

**Hveragerði : The town that pioneered  
utilization of geothermal steam in Iceland**

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**Greinargerð SP-95/-**

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## The town that pioneered utilization of geothermal steam in Iceland By Sverrir Thorhallsson

### HVERAGERÐI

Much of the pionering effort in harnessing geothermal steam in Iceland took place in the community of Hveragerði (pop. 1500). That inland village in the south, in fact, developed because of the easy access to geothermal heat. Without going into details, some of the highlights of geothermal utilization in Hveragerði are listed below:

1929: The **greenhouse farm** of Fagrihvammur started operation. It was the first such farm in Iceland to use geothermal heat. Now over 40 hectares are under glass in Hveragerði.

1930: A **dairy** was established to pasteurize milk and evaporate whey to produce brown whey cheese. The dairy merged with another co-op dairy in 1938 and was shut down.

1937: A geothermally heated **swimming pool** was built for the community. The water was piped directly from a nearby thermal spring to the pool.

1938: The **State Horticultural College** was established. It gave strong impetus to greenhouse farming based on geothermal heat.

1938: Tests were carried out to **dry hay** on a grid of pipes with forced air circulated. The test was successful, but the cost of transporting the grass to the plant was considered too high.

1939-1941: A plant to **dry sea-weed** was built. Drying took place on three tiers of steam-heated pipe grids. Because of insufficient demand for the product, the plant was converted to a wool scouring plant, and it served for a time as a laundry for British soldiers during World War II.

1940: First **geothermal well** was drilled to 34 m depth 3 m away from the thermal spring at the greenhouse farm of Fridarstadir. The output was reported to be 0.5 l/s of steam and water. For the next four years, 15 new wells were drilled to a max. depth of 70 m.

1944: The first small **geothermal turbine** was tested for a short period on a well at the farm Reykjakot, with an output of only a few kilowatts. A 35 kW specially purchased steam turbine was operated at the same location for one year (1946).

1946: A **freezing-plant** for vegetables was built based on absorption refrigeration and the use of geothermal heat. Due to various equipment problems, the project was discontinued.

1947: Slow **baking** of rye bread ("hverabrauð") or pumpernickel was started on a commercial basis; the baking forms were simply buried in the steaming ground.

1947: A **wood drying** kiln was built to serve a local carpentry shop.

1947-1952: Extensive shallow **exploratory drilling** was carried out by the newly incorporated village of Hveragerði and the state. The maximum temperature logged was 220°C, and promising steam finds were made.

1953: Municipal **district heating** was started. Earlier, private systems were in extensive use for domestic and greenhouse heating. Around 1955 a two-pipe district heating system was laid, with a heat-exchanger at the steam field. Due to corrosion problems caused by inadequate deairating of the feedwater, a single-pipe system was adopted in 1973. Two deep wells drilled in 1960 outside town were connected to the system. Flashed water was piped directly to the system, but rapid precipitation of silica created problems in the pipes and home heat-exchangers. In 1974 mixing of fresh-water into the flash tank was started to dilute the geothermal water. Some scaling of magnesium silicate continued so in 1979 mixing of steam only with a fresh water was started. Direct use of steam and water from the shallow wells in town continued on some scale.

1955-1965: A **concrete block** and pipe plant was operated, using geothermal steam to cure the concrete.

1955: The vegetarian **health spa** using steam and mud baths was opened. A large home for the aged is also located in Hveragerði.

1956: **Production wells** for the district heating service were drilled. These wells are located within the town and have been in continuous use. The wells are cleaned of calcite deposits once or twice a year.

1958-1961: drilling of eight deep geothermal wells with new drilling rig ("Gufubor") to a depth of 300-1200 m. Plans were made for a 15 MW geothermal powerplant. Sufficient steam was produced, but the project was abandoned in favour of a larger hydro-electric scheme (Búrfell 210 MW). Six of the wells were productive, but only two have been put to use (district heating). One well is allowed to discharge freely during visits by dignitaries for dramatic demonstration of the geothermal resource.

1963: The Eden greenhouse complex that includes a flower shop and a restaurant started operation. It soon became a magnet for **tourists**.

1964: A modern wool washing plant was built. The annual capacity is 300 tons of wool. The washing is done at 45-55°C and air drying at 60-70°C.

1964: A vacation resort owned by labour unions taps a private well for space-heating of 37 cottages and a swimming pool.

1967-1968: A **cheese plant** was operated, but went out of business due to disagreement over raw-milk supplies. The plant was converted for production of **ice-cream**.

1975: Plant to **dry fish** was built. Initially, it handled salted codfish, but later capellan and cod-heads. The drying kilns are of the tray-type, and in 1980 a new belt dryer was

added. The temperature of the drying air is 25°C. In 1982 the plant was forced to close due to complaints from the townspeople about fish odour.

1979: A Candy factory was established, using steam jacketed-kettles.

1979: A plant to dry "harðfisk", a traditional Icelandic delicacy, was set up.

1983: A plant for drying stockfish items was set in a vacated fish farm building on the outskirts of town.

1983: Plans are being made to produce thin-walled polystyrene food containers.

**Abandoned (or temporarily suspended) plans for geothermal utilization:**

Production of fishery salt by evaporating sea-water (1952).

Production of heavy water by multiple evaporation (1960).

Refining of sugar from raw sugar (1962).

Production of electricity (1963).

Production of building sealants (1974).

Refining of sugar from molasses raw stock (1978).

Growing of chrysanthemum seedlings for export (1977).

Production of cosmetics from local clays (1980).