

# Research and development projects to meet injection demands at Hellisheidi and Nesjavellir

The results of research, development and implementation of projects 2015-2022 is that all separated geothermal water from the geothermal power plants can be reinjected back into the geothermal reservoir. The projects will continue in 2023 with an emphasis on implementing improved techniques. A special effort has been made in the injection at Nesjavellir, but positive results are still awaited.

---

## Hellisheidi Geothermal Power Plant

- Geothermal water has been reinjected into production wells that are not used for steam production since 2015 in Sleggjubeinsdalur Valley and since 2017 in mt. Skarðsmýrarfjall. These injection wells receive a lot of geothermal water. The re-injection is working well and is considered to provide good pressure support to the production fields. In some cases, the nearness of production wells is too great, and efforts are being made to reduce the injection into these wells.
- In late 2016, injection started into wells in the Carbfix site, located outside of the plant's production fields. Injection at the Carbfix area has been stopped and now the injection field is used for carbon dioxide injection from the Orca Plant.
- A new injection well, HN-18, was drilled and commissioned in 2020. The well is drilled from the same drilling site as HE-55 in a south-easterly direction. Injection is going according to plan and no increased seismic activity has been observed in connection with it.
- The impact of re-injection on the geothermal system will continue to be closely monitored, and the arrangements will be changed if deemed necessary due to negative effects.
- ON Power has been operating a seismic network in the Hengill area since 2016. The number of seismometers has varied somewhat over the years, but today ON Power operates 10 seismometers in both Hellisheidi and Nesjavellir with the aim of investigating the interplay between injection, production and seismic activity.
- Furthermore, ON Power participates in various research projects that work on seismic measurements. E.g., one of the goals of the COSEISMIQ project, which was completed in 2021, was to develop methods to minimize seismic activity in high-temperature production fields.

## Nesjavellir Geothermal Power Plant

- The results of tracer tests that began in 2015 and 2018 show that geothermal water discharged in some of the 300 to 600 m deep injection wells connected to the power plant's injection system is found in groundwater and springs by Thingvallavatn Lake. Efforts are being made to keep the mixing between groundwater and geothermal water to a minimum.
- Injection in well NJ-18 started in November 2019. The injection is progressing well and around 10-15% of the geothermal water from the power plant is reinjected into the well. It is considered unlikely that geothermal water will mix with groundwater.
- A new deep injection well will be drilled at Nesjavellir in 2022. The well was successful in all respects, and it is believed that it can receive 150-200 kg/s of injection water. Work is underway to connect it to the power plant's injection supply, and injection will begin in spring 2023. When the well starts operating, 30-40% of the geothermal water from the power plant will normally be reinjected deep down into the geothermal system.
- The effects of re-injection on the geothermal system will continue to be closely monitored and will be re-arrangement if deemed necessary due to negative effects on the geothermal system.
- Thermal images were taken of the shore of Þingvallavatn Lake, where the effects of heat emissions from Nesjavallavirkjun can be seen. Those images gave a clear picture of its distribution and will be used to monitor changes in the distribution of heat when the results of the measures undertaken are evident.