European Hydrogen Week

# 24 - 28 October 2022

# Brussels, Belgium

euhydrogenweek.eu

Hydrogen Europe

Flagship Expo

Clean Hydrogen Partnership

# Large-scale hydrogen storage

## Underground storage solutions outlook & market perspectives

by Storengy

# Unmatched value of large-scale H2 infrastructures

**Large industrials**

**Power grid operators**


**REN power & Large-scale H2 producers**


**Strong contribution to both gas and electricity systems**

## Volume

Production disruption, stable supply despite variable green H2 production

## Financial

Hedge against market prices risk (power & hydrogen)

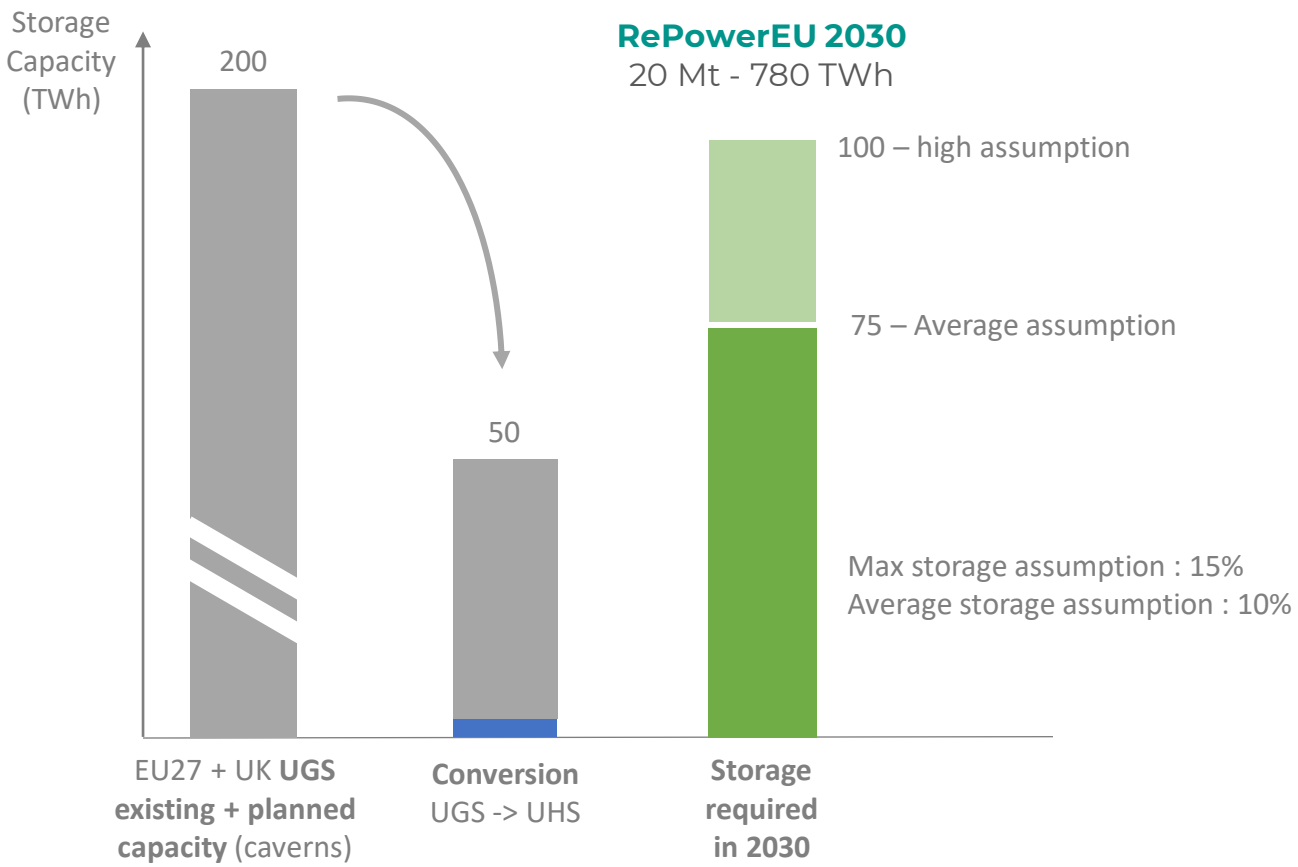
## Economic

Sector coupling & grid balancing services induce optimal system costs

## Zero Carbon

Avoid REN power curtailment & maximize green H2 production

# REPowerEU ambitions drives infrastructure requirements



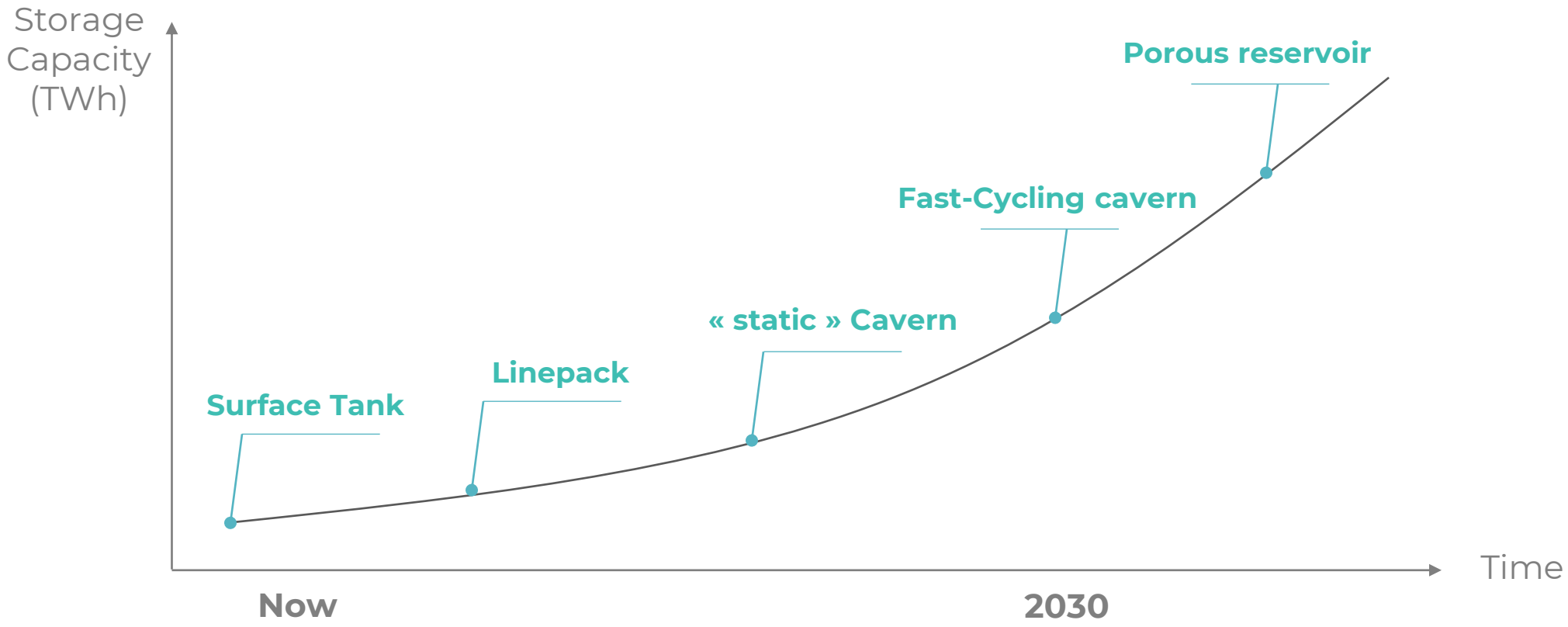

By 2030

- **New H2 storages** projects required
- **Projects to start now** and before 2025
- **Salt caverns are ideal** short term solution (TRL 9)
- Unlocking **depleted fields potential will be key** in the medium term (2/3 of existing natural gas storages)

*Energy density factor H2 / CH4 : 3.8*
*Storage capacity required : 20% of demand if mainly Green H2 /-/ 10% if mainly blue H2 /-/ 24% for NG*

*Medium size cavern : 0,275 TWh*
*Source : GIE Storage Database, based on existing UGS in caverns (WGV considered)*

# What are the technical solutions do we have to store pure hydrogen?




*For illustration purpose only*

# Underground Hydrogen Storage solutions & potential

## Salt Caverns

**TRL 9** (Commercial)

~8 kt H2

hypster Hydrogen Storage

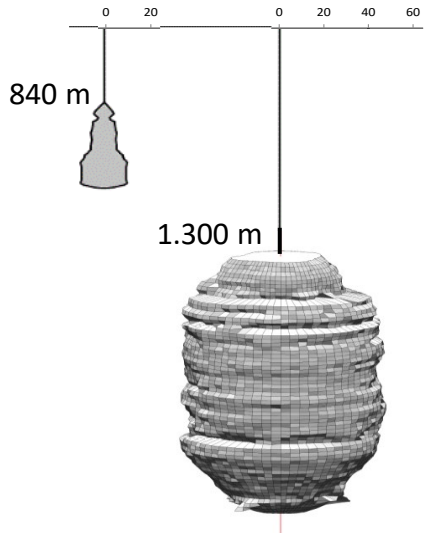
**Geometric volume :** 7,000 m3
**Total gas**: 45.5 MMcf
**Equiv. H2** : 44 tons

## Fast Cycling Salt Caverns

**TRL 7** (Pilot)

~ 50 to 110 kt H2

from 6 to 14 full cycles/year




## Porous Reservoirs

**TRL 2-3** (R&D)

~ 180 kt H2

### Caverns in Lyon (FR)

**Geometric volume :** 570,000 m3
**Total gas**: 4.75 Bcf
**Equiv. H2** : 6,300 tons

*Source : Storengy, European Directorate for Energy « The role of renewable $H_2$ import & storage to scale up the EU deployment of renewable $H_2$", Feb. 2022*

# What we need to succeed

- Investment on predevelopment, pilot and R&D
- A **holistic “gas” infrastructure approach**
- **Rules to arbitrate** between gas / hydrogen needs
- A **clear and supportive regulatory context**
- Adequate **permitting processes**

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