

GFZ

Helmholtz-Zentrum
POTSDAM

TNO innovation
for life

TU Delft



ISOR
ICELAND GEOSURVEY

Imperial College
London

WSG
Well Services Group BEST IN CLASS

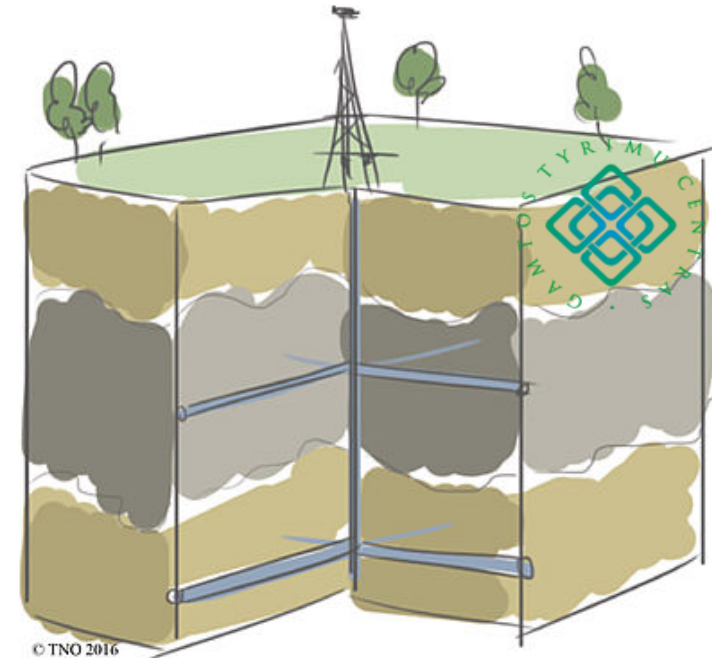
DTU
GEOTERMA

GZB

The H2020-SURE Project

Novel Productivity Enhancement Concept for a Sustainable Utilization of a Geothermal Resource

- Investigate and test the Radial Water Jet Drilling (RJD) technology
- connect high-permeable structures (faults/fractures, karst systems, high-permeable sedimentary structures) to main wellbore.
- Indicators: Performance increase, sustainability of stimulation treatment, environmental footprint



Approach

Status M6: achieved: ✓ / progressing: *

Status M14: achieved: ✓ / progressing: *

Status M26: achieved: ✓ / progressing: *

State-of-the-Art

- Conventional stimulation technologies ✓
- Radial water jetting technology *✓

Micro-Scale Investigation (Sample-Scale)

- Mechanical and hydraulic sample characterization ✓
- Fracture permeability characterization * * ✓
- Stability of laterals * ✓

Meso-Scale Investigation (Rock Block-Scale)

- Jetting in lab with full scale equipment ✓ ✓
- Jetting experiment in quarry * ✓
- Jetting at reservoir conditions * ✓

Macro-Scale Investigation (Field-Scale)

- Pre-operational survey * ✓ ✓
- Field tests * *
- Long term evaluation

Integration * *

- Total Cost / EC contribution: ~6.1M€ / ~5.9M€
- Project Duration: 2016-03-01, 42M
- TRL: 3-4

Impact/Results

- Scientific
 - Peer reviewed publications: 4 (all OA), Presentation on conferences: 43
 - Nucleus for Grants: DAAD Rise Germany, CAGE, National in NL
- Technology - TRL
 - Patent application on an abrasive water jetting nozzle (WP5)
 - Software tools developed: lateral stability, rock destruction, reservoir simulation
 - Development of equipment: downhole geophone, geometry sensor, cuttings retrieval basket
- Hurdles in accomplishing TRL
 - Not applicable to hard rock: Technology optimization planned at the end of the project will be done earlier, Field experiment this year
 - Negotiating with site owners/availability of sites in „continental Europe“ is difficult. (potential site benefits not sufficient to trade off technical and financial risk)