

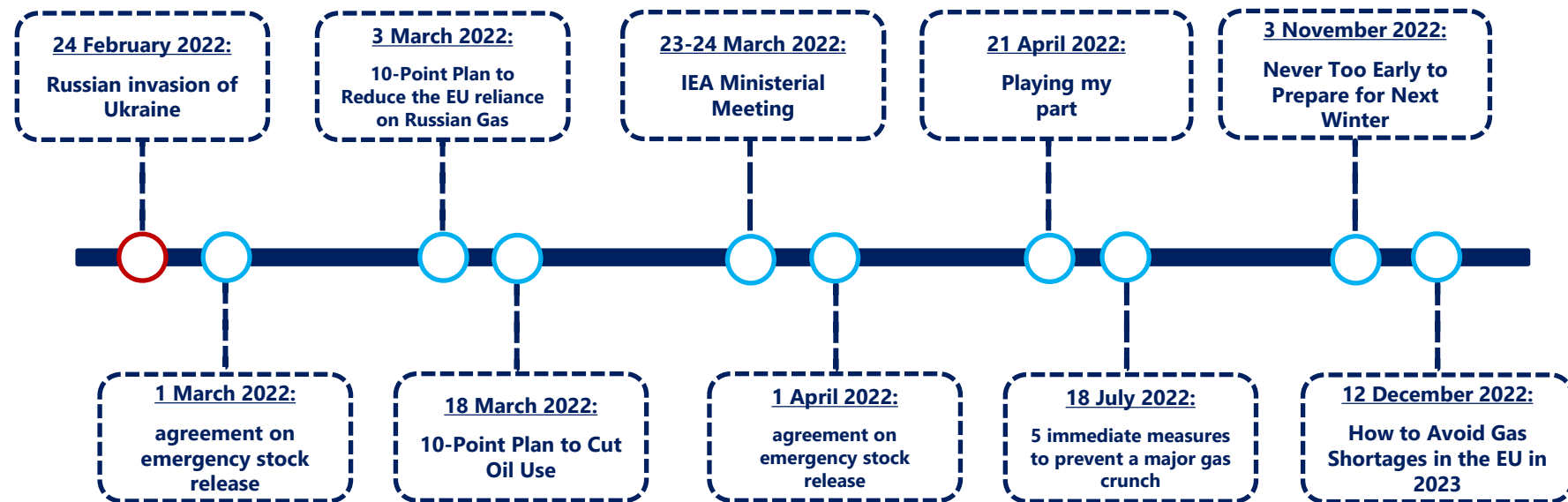


The role of hydrogen storage in decarbonised gas systems

Gergely MOLNAR, Gas Analyst

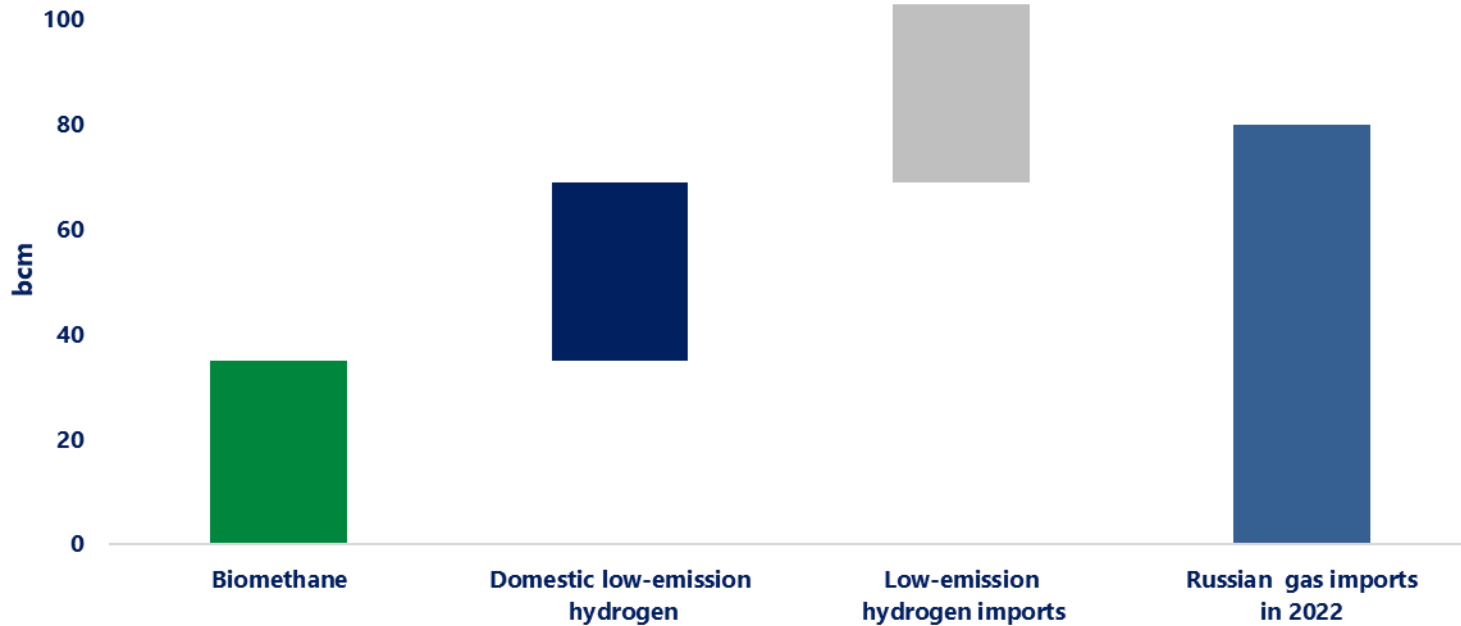
GIE Stakeholder Workshop, 10 January 2023

Energy supply security takes central stage



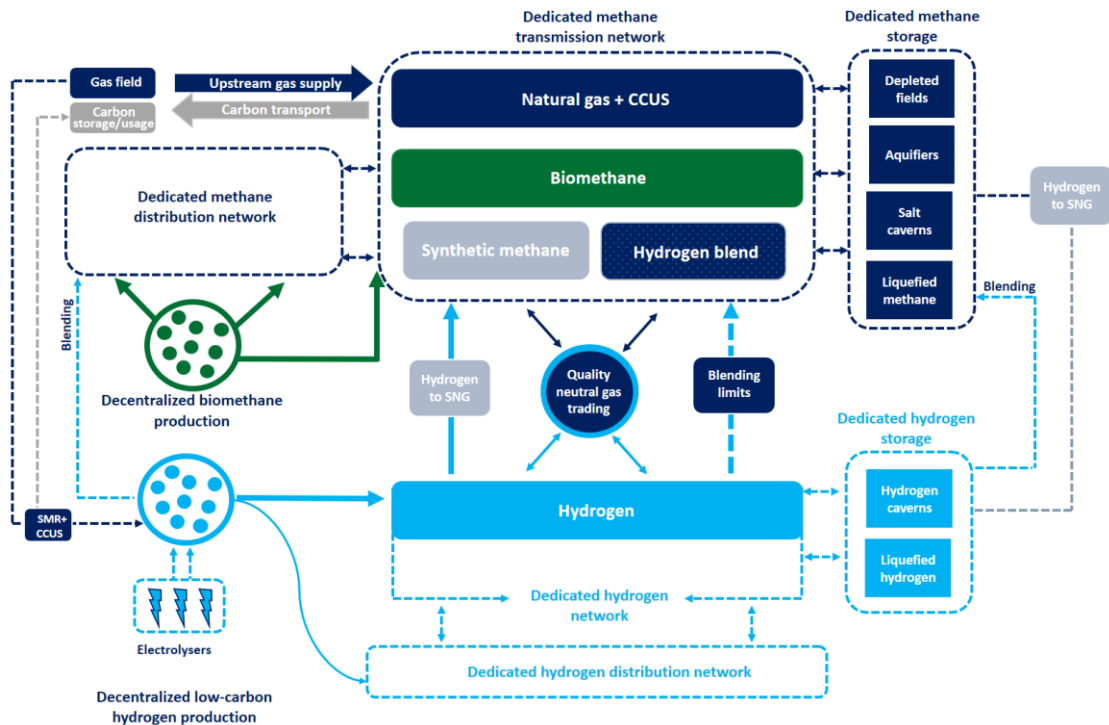
The gas supply shock put the spotlight on low-emission gases

Low-emission gas supply in REPowerEU Plan by 2030



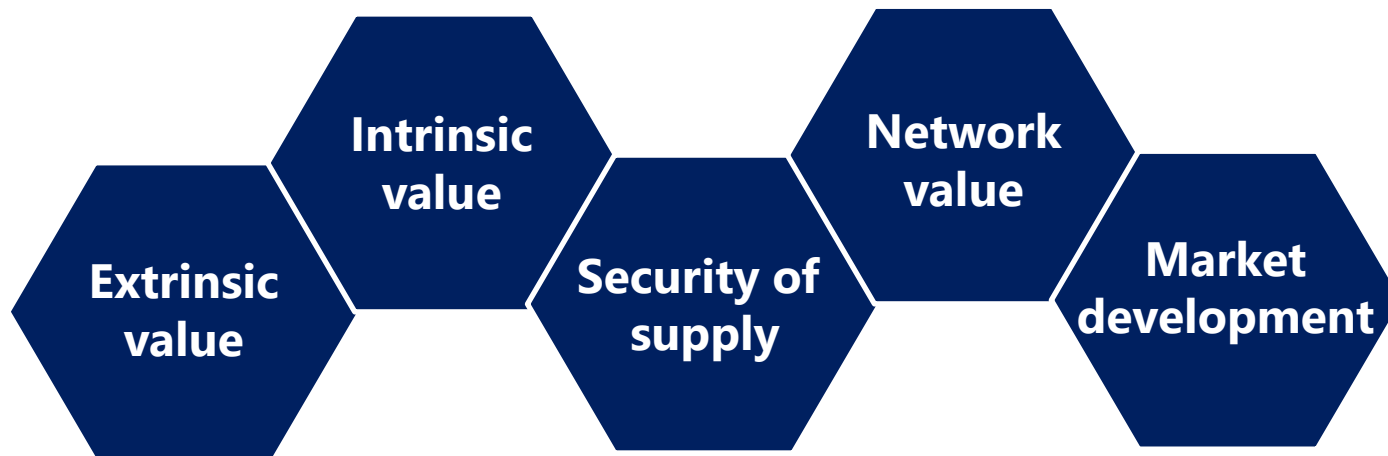
Low-emission gases are at the intersection of energy supply security and decarbonisation efforts: while contributing to lower emissions they can reduce significantly the reliance on fossil fuel imports.

Low-emission gases will lead to a more complex gas system



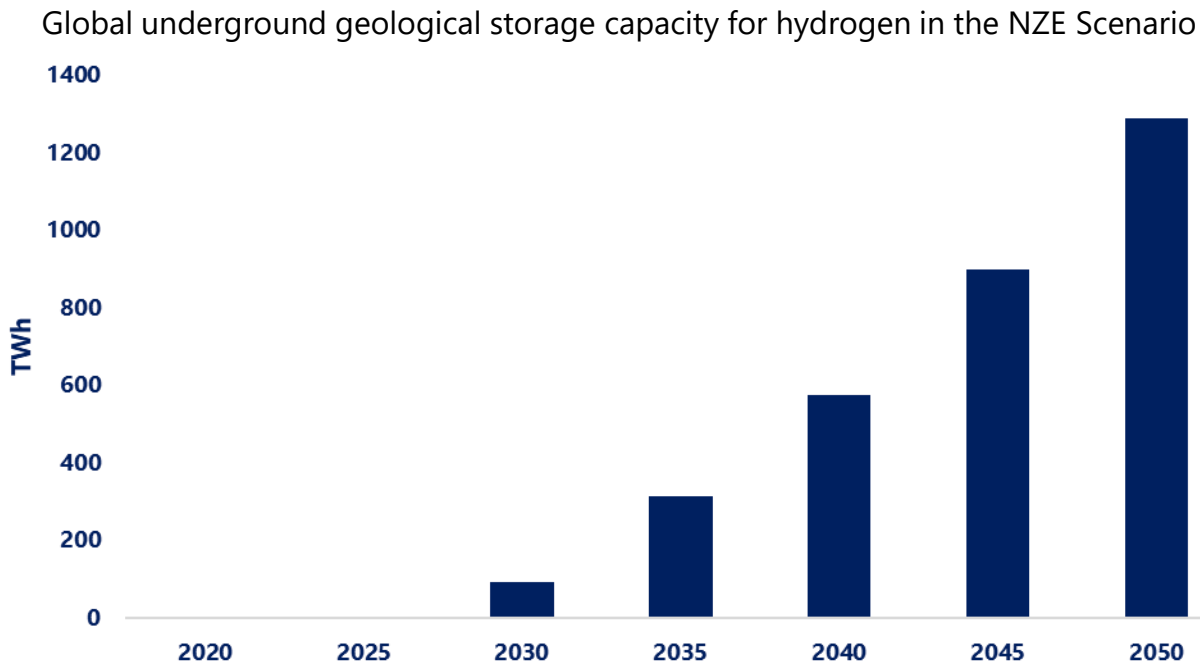
The transition towards low-carbon gases will require prudent infrastructure design, taking into consideration the network integration challenges and changing supply flexibility of low-carbon gases.

What role for underground hydrogen storage?



Hydrogen storage can enhance overall the overall flexibility of the energy system, by balancing short-term supply and demand variability, meeting seasonal demand swings and provide security of supply.

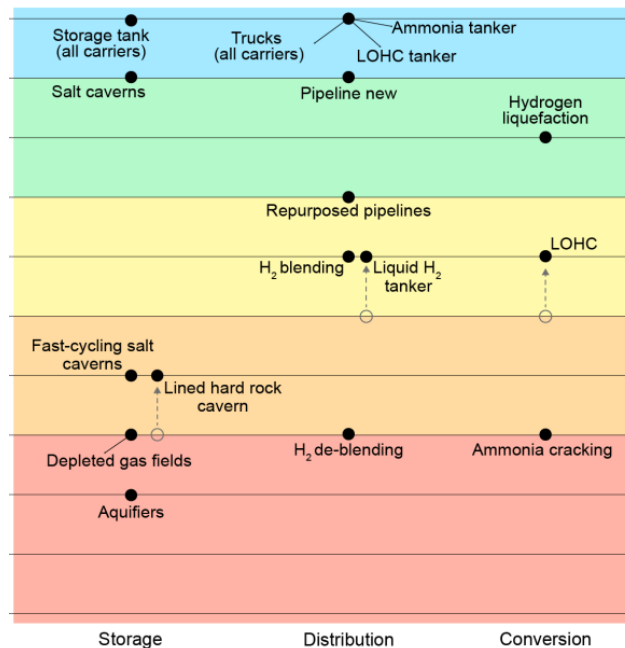
Global hydrogen storage capacity could reach 1300 TWh by 2050



Rapid hydrogen supply growth in the NZE Scenario will require a strong increase in underground storage up to 1300 TWh by 2050, although project developments are lagging behind.

Hydrogen storage technologies are in different stages of maturity

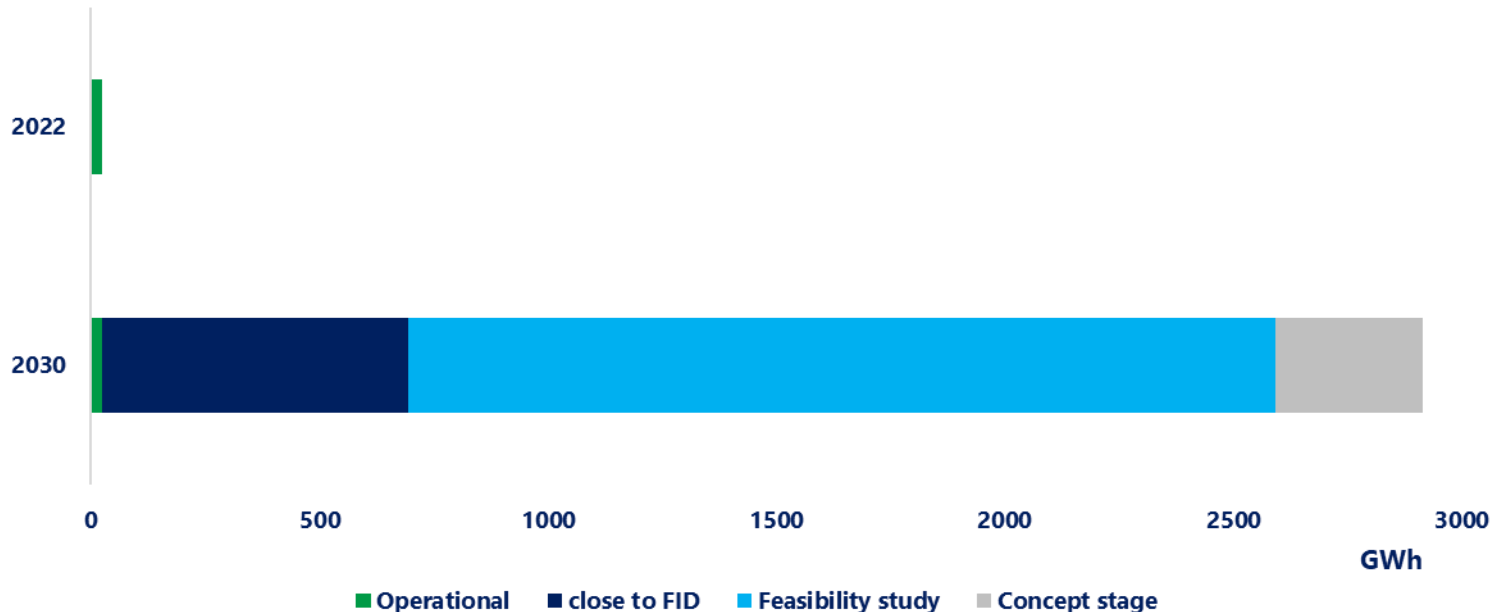
Technology readiness levels of low-emission hydrogen infrastructure



While hydrogen storage in salt caverns is a proven technology, the experience in storing hydrogen in porous reservoirs such as depleted fields or aquifers is limited.

Mind the gap: the European hydrogen storage landscape

Underground hydrogen storage capacity development in Europe by 2030



Around 3 TWh of hydrogen projects were announced in Europe, with most of them are either at the conceptual phase or undergoing feasibility studies.

Conclusions

- **Russia's brutal invasion of Ukraine** triggered an unprecedented **global energy and gas crisis**, putting the spotlight on **energy supply security**.
- **Low-emission gases** are at the **intersection of energy security and decarbonisation efforts**: while contributing to lower emissions they can reduce the reliance on fossil fuel imports.
- **Underground storage will be crucial** to reach the **full potential of hydrogen** as an energy carrier and respond to the **flexibility requirements** of a more complex energy system.
- Global **underground hydrogen storage capacity** could reach **1300 TWh by 2050**, although project developments are lagging behind, including in Europe.
- Hydrogen storage technologies are in **different stages of maturity**. There is clear and urgent need to double down R&D and demonstration efforts in hydrogen storage in porous reservoirs.

Recent IEA Reports on hydrogen

- **Global Hydrogen Review 2022**

<https://www.iea.org/reports/global-hydrogen-review-2022>

- **Northwest European Hydrogen Monitor:**

<https://www.iea.org/reports/northwest-european-hydrogen-monitor>

- **Hydrogen patents for a clean energy future – 10 January 2023:**

<https://www.iea.org/reports/hydrogen-patents-for-a-clean-energy-future>

- **Energy Technology Perspectives – 12 January 2023**

<https://www.iea.org/reports/energy-technology-perspectives-2023>

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