

HUG SCENARIOS AND ROADMAP

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Starting point

- In the hydrogen economy, storing of hydrogen will be needed for successful business: ensuring flexibility to balance production and consumption, delivering reliability, cost-efficiency, and a competitive edge for Finnish industry.
- Forms of underground hydrogen storages in Finland will be lined rock shafts (LRS) and lined rock caverns (LRC)
- There will be small, medium and large size underground hydrogen storages, depending on business needs
- Incentives for building a LRS or LRC depends on market mechanisms in the future hydrogen markets:
 - Fixed-price models with steady supply requirements will motivate hydrogen producers
 - Stock-market prices will motive hydrogen users (fill the storage when the price is low and use when the price is high)
- Four scenarios setting differently into the timeline of Finnish hydrogen economy development

Four scenarios for the LRC & LRS storages

Open LRC in the transmission network

- Nationwide open, large-scale LRC in the hydrogen transmission network
- Owner-operator: "Gasgrid Vetyvarasto Oy"
- Customers: both hydrogen producers and users, the use depending on hydrogen market mechanisms
- The scenario is possible, if the building and operation of such a storage is given as a task for Gasgrid by the Government
- Timeline: earliest in 2035

Closed LRC in the transmission network

- Nationwide large-scale LRC in the hydrogen transmission network serving only its owners
- Owners are large hydrogen-using companies across the country.
- Building and operation by a service operator (SO) established by the owners (Mankala-model)
- Regulative status of scenario unclear
- Timeline: earliest in 2040

Local LRS in the distribution network

- Local small-size storage using the LRS technique in the local distribution network
- The LRS serves only its owner (i.e. storing for the own needs)
- Owner can be a hydrogen producer and/or user
- Good hydrogen storage option for the scale-up phase of hydrogen economy, but may be competitive also in longer term
- Timeline: earliest in 2028

Local LRC in the distribution network

- A local medium-size storage using the LRC technique in the local distribution network
- The LRC serves either a single user or a local hydrogen society, in the latter case a SO will be needed
- Owner can be a heavy hydrogen user or a group of local companies (joint venture SO)
- The first storage in this scenario is the LRC pilot
- Timeline: earliest in 2030

Timeline / roadmap for the scenarios

