

Geochemical and Cement Investigations

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Agenda

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- 2 DBI Group's Contribution in the HENRI Project
Geochemical Investigation
Cement – Testing
- 3 Previous Projects in the DBI Group

DBI Group

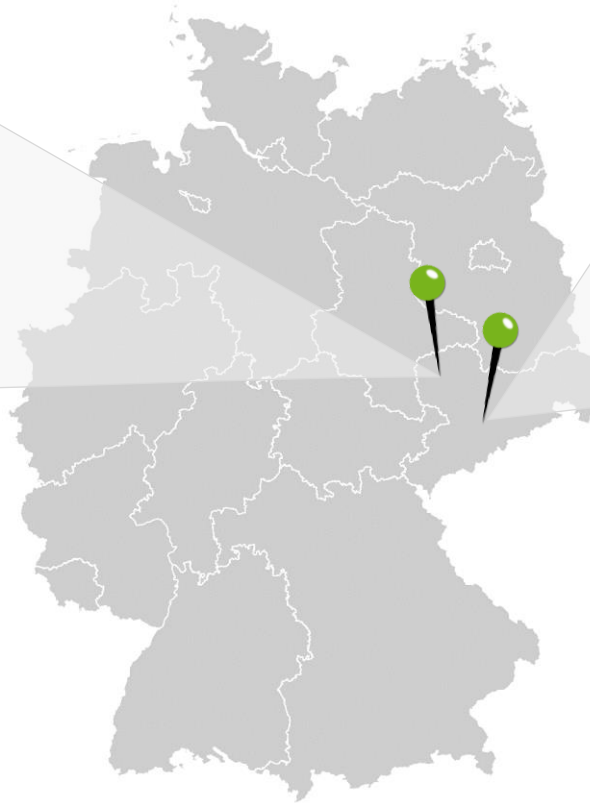
➤ Introduction

Two locations



Leipzig

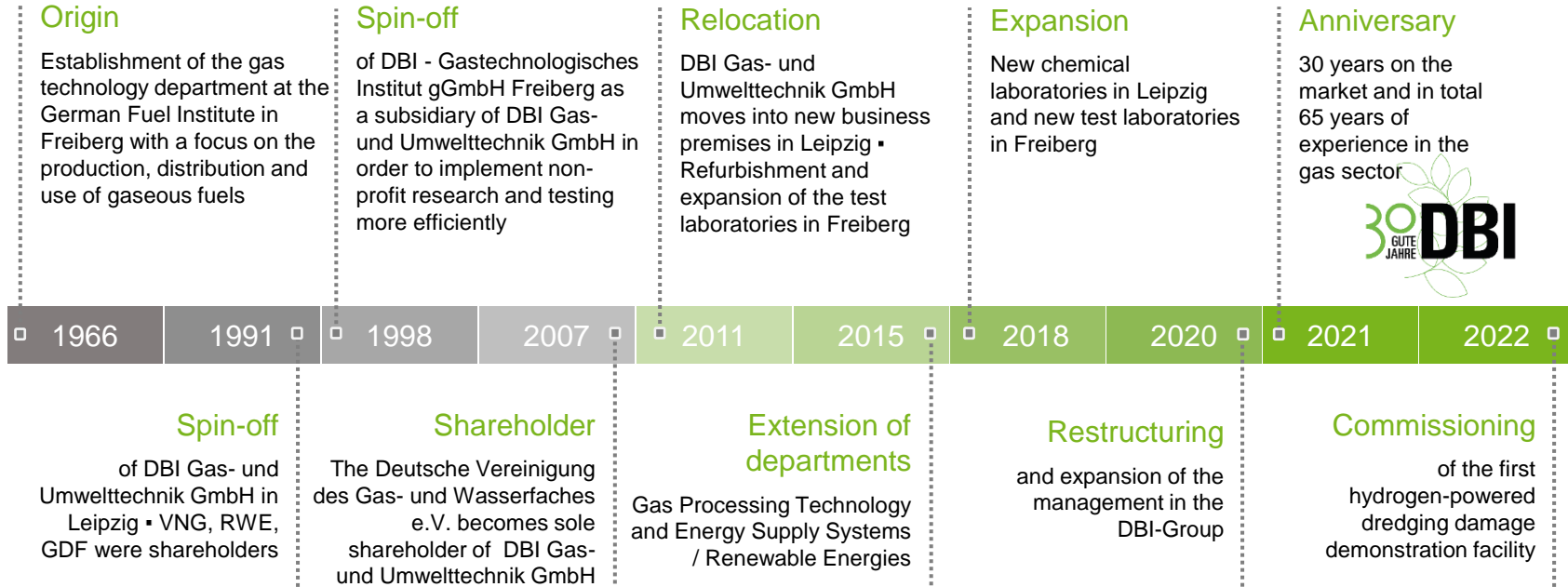
DBI Gas- und
Umwelttechnik GmbH



Freiburg

DBI - Gastecnologisches
Institut gGmbH Freiburg

Milestones in the History of the DBI Group



Our eight departments



Gas Production
Gas Storage



Gas Grids
Gas Facilities



Gas Utilization



Gas Processing
Technology



Gas Chemistry
Gas Treatment



Energy Supply Systems/
Renewable Energies



DVGW-Test Laboratory
Energy



Training Center Gas



DBI Group's Contribution in the HENRI Project

- **Geochemical Investigation**

- WP 1.2 Laboratory research for maximum H₂ concentration with NG in % range in real reservoir conditions

- **Cement – Testing**

- WP 1.4 Research of H₂ Impact to UGS and distribution infrastructure – cement testing

- **Reservoir Simulation (Nazika Moeininia)**

- **Scope:**

- Laboratory Investigations: Alteration of reservoir rock

| Reservoir | Pressure [bar] | Temperature [°C] | Salinity [mg/l] |
|-----------|----------------|------------------|-----------------|
| Nr. 1 | 80 | 40 | 19 000 |
| Nr. 2 | 160 | 90 | 16 000 |
| Nr. 3 | 200 | 60 | 24 000 |

- different H₂ concentration (50% of H₂, 100% H₂, 25% of H₂, 10% H₂)

- **Investigations:**

- Permeability measurements (water and gas)
- Petrographical characterization (Thin section analysis)
- Storage experiments in specific pressure vessel
 - » Total for 12 months (Sampling after 6 and 12 months)



- **Scope:**

- Demonstration of stability of the concrete to hydrogen
- Long-term storage tests of concrete cores
 - » same conditions and hydrogen shares as WP 1.2 - Geochemical Investigation
- Evaluation of concrete stability before and after storage.

- **Investigations:**

- Permeability measurements (Gas)
- Storage experiments in pressure vessel
- Microscopic investigations, X-ray diffraction, Energy-dispersive X-ray spectroscopy (EDX)



Previous Projects in the DBI Group

Previous Projects

Underground Sun Storage (2013-2017)

RAG Austria AG

- Investigation of reservoir rock and concrete in pure Hydrogen at 40 °C und 70 bar

Underground Sun Conversion (2017-2021)

RAG Austria AG

- The project's background was centered on assessing the feasibility of bio-methanation occurring within the reservoir.
 - Investigation:
 - » Alteration of concrete and reservoir rock
 - » Storage experiments at 40 °C and 100 bar, Gas mixture 80 % H₂ and 20 % CO₂

Hystorage Project

DVGW

- Investigation of of reservoir rock and concrete in H₂ – Natural gas and mixtures (10 und 50 Mol-% of H₂)
 - » At the reservoir condition: 50 °C and 100 bar
 - » Influence of reservoir water, Low salinity: 10 g/l NaCl

Thank you for your attention!

Your contact person

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