Recent developments in an enclosed-loop co-axial geothermal solution

Kim Gunn Maver, Chief Geologist

Making co-axial enclosed-loop commercially viable

Scale, scale, scale

International Energy Agency (2024)

“With the right policy support, innovation backing and simplified permitting, the cost of next-generation geothermal could fall by as much as 80% by 2035”

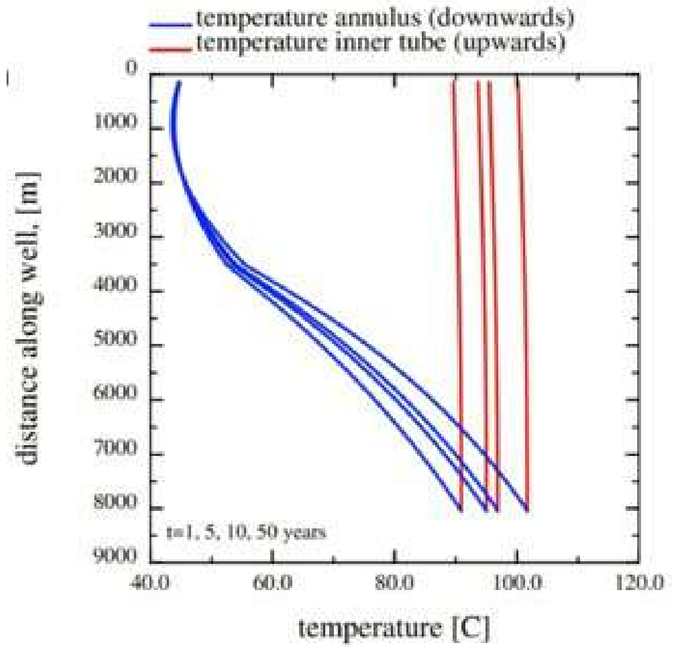
Long laterals

Increases the heat-uptake area dramatically

- Lateral wells are standard in the oil and gas industry
- 75% of all wells onshore USA are horizontal

Vacuum insulated pipes

Reduces heat loss to a few percent



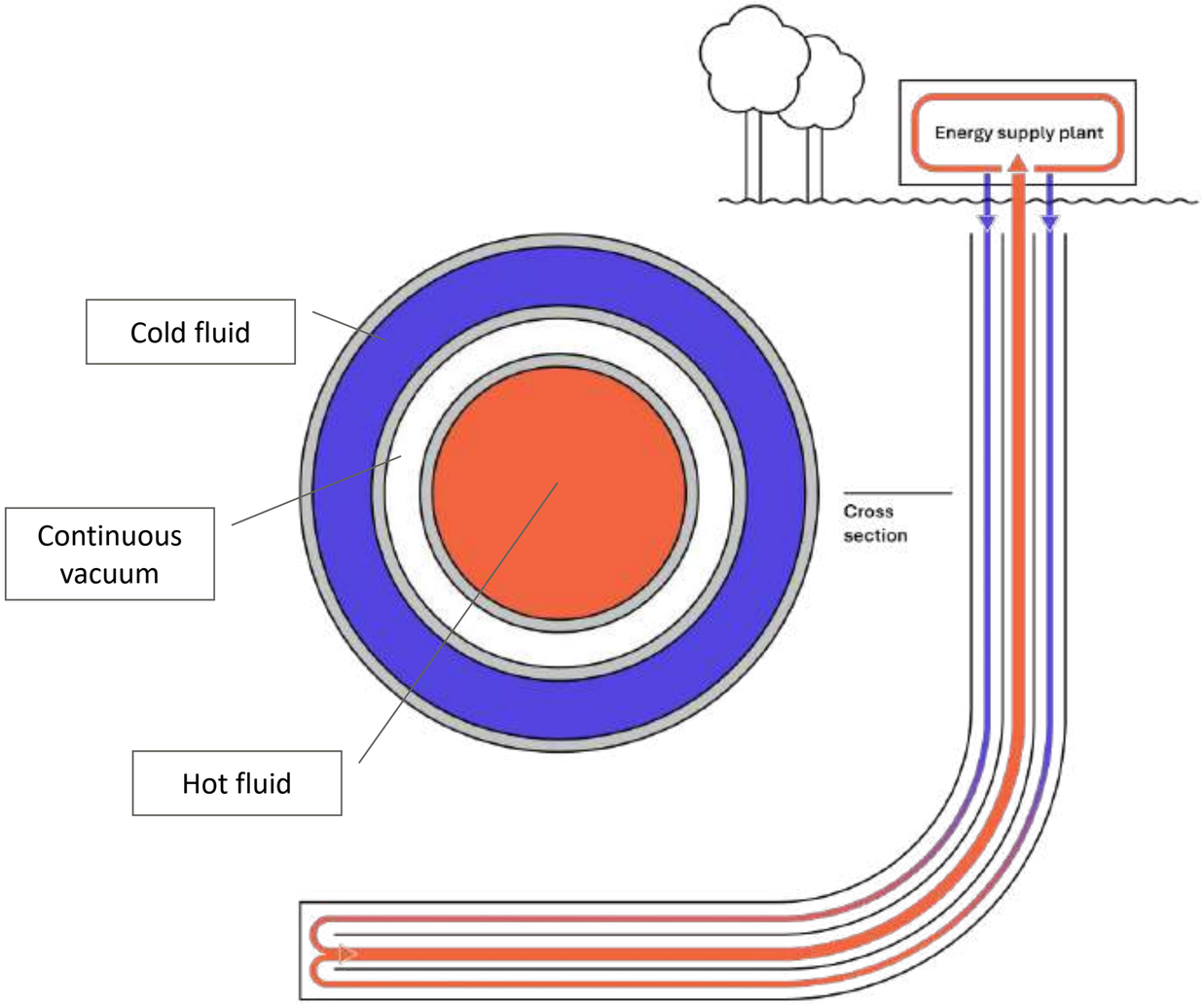
Source: International Energy Agency (2024), The Future of Geothermal Energy.

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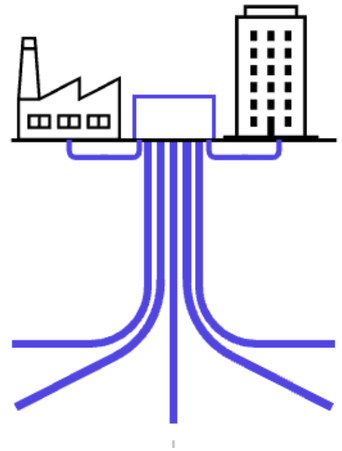
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Enclosed-loop lateral geothermal well solution

Well completion



- Oil and gas industry technology:
  - 9.5-inch tubing
  - Vacuum pipe: 4.0-inch inside 5.5-inch
- Well design:
  - Vertical section: 2–5 km
  - Horizontal section: 2–7 km
- Continuous vacuum maintained at the surface
- 45 kW pump for circulation
- No downhole equipment



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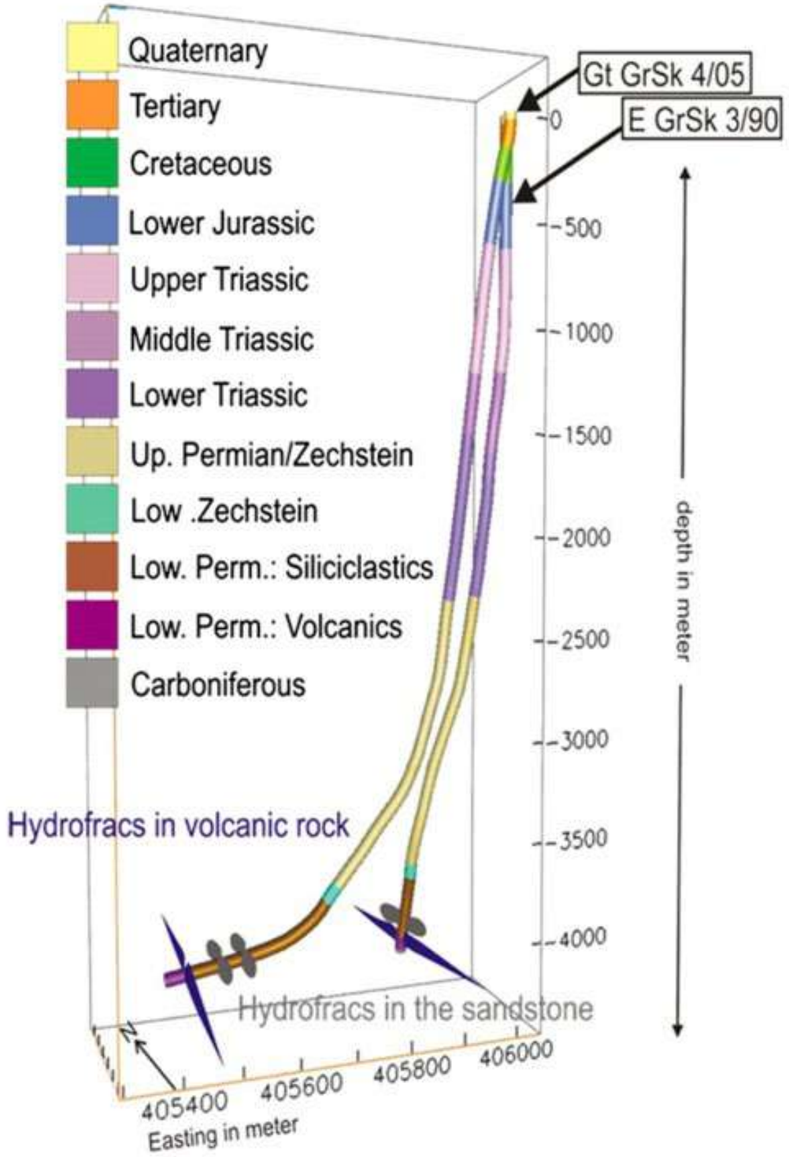
Groß Schönebeck (Germany)

Project scope

- Cooperation with German Geo Forschungs Zentrum (GFZ).
- The purpose is to demonstrate the Heat4Ever™ solution.
- The project includes installation of a DualVac™ pipe-string to a depth of more than 3 km in an existing well and a surface facility.

Objectives

- Demonstrate the DualVac™ technology.
- Further test and demonstrate:
- Provide learnings to be used in the Aalborg project.





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Groß Schönebeck (Germany)

DualVac™ installed July, heat production August 2026

















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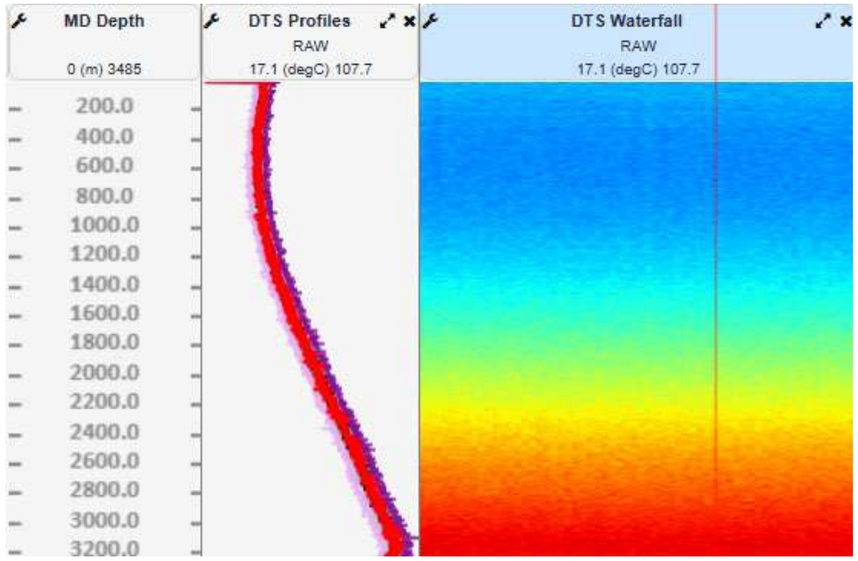
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Temperature measurements

Control panel



Fiber optic temperature distribution





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Groß Schönebeck (Germany)

13 October 2026: 25 visitors for well site visit

- Many utility companies (stadtwerke)
- Engineering companies
- Infrastructure investors









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Aalborg-1 well (Denmark)

Citizen meeting, seismic completed, well site being prepared









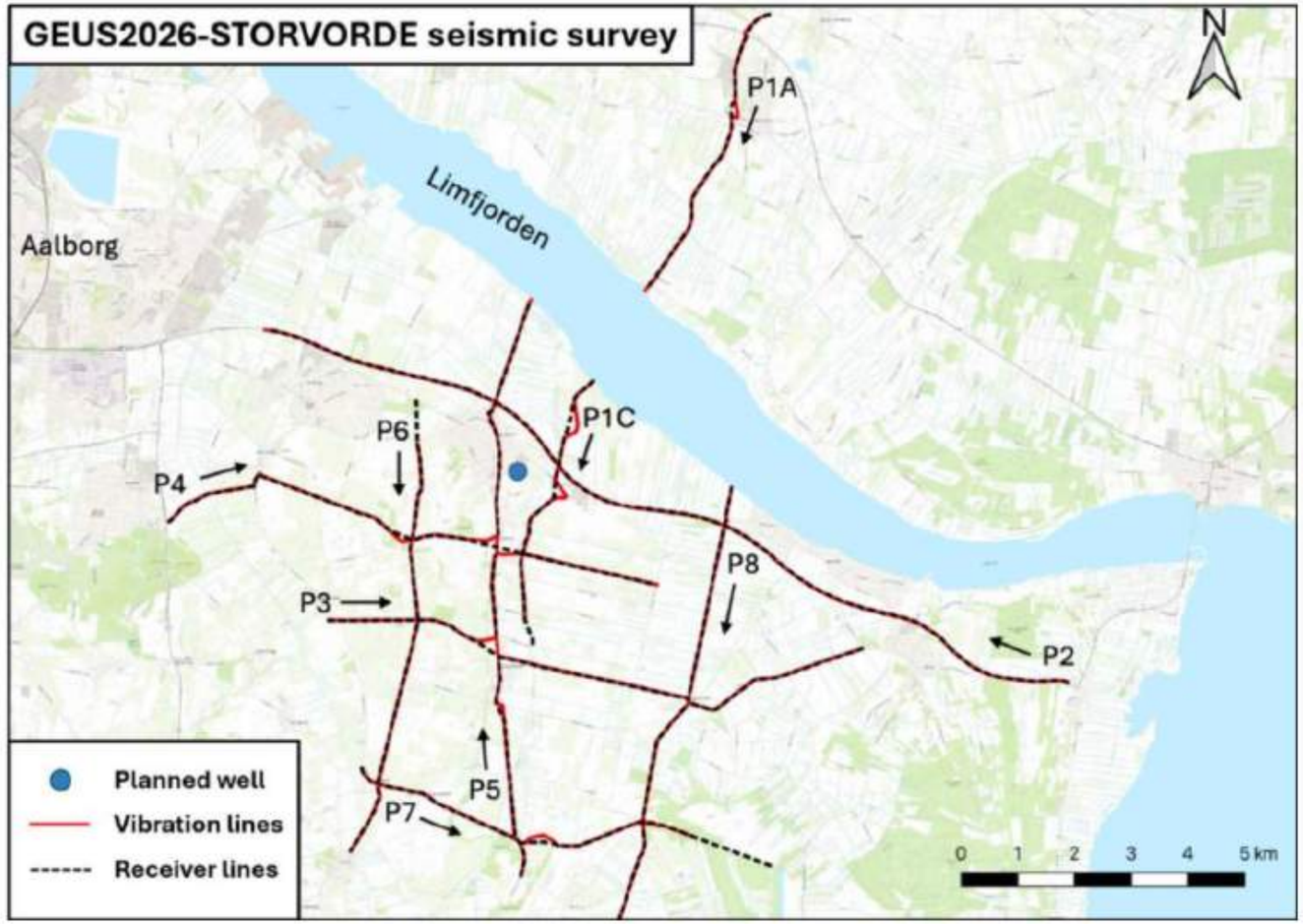


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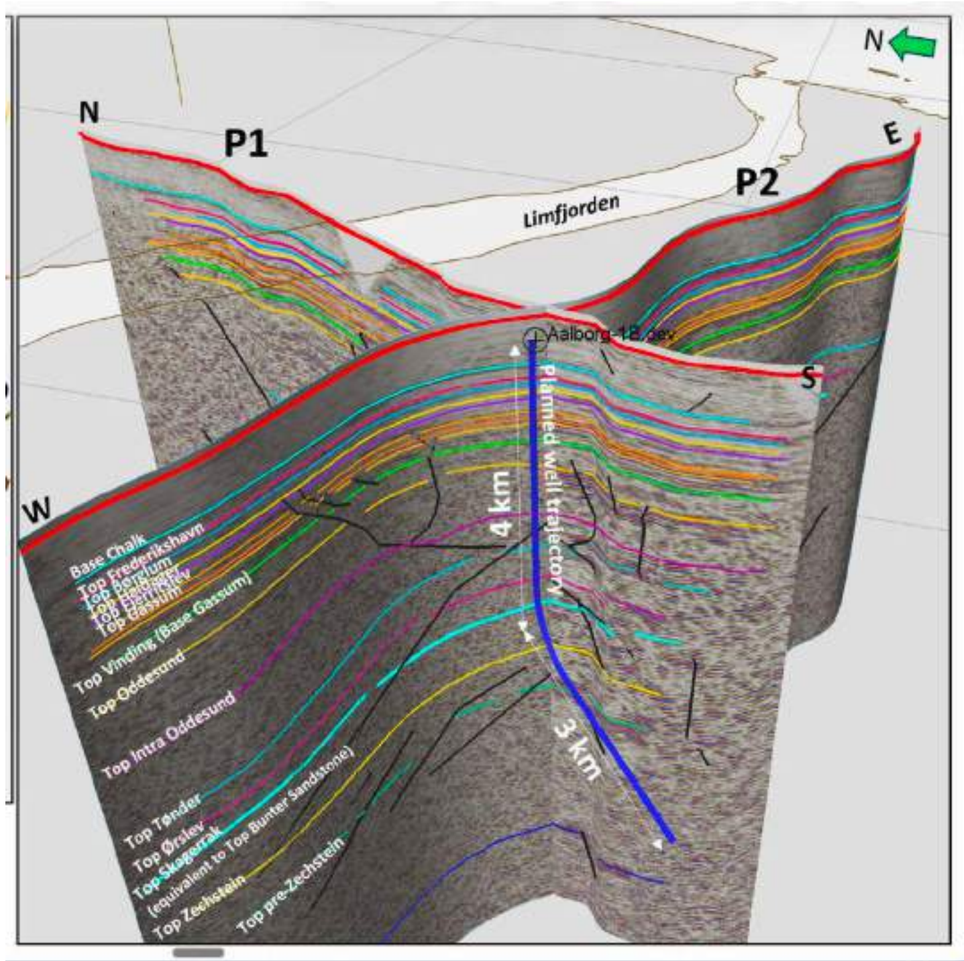
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90 km 2D seismic data acquired spring 2026

Survey map



Seismic panel



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Aalborg-1 well (Denmark)

Aerial view of the well site and drilling conductor to 50 m





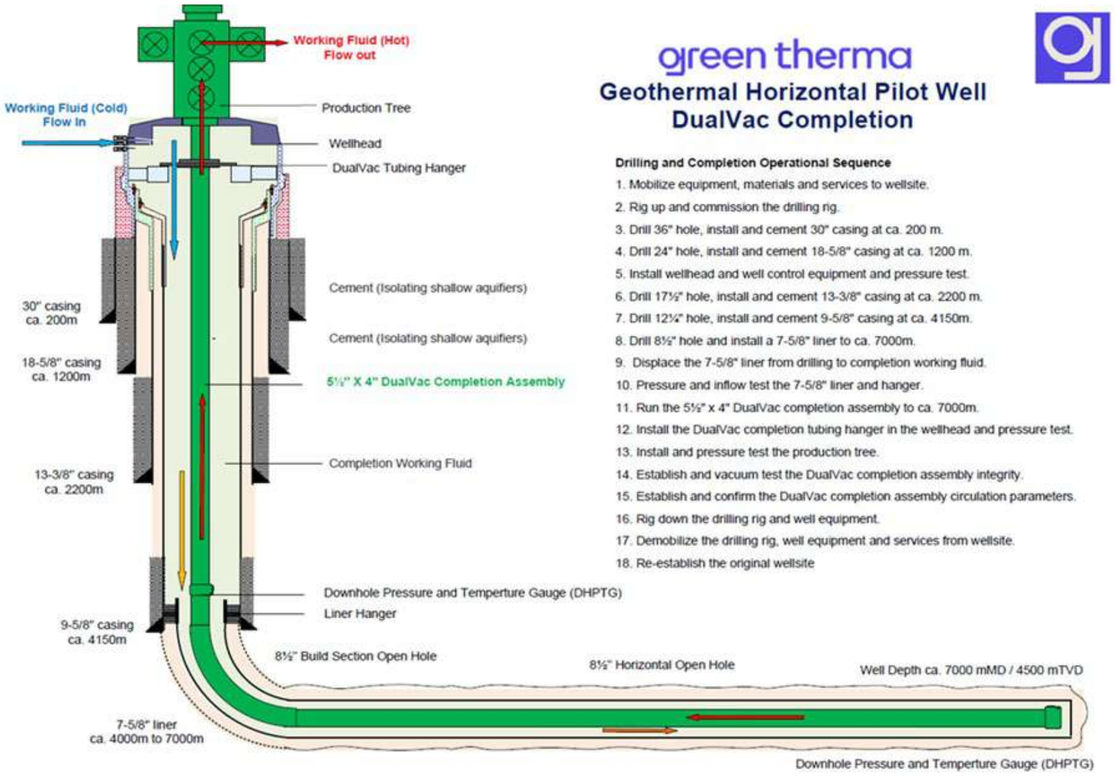


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Aalborg-1 well (Denmark)

Well design and geological model

Conceptual well design



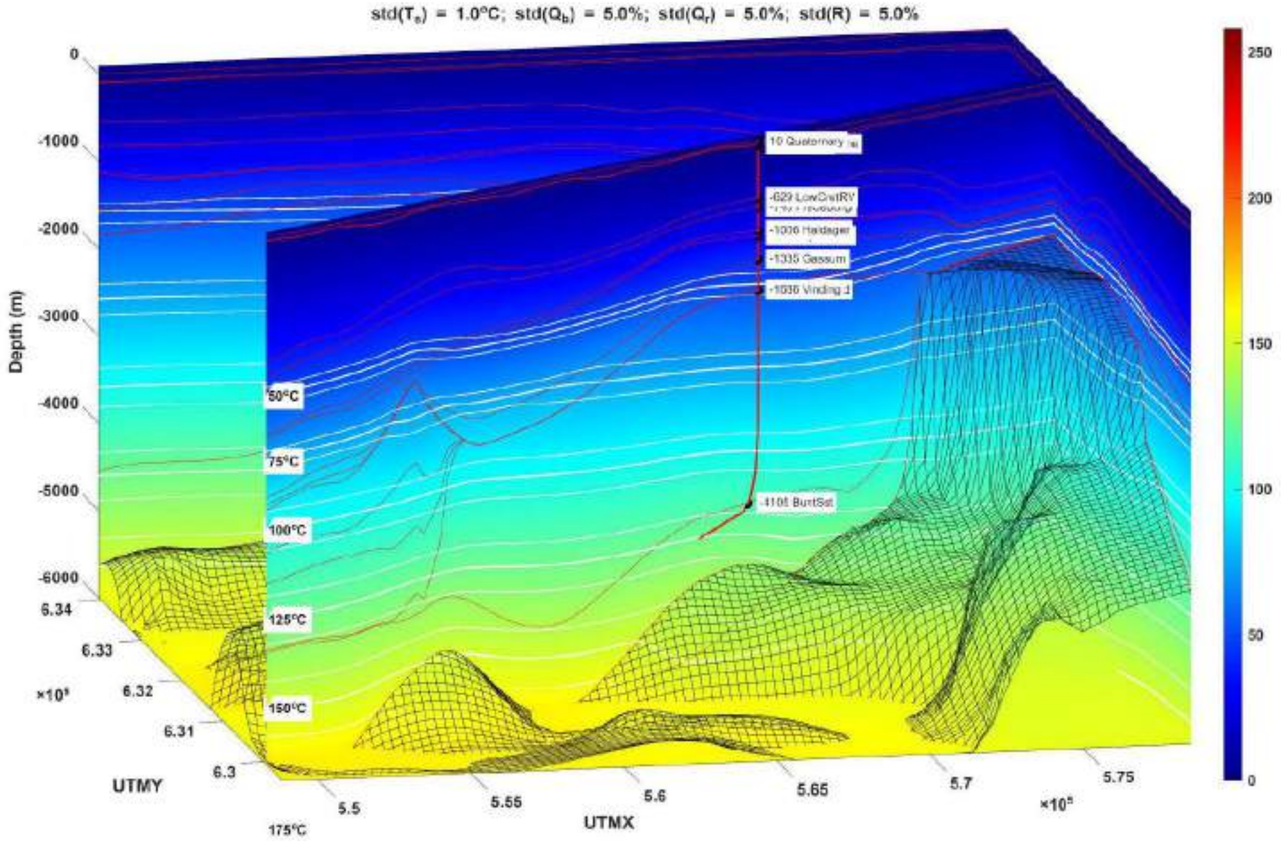
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Geothermal Horizontal Pilot Well
DualVac Completion

Drilling and Completion Operational Sequence

1. Mobilize equipment, materials and services to wellsite.
2. Rig up and commission the drilling rig.
3. Drill 36" hole, install and cement 30" casing at ca. 200 m.
4. Drill 24" hole, install and cement 18-5/8" casing at ca. 1200 m.
5. Install wellhead and well control equipment and pressure test.
6. Drill 17½" hole, install and cement 13-3/8" casing at ca. 2200 m.
7. Drill 12¼" hole, install and cement 9-5/8" casing at ca. 4150m.
8. Drill 8½" hole and install a 7-5/8" liner to ca. 7000m.
9. Displace the 7-5/8" liner from drilling to completion working fluid.
10. Pressure and inflow test the 7-5/8" liner and hanger.
11. Run the 5½" x 4" DualVac completion assembly to ca. 7000m.
12. Install the DualVac completion tubing hanger in the wellhead and pressure test.
13. Install and pressure test the production tree.
14. Establish and vacuum test the DualVac completion assembly integrity.
15. Establish and confirm the DualVac completion assembly circulation parameters.
16. Rig down the drilling rig and well equipment.
17. Demobilize the drilling rig, well equipment and services from wellsite.
18. Re-establish the original wellsite

Well trajectory in geological model



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Aalborg-1 well (Denmark)

Well plan

Timing	Action
Q3–Q4 2026	Well site under construction
December 2026	Rig arrives
Q1 2027	Drill and complete 7 km well: • 4.5 km vertical • 2.5 km lateral
April 2027	• Heat production directly to local grid • No heat pumps • 1.5 MW @ 80 °C

Rig contracted



Green Therma Awards Drilling Rig Contract to H&P for Aalborg Heat4Ever™ Demonstration Project

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Germany project opportunities in development

District heating



Research project – salt with Kiel University



Repurposing suspended geothermal well



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Strategic Business Network

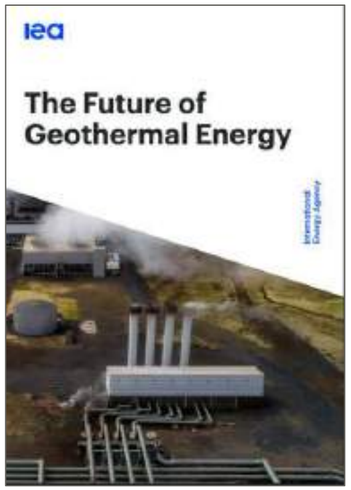
From a science project to an engineered product

Well services

Rigs

Pipes

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International Energy Agency (2024)

Key statements

“Up to 80% of the investment required in a geothermal project involves capacity and skills that are already common in the oil and gas industry”

“With the right policy support, innovation backing and simplified permitting, the cost of next-generation geothermal could fall by as much as 80% by 2035”

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Thank you

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