

Geothermal

Environmental Impact Assessments

Environmental Impact Assessments (EIAs) are an important aspect of any geothermal project, from the earliest planning stages through to post- project analysis.



www.geothermal.is

An Environmental Impact Assessment (EIA) of a geothermal project involves comparison with other energy sources that may include fossil fuels, hydropower, nuclear power, renewable energy sources (solar, wind, tide etc.), or no project.

The chief environmental issues in geothermal utilization are:

- Surface disturbance
- Physical effects of fluid withdrawal
- Noise
- Thermal pollution
- Groundwater contamination
- Gas emissions

Iceland GeoSurvey offers EIA services at every stage:

▶ **Monitoring environmental changes**

Monitoring changes in geothermal manifestations in non-producing areas to establish whether changes that occur after the start of production are due to exploitation or to be expected from natural causes. Such studies include mapping, establishment of base concentrations and monitoring of chemical composition of fluids, monitoring surface temperature changes, e.g. by remote sensing.

▶ **Gravity and leveling surveys before utilization**

To obtain a background value prior to utilization followed by monitoring changes due to subsidence caused by mass removal from the geothermal field.

▶ **Groundwater studies**

To establish whether direct discharge of geothermal effluent into the ground is feasible. If this course of action is followed the groundwater in the area needs to be monitored with respect to temperature and chemical composition with an eye to possible changes in flora and fauna.

▶ **Re-injection studies**

Involve thermodynamic calculations and experimental work concerning the danger of deposition if reinjection is the option chosen for the discharge of geothermal effluent. Modeling of reservoir properties that establish the optimum distance of reinjection wells from the production area will be necessary. If they are too close there is a danger of cooling down the fluid in the producing reservoir but if they are too far their role in recharge may become minimal.

▶ **Gas emission monitoring**

Point measurements and monitoring of gases in the atmosphere involve establishing a base level for gases such as H₂S, SO₂ and Hg in the atmosphere followed by monitoring to find out whether recommended levels are being exceeded or not.

Contact: Bjarni Richter - br@isor.is

