

Hengill, Iceland

KEY STATS:

- Number of SHR wells drilled: 2
- Deepest well: 2,398 m
- Hottest well: >380°C



PROJECT DETAILS:

Reservoir Lithology

Hengill and the Nesjavellir geothermal field consists of alternating successions of hyaloclastites and tholeiitic lava sequences. Intrusive rocks dissect the succession below ~800 m depth below sea-level. These are mostly basaltic dikes or inclined sills, although some shallow intermediate intrusions are also present. The diorite intrusions are considered to be one of the main intrusive related aquifers in the Nesjavellir reservoir (Franzson, 2000).

Geological Setting

The Hengill volcanic system consists of Mt. Hengill and SSW-NNE oriented fissure swarm intersecting it (Gunnarsson et al., 2022). This volcanic system is ~0.4 million years old (Galeczka et al., 2022). The surface rocks in the area are mainly basaltic hyaloclastites (breccias) deposited during glaciation and interglacial periods. The bedrock consists of alternating layers of hyaloclastites and olivine tholeiite lava flows (Fredkicksen et al., 2022). Intrusive rocks, mainly dikes and or inclined sills, are common at ~800 m below sea level and become more dominant at ~1,700 m below sea level (Franzson, 2000, Galeczka et al., 2022).

Tectonic Setting

Extensional, Mid-Ocean Ridge: The Hengill area is located at a divergent plate boundary between the North American Plate and the Eurasian Plate. The Hengill area is situated at a triple junction within the Mid-Atlantic ridge and is the meeting point of the Reykjanes Peninsula Volcanic Zone, the Western Volcanic Zone and the South Iceland Seismic Zone (Foulger, 1995). Iceland and the mid-Atlantic ridge are unique due to the positive dynamic topography of the Iceland hotspot, a deep mantle plume. While Iceland is a shallow oceanic plateau which is subaerial, the crust is dominantly classified as thick oceanic crust.

Projects/Players

The IDDP project is investigating the Hengill area as the location for the third IDDP project.

- Iceland Deep Drilling Project (<https://iddp.is/>)
- The project is looking for funding to proceed.

There is also an existing power plant located in the Hengill area. The Nesjavellir high temperature geothermal field has been under production since 1990 and has a capacity of 350 MWth and 120 MWe, producing ~1,000 GWh annually, assuming capacity of 95%. This power plant is owned and operated by ON Power.

Notes

- NJ-32 observed the highest concentration of Hydrogen (H₂) rich gas (>80% by volume). Normal H₂ content in geothermal steam at Nesjavellir ranges from about 4 to 33% volume% and “typical” H₂ content of geothermal steam in Nesjavellir is between 20 and 30 volume% (Fredricksen et al., 2022). Prior to NJ-32 the maximum reported H₂ was 33% in NJ-16. Fredricksen et al (2022) assumed acid dissolution of the steel liner was responsible for the anomalous H₂ concentrations in NJ-32.
- Hellisheidi which is only 11km from Nesjavellir. The [Hellisheidi geothermal power plant](#), the largest power plant (by capacity) in Iceland, sits in the Hengill region. It is a flash steam plant owned by ON Power. It sits on a green energy campus that includes Climeworks’ direct air capture facility, the CarbFix carbon capture facility, as well as planned hydrogen production. Its generation capacity is 303 MW, and electricity production at Hellisheidi started in 2006. [Learn more](#).

Key References

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Well Name	Year Drilled (planned)	Entities/ Players	Depth (targeted) Meters/Feet	Pressure (targeted) MPa / PSI	Temperature (targeted) °C / °F	Latitude WGS84	Longitude WGS84
NJ-32	2020	ON Power	2,398 m / 7,867 ft	17.4 MPa / 2,524 PSI	354°C / 669°F	64.102370	-21.250300
NJ-11	1984-1985	ON Power	2,265 m / 7,431 ft	>22.0 MPa / 3,191 PSI	>380°C / 716°F	64.107350	-21.262980
IDDP-3	(planned)	IDDP (Landsvirkjun, HS-Orka OR- Reykjavík Energy) and Carbfix, ON Power	(>2,500 m / >8,202 ft)	(>22 MPa / 3,191 PSI)	(>380°C / 716°F)	64.1833	-21.3333

Clean Air Task Force (CATF) is a global nonprofit organization working to safeguard against the worst impacts of climate change by catalyzing the rapid development and deployment of low-carbon energy and other climate-protecting technologies.

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This factsheet is part of a CATF project mapping regions of the world where superhot rock energy has high potential. Learn more, and see all of our factsheets, at catf.us/shrmap/