THE HISTORY OF HOT WATER

Reykjavik Energy

The History of Hot Water

From the washing pools to the geothermal fields

Reykjavík District Heating (now Reykjavík Energy) began operations in 1930. Initially, the hot water was extracted from boreholes in the Laugardalur area but later on drilling began in Mosfellssveit, Laugavegur and by the Elliðaár River. In 1990, the geothermal water supply in Nesjavellir was utilised and groundwater was heated up and transported to the capital. In 2010, the heating utility in Hellisheiði began operations.

Over 80 years have passed since hot water was first supplied to the public and water resources have been accessed throughout a widespread area during this period, from the low temperature areas found in the capital and neighbouring countryside and right up to the high temperature areas in the Hengill geothermal area.

The economic evaluation of the 2012 national dividend of Icelandic geothermal energy was valued at 55 billion each year. This could reach up to 95 billion.

Hydrothermal aqueduct from Mosfellssveit to Reykjavík

Widespread Doubts

The district heating endeavour receives widespread attention

Construction of the first geothermal heating utility began in Laugardalur, in 1930 and hot water was first supplied to Austurbæjar School in November of that same year. However, the old heating unit was not abandoned; for fear that the new system could fail. Other large residencies in the Reykjavik centre followed suit, including the University Hospital in 1931, the Sundhollin Swimming Pool in 1934 (who were supplied with free water) and Laugarnes School in 1935. Geothermal research began in the Reykir area in September, 1933 in order to meet the increased demand for supply. Fifty eight houses had been supplied with hot water by 1937.

The initiative was initially met with public concern but the residents of Reykjavik and the local farms were quick to demand access to the much anticipated new district heating supply. It was not until the Second World War that the scale of the geothermal project grew, especially in the oil crises of the seventies, when Reykjavík's neighbouring districts were connected, one by one.

The district heating endeavour received widespread attention from neighbouring countries in the first few years and many asked for expert advice on how to supply domestic heating, and what experience had been gained from the adventure.

Some of the most important events in the history of the district heating endeavour are the opening of Reykjaveitan in Mosfellsbær, in November of 1943, the production of hot water in the high temperature Hengill area in 1990 and the opening of the Nesjavellir Power Plant. Reykjavík District Heating purchased the land in Nesjavellir in 1964 in order to ensure an on-going water supply for future generations.

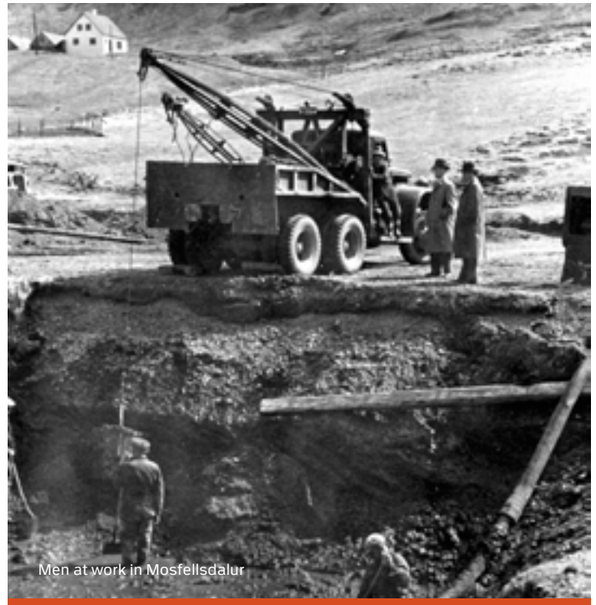
The largest geothermal energy source can be found on the surface of the area south of Nesjavellir and efforts were made to explore the area. The Nesjavellir Power Plant was initially the country's largest geothermal power plant and today produces nearly half of all the hot water used in the metropolitan area. The capacity of the plant is 1640 l / s of 85 ° C water; equivalent to 300 MW of thermal energy.

In December, 2010 the first stage of the Hellisheiði Power Plant was completed and came online. The station was designed with the specific goal of increasing the production of hot water for district heating purposes. The construction of Nesjavellir Power Plant has been completed and the hot water supply from the station is now utilised to full capacity.

This first stage at the Hellisheiði Power Plant provides 133 MW and the water is transported via a new underground pipeline and pumped to collection tanks in Reynisvatnsheiði.

Geothermal water from the low-temperature area is directed straight into the distribution system and the geothermal energy is used to heat cold groundwater, which is then supplied to Reykjavik, Kópavogur and Garðabær. The district heating system in Akranes and Borgarfjarðar (which is now owned by Reykjavík Energy) supplies its local area with hot water. Reykjavík Energy also owns heating utilities in regions in the south and west of Iceland, including Stykkishólmur, supplying hot water to the summerhouses in the area.

Reykjavík Energy supplies over 200.000 residents and a number of businesses in the south and west of Iceland with hot water. Over 80 million cubic metres of hot water is produced annually. 80 years of experience and expertise have enabled Reykjavík Energy to create the powerful district heating supply, enjoyed by Icelanders every day.



Men at work in Mosfellsdalur

In the autumn of 1944, New Zealand requested information and advice on how to heat up entire urban areas. New Zealand has one of the largest geothermal resources in the world today but had not been as successful in harnessing the natural resource during this period.

One of the best-known names of the 20th Century, Winston S. Churchill, Britain's prime minister came to Iceland in 1941. He referred to the hot springs in Reykjavik, used for heating in his war stories

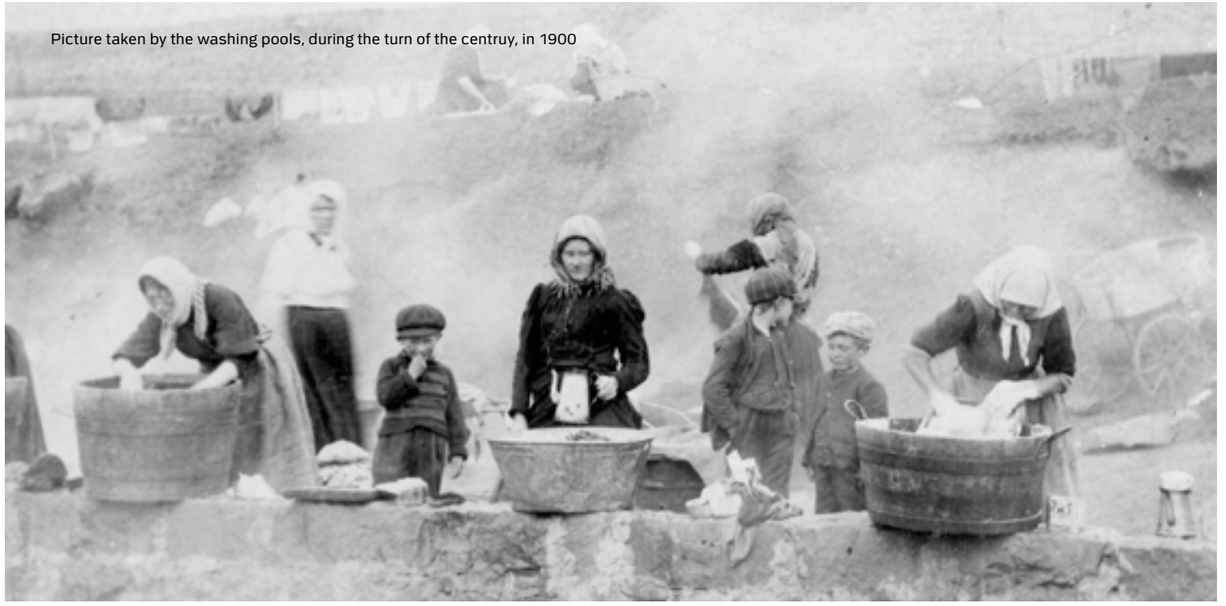
Source: History of Reykjavík District Heating 1928-1998.

The District Heating in Akraness and Borgarfjarðar (HAB)
The richest water resource over the greatest distance

The origins of the district heating in Borgarfjörður can be traced back to the 7th decade of the twentieth century when the evaluation of geothermal resources began in the area. Initial attempts were unsuccessful but the Borgfjörður and Akranes residents soon discovered that the Deildartungu hot springs could provide an economical means of supplying hot water to the area. Akranes and Borgarnes entered into a joint venture to provide district heating, abstracting hot water from the Deildartunguhver hot springs which are considered to be the most voluminous hot springs in Iceland, and perhaps worldwide. The temperature of the hot springs can reach 100°C and they produce 180 litres of water per second. The heating utility was officially established in 1979 at Hvanneyri and the equity ratio was divided equally between the two parties, in accordance with the population in each area. The hot water supply pipeline is the longest in the country, covering a distance of 64km between Deildartunga and Akranes.

Financial difficulties overshadowed the success of the first years of the geothermal heating utility and the venture was mostly financed by foreign loans. These circumstances made it one of the most expensive heating utility units in the country in the mid-nineties. Eventually the unit was divided up, with the intervention of the state.

At the turn of the last century, HAB merged with Reykjavík Energy.



Picture taken by the washing pools, during the turn of the centruy, in 1900

Multiplied Capacity and Increased Expertise

From 15 litres per second to 5000

Production has increased considerably since the early years of the venture. Only 15 litres per second could be extracted back when Laugaveitan was the only source, but today over 5000 litres per second, reaches over two thirds of the Icelandic population. It is considered to be one of the largest district heating utilities in the world.

Many obstacles have been overcome during this 80-year journey and a great deal of controversy surrounded the initial financial backing for the venture. There were allegations of hidden agendas being forced by local council members, on the behalf of government agencies and coal merchants. Shortly before Nesjavellir Power Plant began operation, water shortages had become a cause for concern. Low-temperature areas were heavily utilised and the situation was stabilised once Nesjavellir began operation. Research on this period of aggressive utilisation has proven invaluable in estimating the sustainability of geothermal natural resources and has received attention worldwide.

History has taught us that the responsible and sustainable use of geothermal areas is of the utmost importance. Experience has also provided invaluable knowledge in the design of distribution systems, the choice of materials in pipelines and effective isolation measures.

Coal cloud over Reykjavík, before the days of district heating

The Common Cold Surrenders

Domestic heating and better health

The victories achieved over eight decades have included more than just the reliable and secure supply of hot water to domestic households. The benefits were far reaching and included the substantial reduction of registered cold viruses in Reykjavík, reducing the figure from 22 cases per 100 residents in 1937 to only 4 cases per 100 residents in 1948. This was mostly attributed to the increased average temperature in domestic households as a result of the new heating system. However, the increase in temperature meant that basements used for storing potato supplies became overheated and so the decision was made to build potato storage units at Ártúnsbrekka. These storage units still exist but are today used for other purposes. The benefits of hot water in today's modern society include the heating of streets and pavements, not to mention the invaluable hot water supply utilised by the public swimming pools and used by so many Icelanders.

Modern day Reykjavík

Quality of Life

Hot water and clean air

Today, Icelanders consider heating their homes with cheap hot water, passing the time in geothermally heated swimming pools, all year round and inhaling pure air as a part of their normal daily life. Heating utilities of this kind also dramatically reduce exhaust emissions that would usually be produced by oil or coal heating.

Before geothermal heating became a reality, there was often a thick black cloud of smoke covering Reykjavik. This is now ancient history, but in addition to the positive environmental impact of the geothermal water supply there have been tremendous financial benefits, as heating costs in Iceland are far lower than that in the other Nordic countries.

Hot water has played an important role in recent decades in improving health and the general quality of life in Iceland.

Washing laundry in the washing pools of Laugardalur.

The average family in an apartment block in Reykjavik uses about 500 tonnes of hot water per year; equal to almost one fifth of the volume of the largest swimming pool in the Laugardal Swimming Pool.

Timeline

1930
Reykjavík District Heating established

1933
Research on geothermal areas in Reykir begin

1943
Reykjaveita in Mosfellsdalur begins operation

1930
Water supplied to Austurbæjarskólann School from water wells in Laugardalur

1979
District heating in Akranes, Borgarfjörður (HAB) established

1990
The production of hot water from the geothermal area in Hengill begins (Nesjavellir)

2001
HAB merges with Reykjavík Energy

2010
First phase of Hellisheiði Power Station completed

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