

Fixed Network solution for geothermal district heating

Selfossveitur (Iceland) Customer Case

46° C

19,637 kWh

55° C





ABOUT THE CUSTOMER

Selfossveitur supplies district heating and hot water to the municipality of Árborg in Southern Iceland, including the towns Selfoss, Stokkseyri and Eyrarbakka. The independent company is owned by Árborg; its main task is building and operating the municipality's supply systems. The district heating service draws hot thermal water for domestic heating and hot water from three reservoirs located at a depth of 1,000 metres which provide hot water at temperatures of 100 to 120°C. The most recent of these reservoirs is located in the town of Selfoss itself, close to the bridge over Ölfusá.

With 8,068 inhabitants Selfoss is the largest town in southern Iceland and an important commercial centre for the island state. Árborg is the fastest growing municipality in Iceland. It has seen large-scale construction of district heating systems and thus increased production of hot geothermal water, of which the region is so rich.

GEOTHERMAL ENERGY IN THE LAND OF FIRE AND ICE

Iceland is one of the front-runners when it comes to utilizing renewable resources for electricity and heat: Nearly 100 % of the electricity consumed in this small country with a population of 330,000 is generated from renewable sources; 9 out of 10 households are heated directly with geothermal energy.

The country is one of the most geothermally active locations in the world, with many active volcanoes. Underground magma rivers producing hot water and steam and many geysers and hot springs are ideal sources of geothermal energy. Iceland started using this energy for district heating nearly 100 years ago. Since then, the country has become a global leader in geothermal district heating. Clean air and very little CO₂ emissions are the main benefits of using geothermal energy for space heating. The energy is available 24/7 rain or shine and has the highest efficiency rating of any renewable, making it essential for the energy transition.



**FUTURE-
PROOF**
SUSTAINABLE
SOLUTIONS

The Fixed Network solution with SHARKY 775 heat meters grants exact readings. Moreover, customers are informed about their consumption patterns and can adjust them as needed.



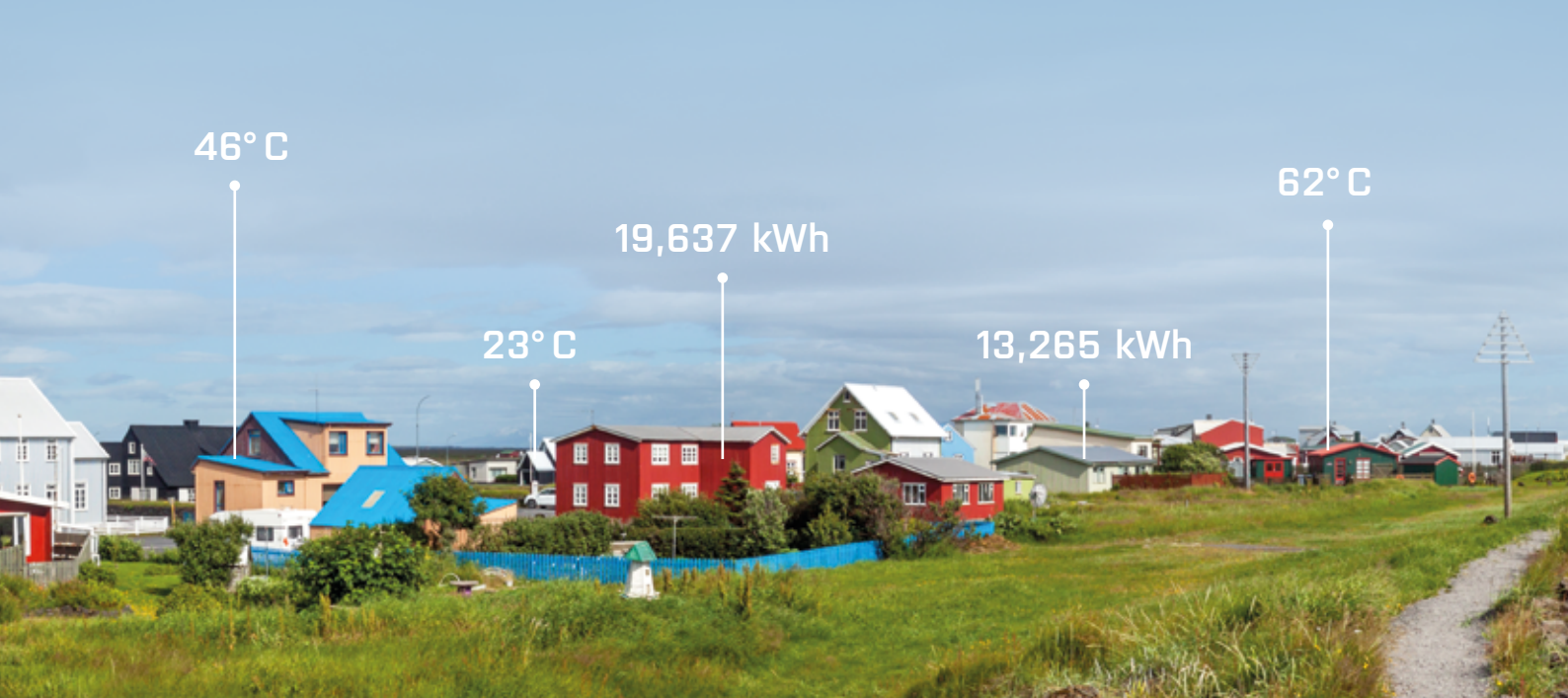
2 MIO
TONS OF CO₂
SAVINGS

per year in Iceland thanks to house heating with geothermal.



90%
HOUSEHOLDS HEATED
WITH GEOTHERMAL
ENERGY

The benefits: clean air and very little CO₂ emissions.



THE CHALLENGE: COLLECT DATA REGULARLY AND AUTOMATICALLY


For the town of Selfoss and the surrounding area with the villages of Eyrarbakki and Stokkseyri, the district heating supplier Selfossveitur wanted to implement smart ultrasonic heat meters. The existing non-communicating heat meters were read out manually only once a year. Due to incorrect readings and the lack of accurate data, the utility had to estimate billing based on the consumption of the previous year. As a consequence, customers could not monitor their consumption during the year in order to adjust consumption patterns if needed. The lag in collecting and assembling data also made it impossible for Selfossveitur to

conduct advanced analyses like detection of leakages or pressure drops in the distribution network.

Geothermal hot water with its very high chlorine and sulphur level is very demanding for heat meters. From a metrology perspective, the heat meters must perform reliably and their measuring accuracy should not decrease over the years. That was the problem with the mechanical meters used so far and resulted in incorrect consumption values, incorrect bills and customer complaints.



KEY ISSUES



- ▶ Estimated consumptions led to incorrect bills
- ▶ Lack of consumption information for users during the year
- ▶ Due to lack of data, no possibilities to carry out efficiency improvements in the district heating network

THE SOLUTION: FIXED NETWORK SOLUTION FOR FULLY AUTOMATED READING



4,150 SHARKY 775 heat meters



IZAR RDC Premium 2



IZAR@NET 2 for 4,150 meter points

For Selfoss and vicinity a comprehensive fixed network solution for the fully automated reading of 4,150 SHARKY 775 ultrasonic heat meters will be implemented. A Drive-by solution serves as backup.

The integrated radio module makes the meters ready for work immediately after installation. Permanently installed receivers with receiving antennas regularly collect real time data recorded by the SHARKY 775 meters, including flow rate, forward and return temperatures, energy consumption and

alarm alerts. The reading interval of the radio meters is hourly.

The radio receiver (IZAR RDC – radio data concentrator) is the significant part of our IZAR radio fixed network solution. Optimized, cost-effective positioning of receiving antennas at strategic locations, e.g., the chimney of a taller building, ensures reliable data transmission. And thanks to our sophisticated fixed network planning tool we could present the detailed network coverage and the exact number of required antenna locations in advance. All heat meters automatically deliver

their meter data to the dedicated FTP server. From there, the data are imported into the Meter Data Management Software IZAR@NET 2 installed at Selfossveitur. The software provides a central monitoring of the distribution network and interfaces with the company's billing system, allowing it to automatically bill consumption on predefined dates. Using IZAR@NET 2, Selfossveitur has access to all heat meter data, including flow and return temperature for more detailed analyses.

GEOTHERMAL DISTRICT HEATING – HOW IT WORKS?

HEAT COLLECTION

Heat is collected from a geothermal reservoir in the earth's crust using a production pump.

HEAT STORAGE

The heat is transferred to the district heating facility for storage and future distribution.

DISTRIBUTION NETWORK

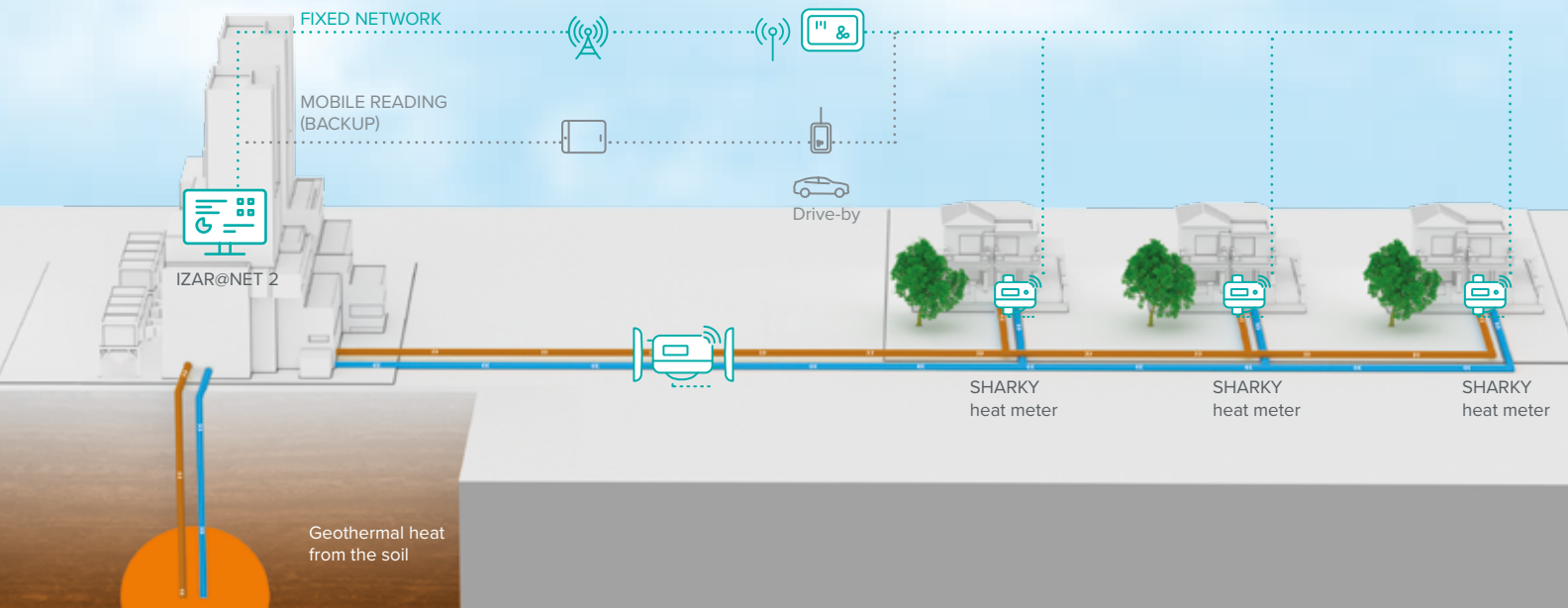
The stored heat is distributed using a specially-insulated subterranean network.

DELIVERY & CONSUMPTION

District heating substations deliver the heat to the consumer's home.

RETURN CYCLE

The cooled fluid is sent back to the district heating utility and injected into the geothermal reservoir for reheating.



THE BENEFITS: CORRECT BILLING, SATISFIED CUSTOMERS, OPERATIONAL AND ECONOMIC OPTIMIZATION

With the smart SHARKY 775 heat meters, Selfossveitur customers will be billed based on their real hot water consumption rather than estimates. Since the meter readings are automatically transferred from IZAR@NET 2 to Selfossveitur's billing system, the billing process is faster, more effective and not prone to errors.

The fixed network solution (AMI) reads out the heat meters fully automatic on an hourly basis. Customers can view their consumption online and compare it to average values of similar households. They can immediately identify whether their consumption is above average, adjust their consumption behavior accordingly and take action against a high bill at an early stage.

The high-resolution data can also be used to monitor the geothermal district heating network. In addition, Selfossveitur can also observe leakages and pressure drops in the distribution network. The IZAR@NET 2 meter data management software gives the utility an overview of the complete district heating network and displays meter alarms immediately at any time. Smart meters provide valuable information for Selfossveitur especially concerning temperature in certain areas as well as total consumption for different districts of the town. And they provide many opportunities of detecting faults in the district heating system since outliers, i.e., a house that gets unusually cold or warm water, can be easily spotted.

In the flat Icelandic landscape, our radio performance convinces with outstanding ranges. Only a few receiving antennas are needed for perfect coverage. In addition, our fixed network planning was very good and showed the utility the network coverage in detail in advance.

The meters bring considerable operational optimization for Selfossveitur, as manual reading is a thing of the past. And the economic potential is enormous, too: Thanks to their extended service life – the capability to withstand high-chlorine and high-sulphur geothermal water – the SHARKY 775 heat meters will perform to the highest standards over 12 years after installation.



SUSTAIN- ABLE

Customers get the information they need to question and eventually adapt their consumption behavior – for more sustainability.



ROBUST & RELIABLE

Capable of withstanding high-chlorine and high-sulphur geothermal water, the SHARKY heat meters are still performing to the highest standards over 12 years after installation.



NETWORK OPTIMIZATION

Thanks to richer data and regular monitoring, Selfossveitur can monitor temperature flows in specific zones and detect outliers more easily.



AWARDED 5 STARS FOR SHARKY

Since 2007, SHARKY has consistently been awarded 5 stars out of 5 for measurement accuracy and stability following stress tests conducted by AGFW, the independent energy efficiency association.

