



STATEMENT OF ORIGIN – VEITUR UTILITIES DISTRICT HEATING IN 2023

It is hereby confirmed that in the year 2023, Veitur Utilities supplied its customers of district heating, in the municipalities listed in Table 1, hot water from 100% renewable sources. The water used in Veitur Utilities district heating networks comes from one of two sources, (a) natural geothermal water from low temperature fields or (b) heated cold groundwater from high temperature fields. A more detailed description can be found below:

- a. Natural geothermal water from low temperature geothermal fields. Low temperature fields are located outside of the volcanic zones in Iceland. The temperature in the fields is mostly between 50 and 150°C. The geothermal water is originally precipitation, forming groundwater that heats up due to contact with hot rock, usually at around 1 to 2 km depth. Then water is also slightly enriched in dissolved solids as it reacts with the surrounding hot rock. The benign chemistry of the waters allows them in most cases to be used directly for space heating, tap water, for spas and industrial uses.
- b. Heated cold groundwater from high temperature fields. High temperature fields are located within the volcanic zones in Iceland. The temperature in the high temperature fields is >200°C and can reach 380°C. The mixture of steam and water coming from high temperature fields is originally precipitation. The cold groundwater heats up at 1 to 3 km depth up to 200 – 400°C. Due to the high temperatures and high concentrations of dissolved solids the liquid cannot be used directly by the consumer. Instead, fresh cold groundwater is heated up in condensers and heat exchangers inside a power plant. The only chemical treatment is allowing the water to boil under vacuum conditions and adding a minute amount of steam to control the pH of the water and getting rid of oxygen to prevent corrosion in pipes and radiators.

NOx in district heating network

Geothermal water supplied for space heating in the Reykjavík area and neighboring communities, is originally cold groundwater, which is heated by natural processes in the Earth by hot magmatic intrusion in low temperature fields or in man-made heat exchangers on the surface in high temperature fields. The concentration of NO₂ and NO₃ in fresh groundwater is below detection limits (<0,01 ppm), which is far below allowed concentrations in water for human consumption. NOx gases are usually produced from the reaction of nitrogen and oxygen during combustion of fossil fuels, such as hydrocarbons, at high temperatures in the presence of atmosphere. No such combustion is used for producing hot water for space heating in Reykjavík. The source water contains no NOx compounds, the heating process does not involve the combustion of fossil fuels nor adds any NOx compounds.



Table 1. Veitur's district heating areas and production in 2023.

District Heating Area	Source	Total production in 2023 (TJ)
Reykjavík	Geothermal	9,568.1
Kópavogur	Geothermal	2,357.6
Hafnarfjörður	Geothermal	1,782.2
Garðabær	Geothermal	1,134.4
Akranes	Geothermal	441.7
Þorlákshöfn	Geothermal	330.2
Borgarnes	Geothermal	275.5
Hveragerði	Geothermal	230.0
Kjalarnes	Geothermal	209.1
Bessastaðahreppur	Geothermal	170.5
Grímsnes	Geothermal	169.6
Stykkishólmur	Geothermal	126.9
Hella - Þéttbýli	Geothermal	88.6
Hvolsvöllur - Þéttbýli	Geothermal	84.4
Akranes og Borgarnes - Dreifbýli	Geothermal	83.7
Bláskógabyggð	Geothermal	79.5
Hella - Dreifbýli	Geothermal	57.1
Ásahreppur	Geothermal	54.8
Austurveita	Geothermal	36.0
Ölfus	Geothermal	34.5
Skorradalsveita	Geothermal	33.7
Hvanneyri	Geothermal	26.8
Munaðarnes	Geothermal	26.0
Bifröst	Geothermal	21.6
Norðurárdalur	Geothermal	19.3
Mosfellsbær	Geothermal	12.7
Hvolsvöllur - Dreifbýli	Geothermal	8.2
Seltjarnarnes	Geothermal	0.6
Veitur Utilities total	Geothermal	17,463.3

Respectfully,

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