



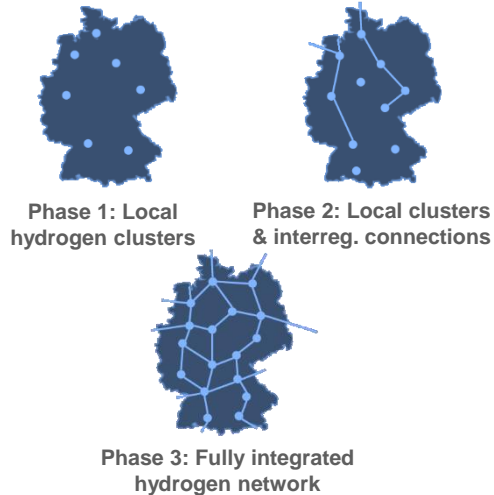
Underground storage natural gas – hydrogen a similar story?

Central European Gas Conference September 22nd, 2022

Doug Waters, Uniper Energy Storage GmbH

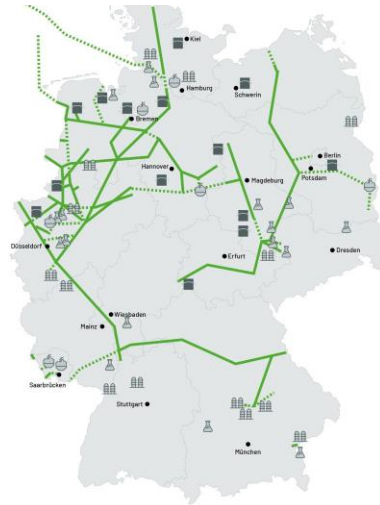
Infrastructure is key: hydrogen pipelines and storage need to ramp-up timely similar to natural gas development

Infrastructure ramp-up



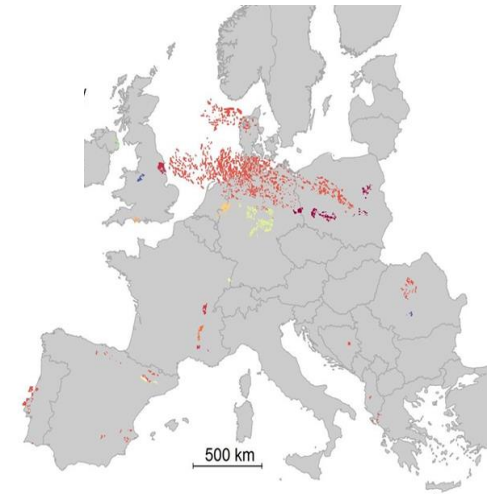
Source: EWI (2020)

Planned German H2-network



Source: FNB (H2-Netz 2030)

Salt deposits



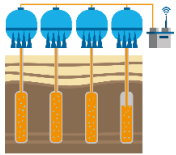
Source: Caglayan et al. (2020)



Since transport and storage of molecules is more economic than electrons, gas infrastructure will be the enabler to connect energy rich regions with energy intensive industrial clusters.

Storage in salt is being developed now but other hydrogen delivery and storage technologies need to be developed for Southern and Eastern Europe

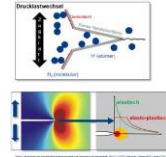
Challenges of hydrogen – to blend or not?



High pressure (> 200bar) essential for energy storage application
→ Maximization of storage capacities due to limited volumes

vs.

Hydrogen partial pressure as the key driver for integrity issues



&

existing regulation insufficient for storage process conditions
→ focus on gas transport applications



vs.

Gas storage process conditions not comparable to transportation grid



Strong political support is necessary to ramp-up the hydrogen market

Support on infrastructure

Financial and regulatory support for hydrogen storage and pipeline infrastructure

State aid

Necessary to support first movers on supply and demand side (OPEX + CAPEX), more pragmatism and less bureaucracy

Fast RES expansion

Stronger expanding of domestic renewable energy sources like wind and solar PV

**Hydrogen market
ramp-up needs to
speed up**

A central graphic featuring a blue circle with the chemical formula H₂ in white. Below it, the text 'Hydrogen market ramp-up needs to speed up' is written in blue. The text is surrounded by several overlapping, semi-transparent blue circles of varying sizes, creating a dynamic, bubbly effect.

Faster permitting

Permitting needs to speed by leaner processes and additional staff

Imports

The EU will not be self-supporter, thus framework for imports needs to be established urgently

EU competition law

EU competition law process slows down a fast hydrogen market ramp-up (IPCEI, etc.)

REDII Delegated Act

High uncertainty on hydrogen business cases due to delay of REDII delegated act

Pragmatic criteria for RES purchase that allow a fast market ramp-up (additionality, temporal & regional correlation)