

BE-HyStore Storing hydrogen underground

A crucial building block for the future energy system



fluxys 

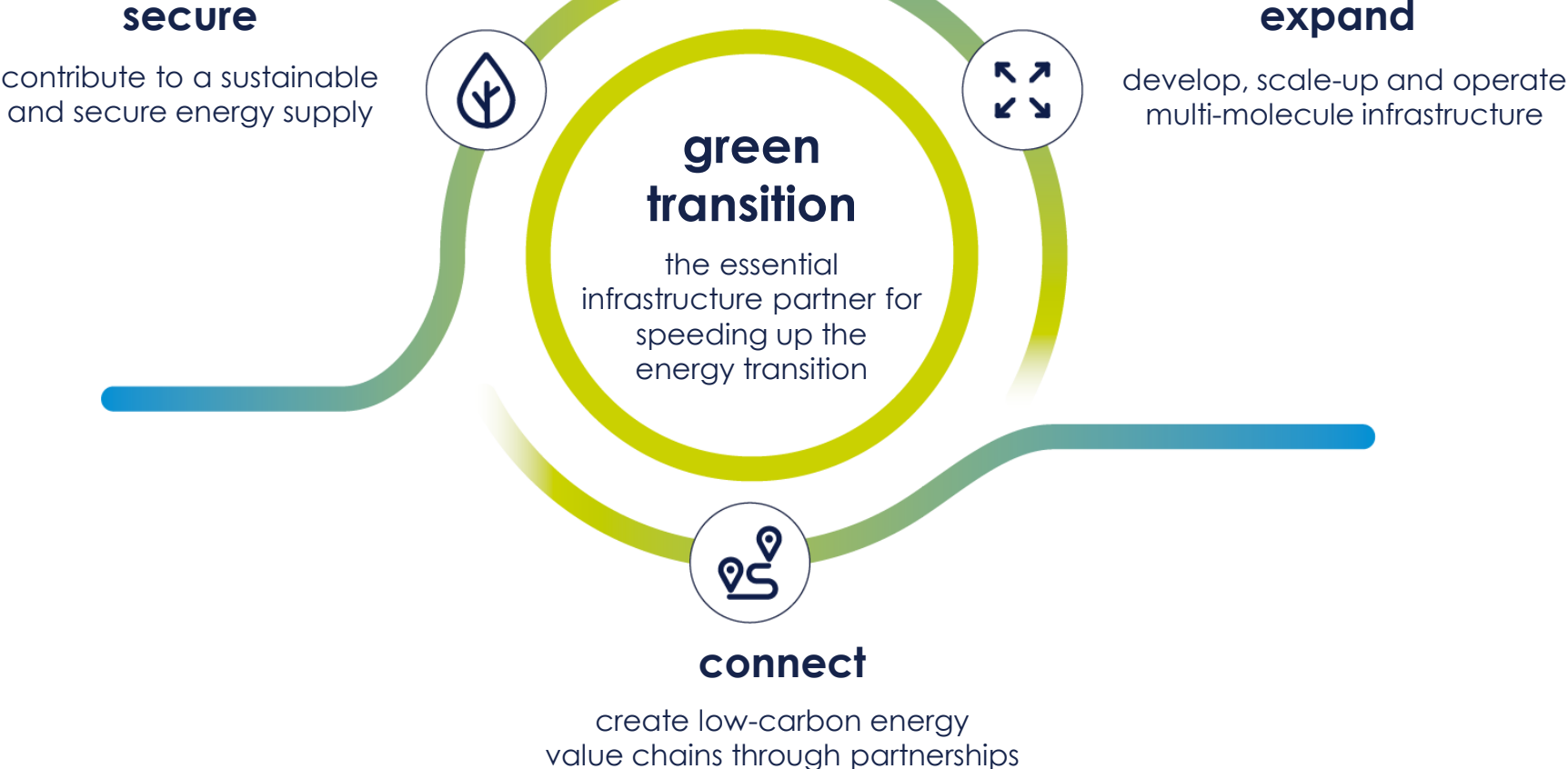
H₂

How Loenhout fits into the energy transition



Energy transition at the heart of our strategy

30 X 30 X 30



Why store hydrogen?

Strong buffer for flexibility and energy security

Buffer for both **peak supply** and **peak demand**

Accelerating the energy transition
with all our infrastructure



Project BE-HyStore



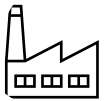
Storing hydrogen in Loenhout

Project BE-HyStore explores the underground storage of hydrogen

Storing **2,4 TWh** of hydrogen



matching the capacity of
178 million home batteries



energy and feedstock to supply industry
and power plants

fluxys 



Supported by
Energy Transition Fund

in collaboration with

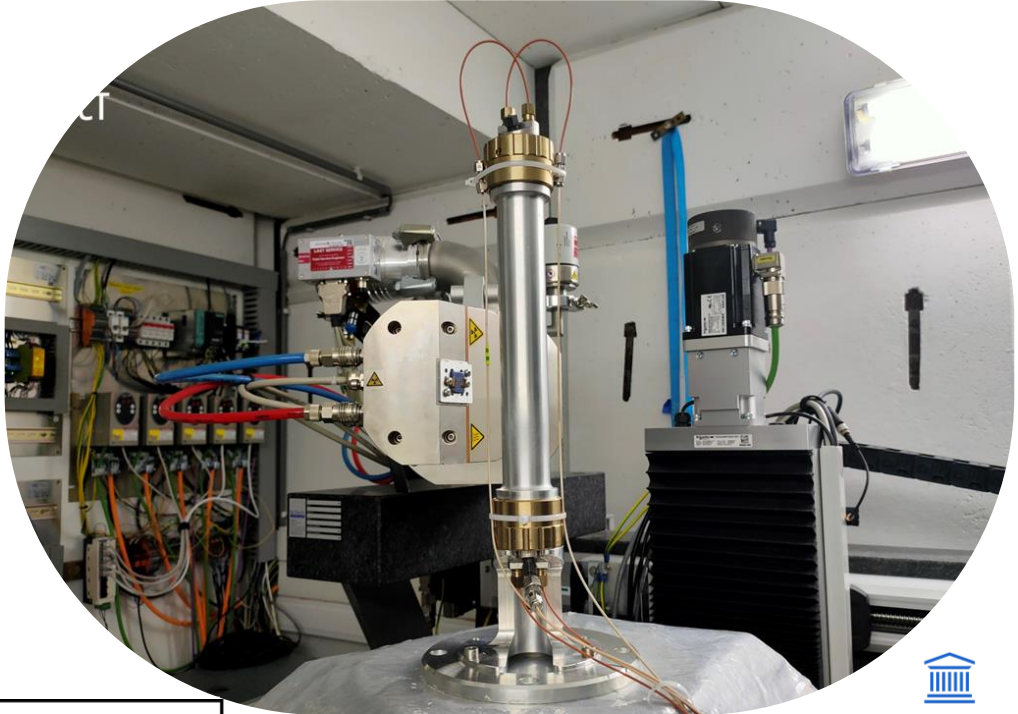



BE-HyStore - Scope

First-of-their-kind
Field Tests



State-of-the-art
Laboratory Experiments



 Supported by
Energy Transition Fund



Hydrogen test injection in aquifer

- Trajectory started in 2019 in collaboration with Geostock
- 2019:
 - Literature study towards the storage of a mixture of CH₄ (90%) and H₂ (10%)
 - No showstoppers to interrupt the project
- 2020:
 - Modelisations as follow-up of the 2019 report
 - Confirmation of the results of the 2019 studies but there is a need for more profound data.
 - Green light to go for on-site testing to confirm the models



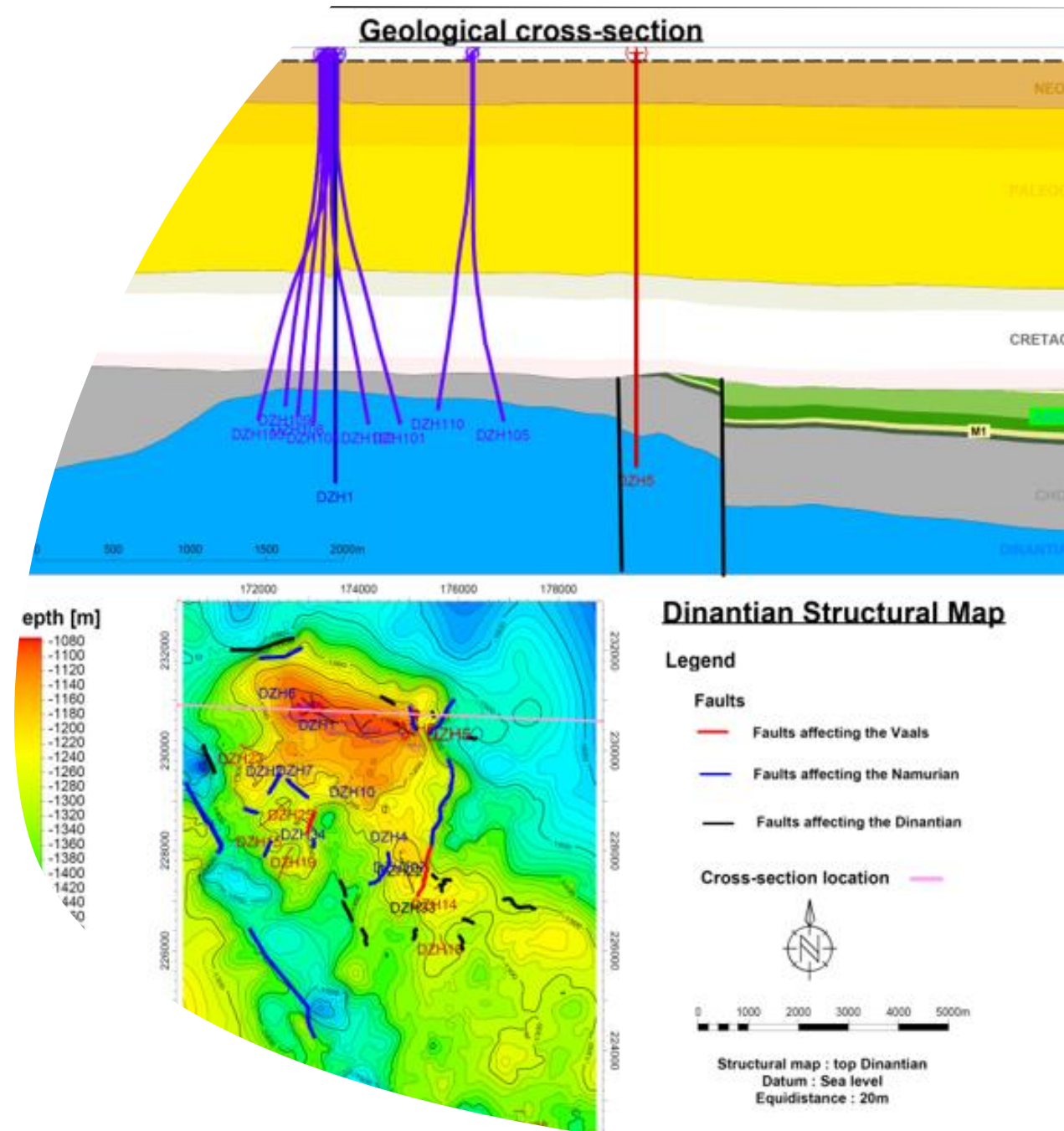
Hydrogen test injection in aquifer

- 2021:
 - Switch from a 10% H₂ content towards a 100% storage project
 - Set-up of the scope to perform on-site pilot tests
 - Study of the materials used in the installation to confirm compatibility with 100% H₂
- 2022:
 - Start-up of the permitting process:
 - » Environmental permit obtained in 06/2022
 - » Adapted Royal Decree obtained in 07/2023



With this test injection, we look for confirmation of theoretical models

- Injection of 3000 Nm³ of Hydrogen
- Soaking during **2 to 3 months** in the reservoir
- Extensive **monitoring** with sampling and follow-up of the microbiology
- Execution of PULSAR-acquisitions
- **First results** to be expected in the spring of 2024

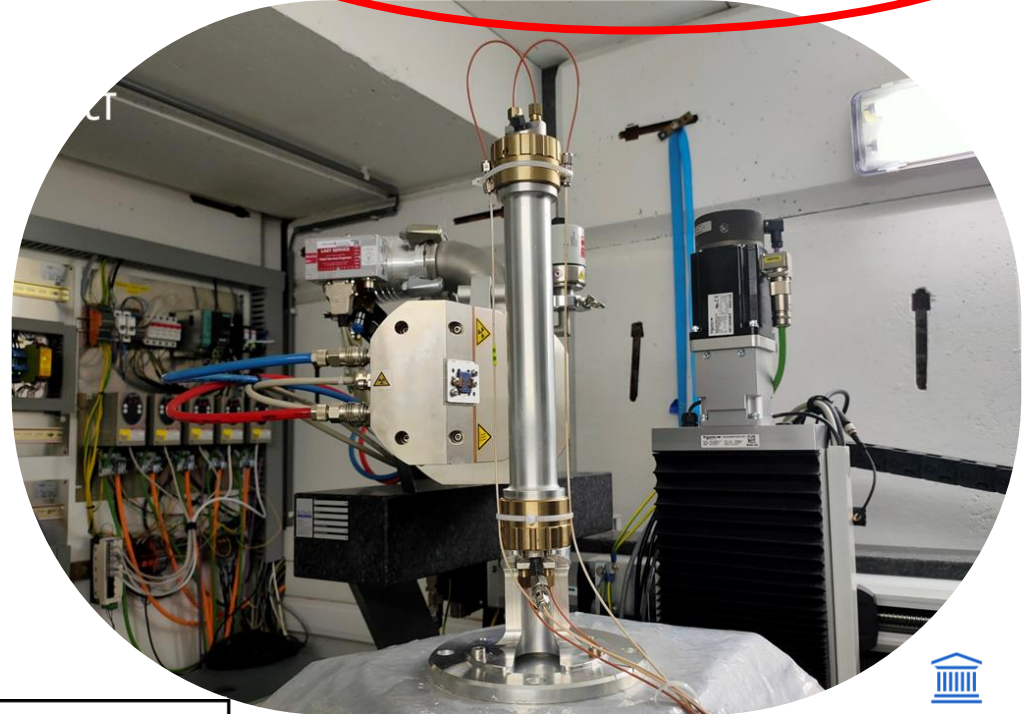


BE-HyStore - Scope

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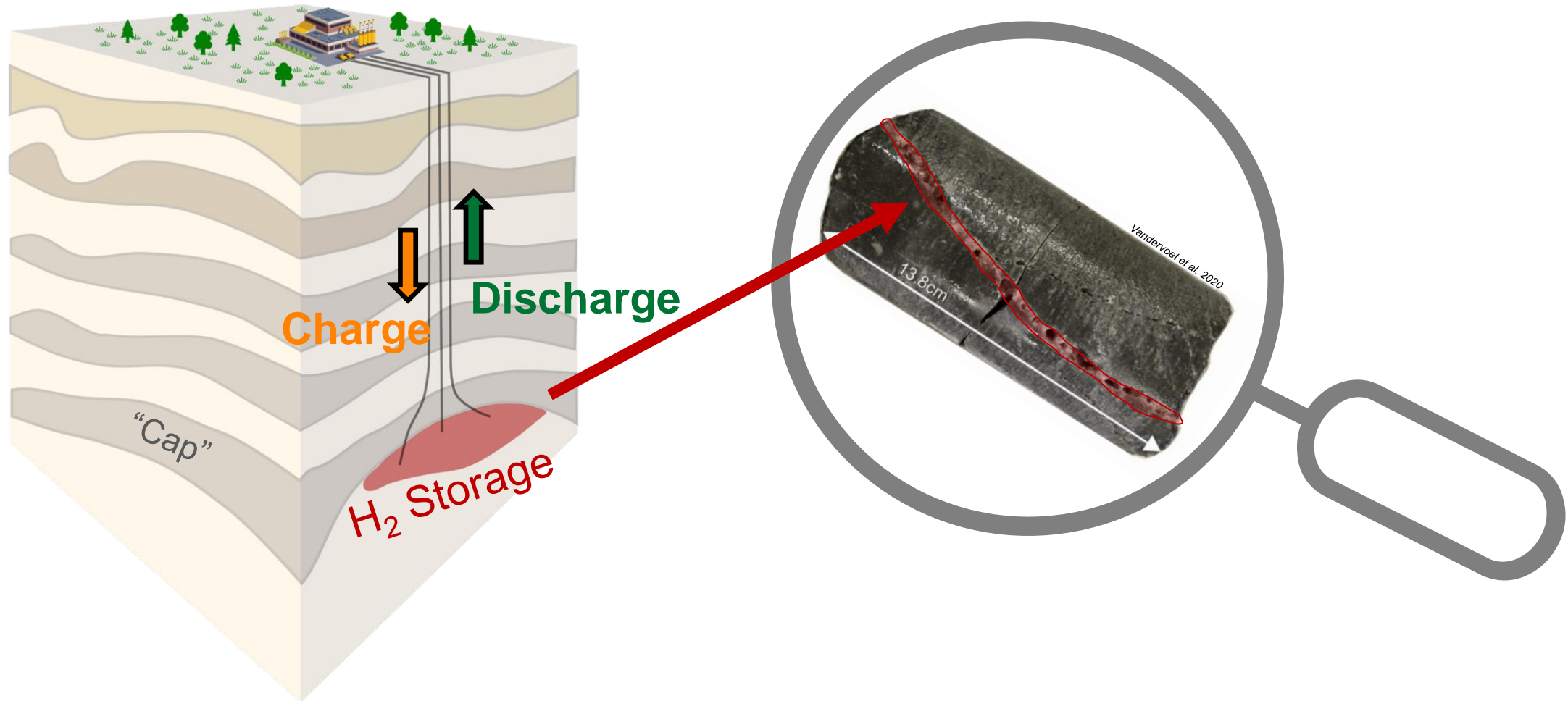


State-of-the-art
Laboratory Experiments



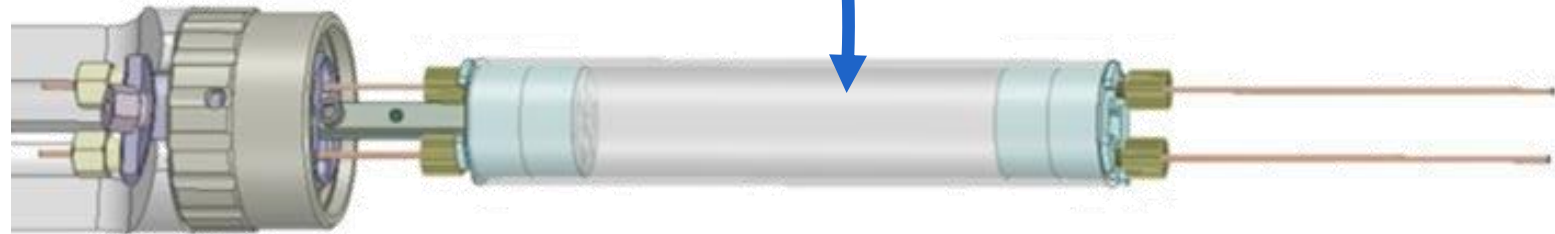
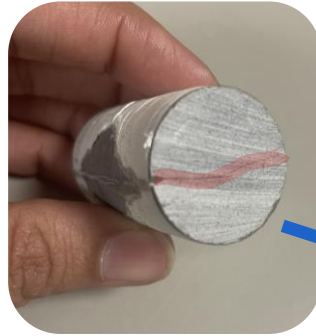
BE-HYSTORE: UNDERGROUND HYDROGEN STORAGE

An innovative solution to storage lies deep below our feet...



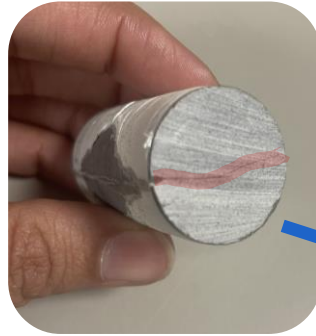
A MINI-STORAGE RESERVOIR IN THE LAB

Realistic rock samples and conditions from > 1000 m depth



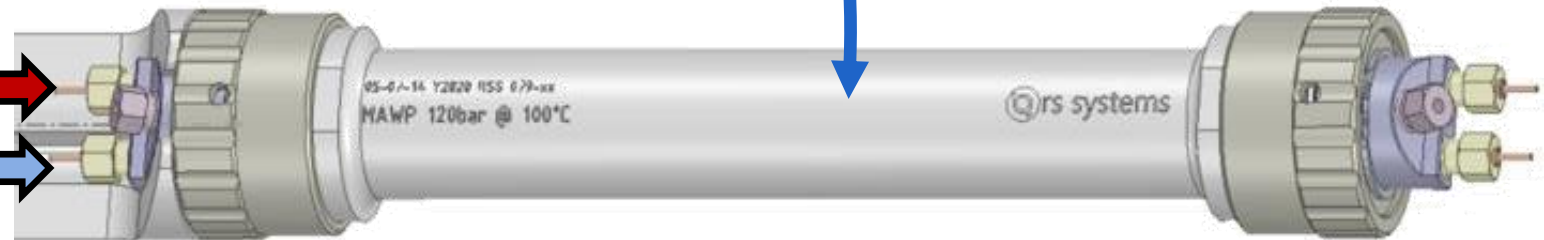
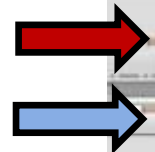
A MINI-STORAGE RESERVOIR IN THE LAB

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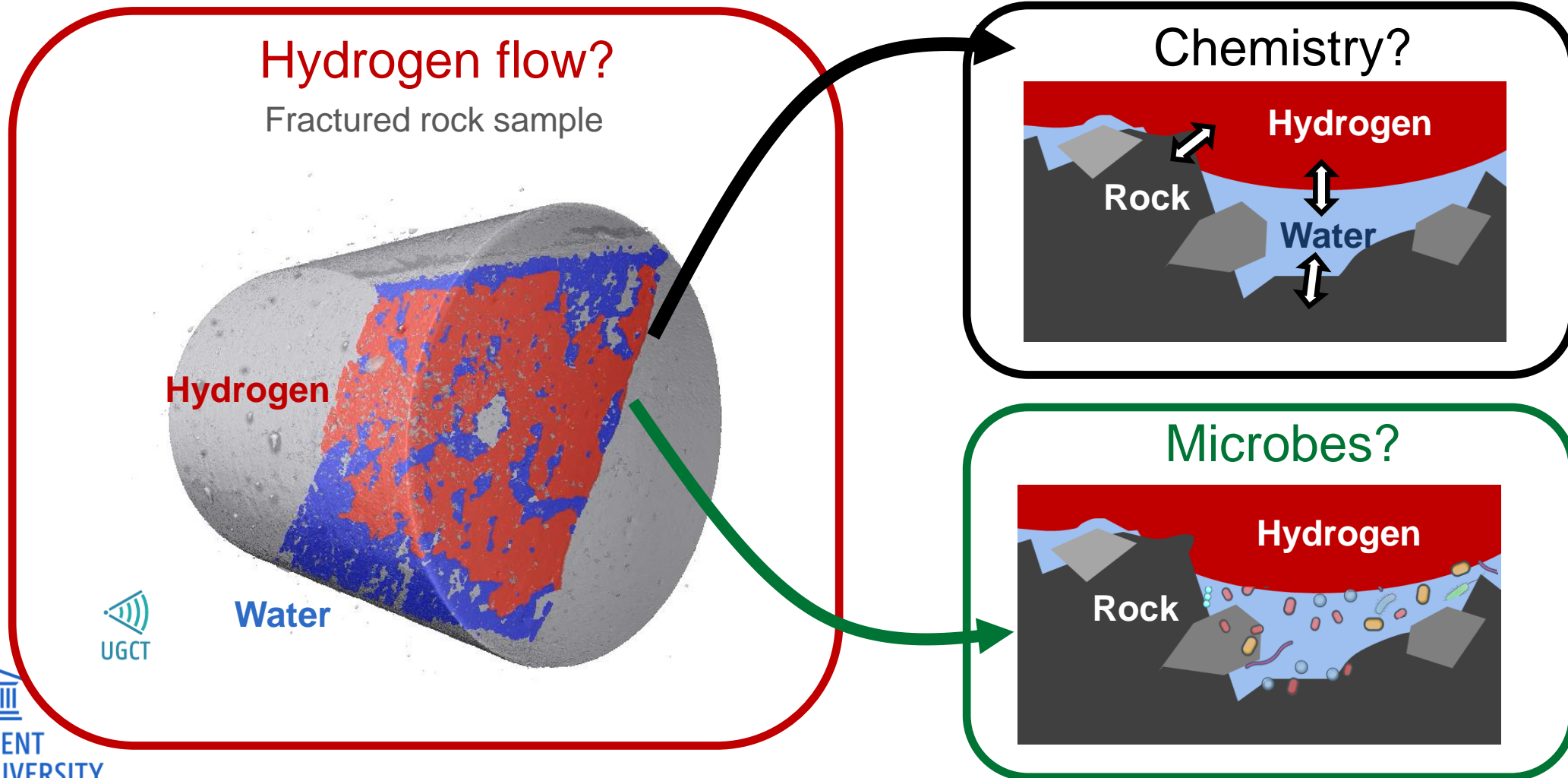
CAUTION
HIGH
PRESSURE

Hydrogen gas
Groundwater
(salty...)



WHAT HAPPENS WHEN WE INJECT HYDROGEN?

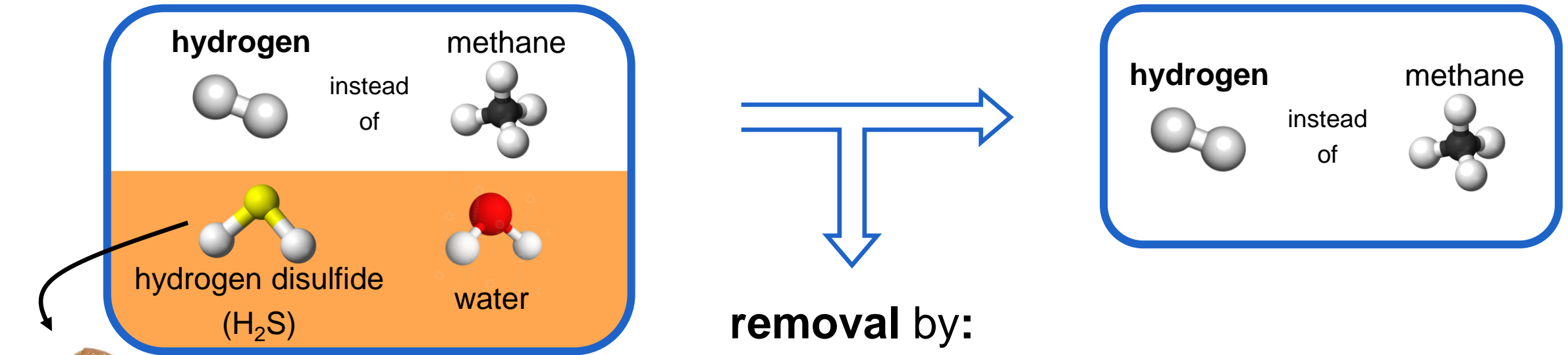
Precise measurements down to the microscopic scale



TREATING THE HYDROGEN AFTER STORAGE

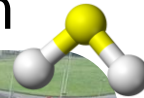
extracted from underground

sent out to grid



removal by:

desulfurization



drying





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Unique opportunity to significantly increase Belgium's renewable energy storage capacity

- **Repurposing** existing infrastructure
- Dealing with **intermittency** of renewables
- Security of supply: **buffer and flexibility**
- **Grid balancing**
- **Large-scale** and long-term storage
- **Vital** in the hydrogen value chain



Q&A



shaping together
a bright energy
future