



INTERNATIONAL WATER RESOURCES ASSOCIATION'S  
1<sup>st</sup> ISLANDS WATER CONGRESS  
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*International  
Water Resources  
Association*



JARÐFEINGI  
Faroese Geological Survey

# The first “very-low-temperature” geothermal district heating in Iceland?

A case study from Patreksfjörður, Westfjords, Iceland

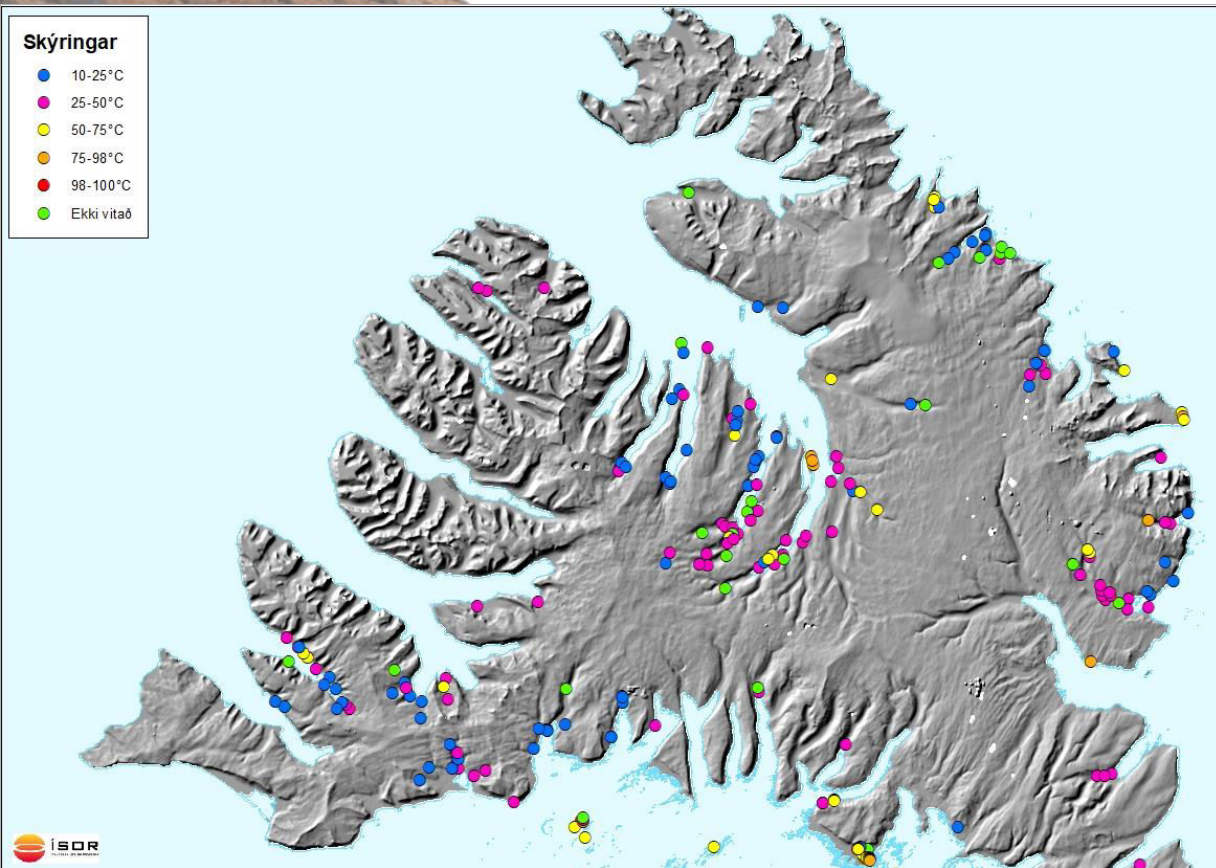
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Iceland GeoSurvey





# Geothermal activity in Westfjords



- Geologically the oldest part of Iceland (8-16 million years old)
- Widespread geothermal manifestations
- Testimony of exploitation
  - Klúkulaug
  - Spa in Reykhólar
  - Gvöndarpool in Tálknafjörður
  - Swimming pool and swimming lessons in Reykjanes from 1837
  - Saltwork experiments begun at Reykjanes and Reykhólar around 1770
- Populated areas not sited near geothermal activity (more likely based on fishery)

# Geothermal utilization in westfjords

## Geothermal district heating – direct use

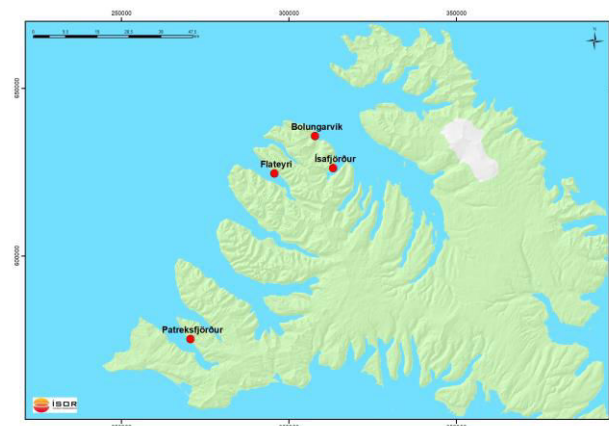
- Suðureyri
- Reykhólar
- Drangsnes
- Tálknafjörður (partly)

## Central boilers (electricity/oil) for district heating:

- Ísafjörður
- Flateyri
- Bolungarvík
- Patreksfjörður

## More geothermal utilization in the Westfjords:

- Fish industries (e.g. Nauteyri)
- Swimming pools
- Other smaller users: Heydalur, Vatnsfjörður, Krossholt, Bjarnarfjörður etc.





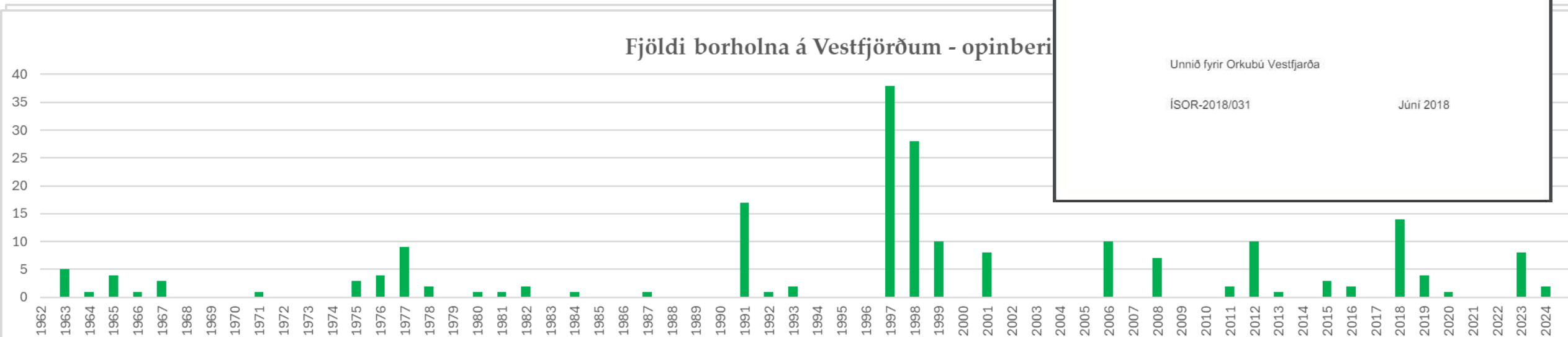
# Long History of Research

Observations, researches and drilling has a long history

Some periods with no geothermal prospecting

Report from 2018, evaluation of geothermal possibilities of almost all the towns in Westfjords

Last 6 years of researches based on this report



# The Village of Patreksfjörður

~ 750 inhabitants

Chief occupation is fishing and fish processing, tourism is on the rise

Currently electrical district heating (district heating with centralized boiler)

- Closed loop
- Occasionally switched to oil

Geothermal manifestations known; geothermometers suggest  $< 50^{\circ}\text{C}$





# Patreksfjörður

First wells drilled in 1976 and 1986/87

Total of 15 wells drilled until 2018, most of them shallow gradient wells (< 100 m)

The wells revealed a lot of water in the bedrock which is unusual for bedrock of this age in Iceland

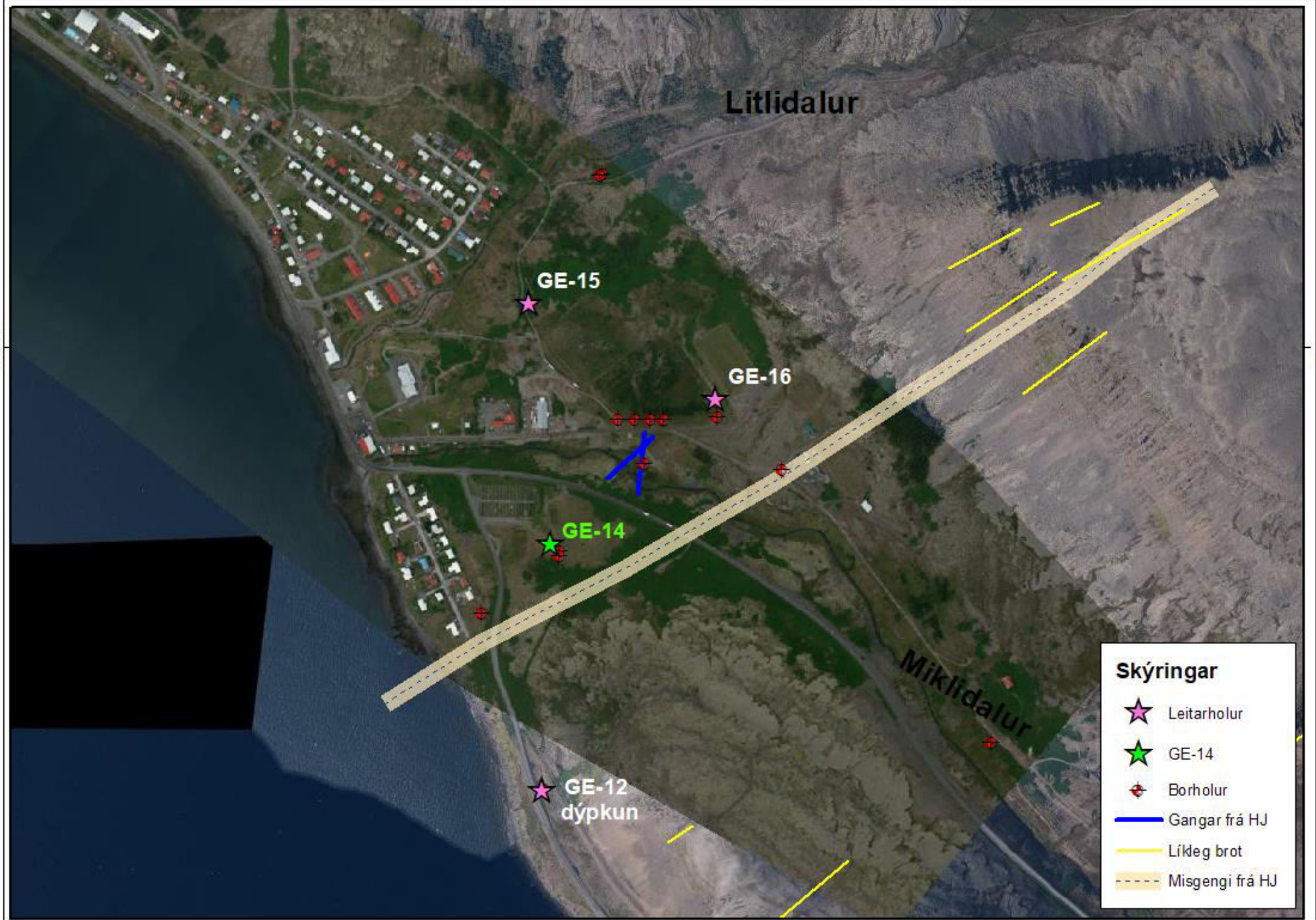
Main goal was > 70°C water → no success

Geothermal exploration last six years:

- With better understanding of the potential value of “extra-low” temperature water, the focus was put on 25-50°C water and heat pumps
- All wells revised, some measured again
- Production well was located and drilled (oct 2023).
- Two gradient wells drilled to map the extension of the area
- Work in process



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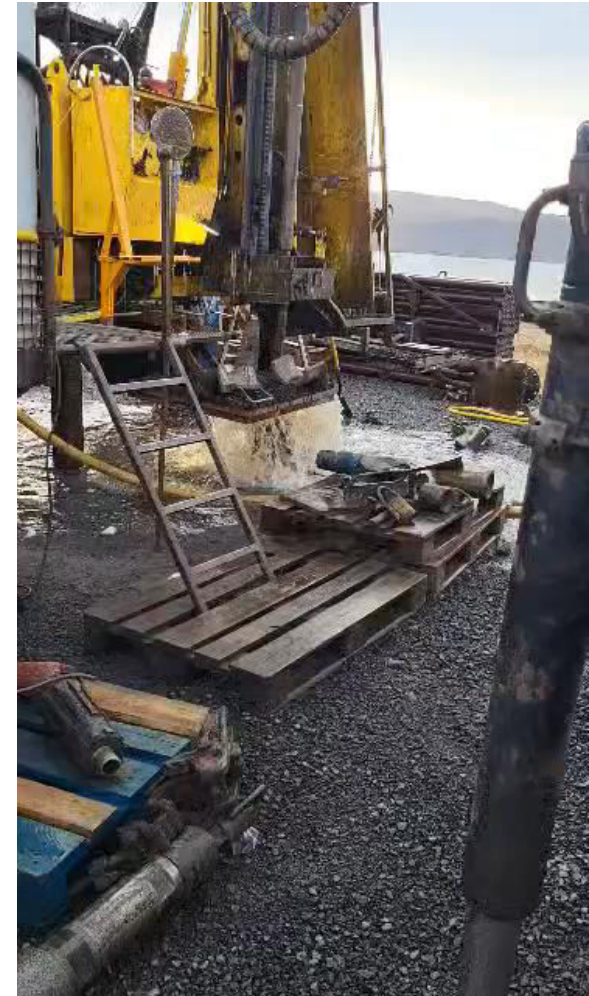


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# The first production well in Patreksfjörður, GE-14

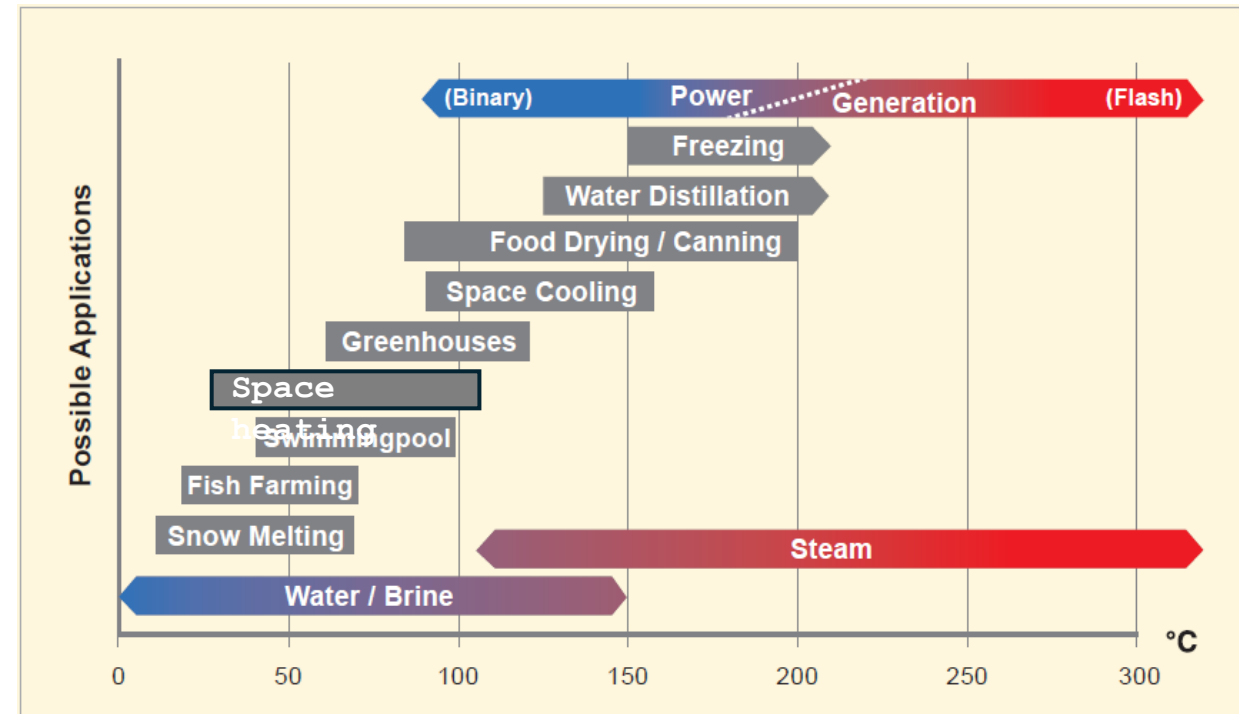
- Planned as 200 m deep but ended in 108 m due to broken drill bit
- Water temperature ~ 25°C
- Amount > 30 L/s



# The main goal

- A pioneering project in usage of extra-low temperature water for district heating in Iceland
- Diminishes electrical use greatly and phases out oil usage
- Paves the way for other similar possibilities in other areas in Iceland

Source: Gehring and Loksha,  
Geothermal Handbook:  
Planning and Financing Power  
Generation, ESMAP 2012





Thanks 😊



Photo: Finnbogi Óska