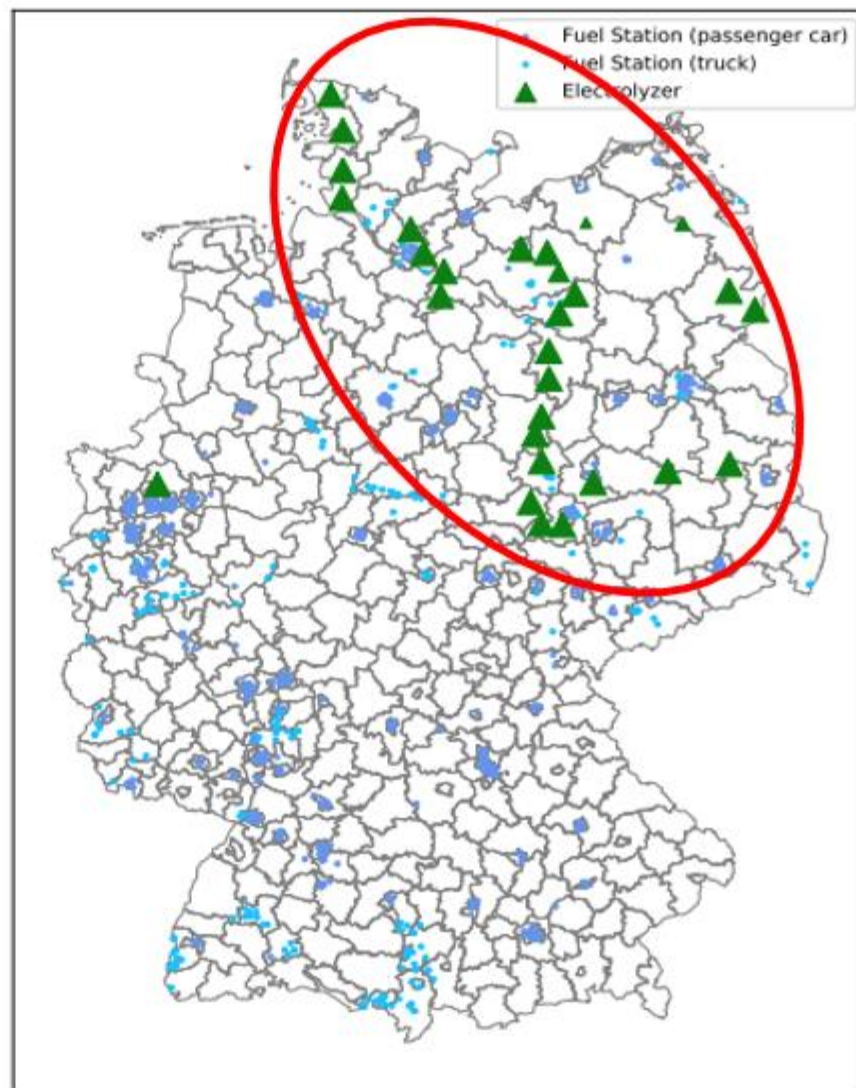
Other variables:

- **Storage:** morphology of countries (salt caverns)
- **Connection with LNG terminals**
- **Consumers** → ESI
- **Placement of H2 installation might be sensitive to the chosen tariff model**

Tariff structure, taxes, levies and infrastructure planning



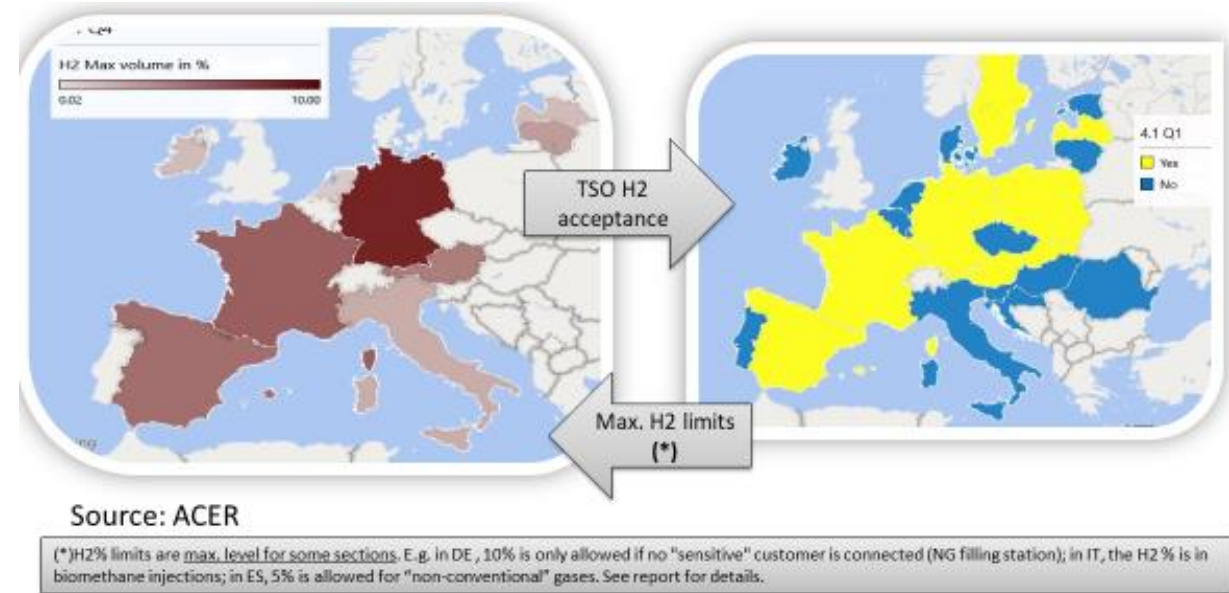
(a) electrolyzers under uniform tariff



(b) electrolyzers under nodal tariff

Transition from the current system

- **Blending:** not a long-term solution to transporting H2, because:
 - a) it reduces the value of H2 as well as the calorific value of gas
 - b) NG volume expected to shrink, hence the volumes of H2 which could be blended into it are also decreasing
- Challenge of system compression management (as to avoid hydraulic issues)



Gas regulation → H2 regulation

Keeping the existing EU gas regulation pillars

- The experience with the regulation of NG networks should inspire most of the new H2 transport regulation;
- Particularly, **unbundling** and regulated access to future hydrogen grids (TPA, regulated tariffs, non-discriminatory access to capacity...), the rules contained in the Gas Directive on these issues have worked well and have created a liquid and competitive gas market.
- As regards the specific issue of **operation of electrolysers**, regulatory sandboxes or other forms of “flexible regulation” could provide effective tools to establish what form of permanent legislation could be suitable.
- Important to foster competitive future low and zero-carbon gases market and **avoid the establishment of entrenched dominant or monopoly positions**; this solution would be preferable to the use of competition policy as an ex-post instrument of control. To this aim, any wide-reaching decision on infrastructure repurposing should be guided by an **EU-wide cost-benefit analysis**, on when and how to regulate hydrogen networks.
- **SoS Regulation** to be updated as to include H2. Update on national plans at Gas Coordination Group meeting should include H2 plan developments and reserves.

Amending INT and TAR Network Codes?

- **INT NC** : amendments to provisions as to include gas quality standardisation, compatibility of appliances etc

Gas quality standardisation in the energy transition

The Forum invites CEN to finalise the process on the Wobbe Index standardisation and to continue its work in support of the use of renewable and low-carbon gases in gas infrastructure and gas applications.

The Forum invites the Commission to integrate gas quality and hydrogen quality considerations, including cross-border operational rules, in its work when re-examining the gas market regulatory framework to facilitate the uptake of renewable and low-carbon gases.

- **TAR NC**: pancaking of the current gas transportation tariff framework to be avoided in future system.

Electricity model → a single EU-wide entry exit system, with an inter-TSO compensation in case revenues for the different TSOs do not correspond to their allowed costs?

Thank you for your attention!



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