

Iceland
Liechtenstein
Norway grants



Ministerstvo financí
České republiky

REPORT ON THE PROJECT OF COOPERATION IN EEA GRANTS

Name: Petra Kašpárková

Project: Comparison of energy potencial of Iceland and the Czech Republic

Date: 1/ 8/ 2021 – 31/ 8/ 2022

Schools: Technical College Reykjavík a Technical College Jihlava

Place: Iceland and the Czech Republic

During our fourteen-day stay in Iceland, we had the opportunity to get acquainted not only with the partner school and its teachers and students, the city of Reykjavik and its surroundings, but also with many other interesting people and places. Icelandic experts have prepared some very interesting presentations for us. They focused on problems related to energy, nature conservation, introduced us to Carbfix technology, ... During our stay, we also had the opportunity to see natural attractions, observe how the lava cools, stand on top of the crater of the volcano, get acquainted with the consequences of the eruption of the Eldfell volcano in 1973 or wait for a geyser. All this together has changed in many ways our view of this island and its inhabitants.

The following first part contains some of the information obtained about Iceland, its inhabitants, the partner school, a list of lectures we attended and a description of the geothermal power plant visited.

The second part focuses on the sights of the capital Reykjavik and the places we saw.

Part One

1 About Iceland and its inhabitants

Given that Iceland is a rather exotic country for us, many of the information we gradually learned before its visit and also during exchanges with Icelandic colleagues and students surprised us. A few interesting figures are in Table 1 for better clarity, followed by insights gained from contact with the inhabitants of Iceland.

Table 1 Iceland in figures

Population	343,000 people	Europe's most sparsely populated state
Area	103 125 km ²	Road No. 1 encircles the entire island and connects the individual regions, length 1339 km
Capital	Reykjavik	largest city
Currency	Icelandic Krona	course 1kr5 = 1 CZK, but you can pay for ice cream and a bus ticket with your card
Time	+ 2 hours	if CEST is valid with us
Longest day	21h 9m 23s	June 21, 2022 Reykjavik
Shortest day	4h 7m 51s	December 21, 2022 Reykjavik
Number of geothermal power plants	90	primarily process hot groundwater and steam for district heating

We have seen with our own eyes that the island is geologically and volcanically active. Iceland lies on the rift zone of contact of two lithospheric plates of the Mid-Atlantic Ridge,

which runs across the mainland and forms a young tectonic zone. This is manifested by occasional earthquakes and volcanic activity. It has a temperate climate, despite the high latitude just below the Arctic Circle. Average winter air temperatures are approximately equal to those in the Czech Republic. This is because most of Iceland is under the influence of an oceanic climate with a warm Gulf Stream. However, this is also associated with occasional strong winds, which mostly blow from the east, with an average strength of 6 m/s (21 km/h). On the contrary, summers tend to be very cold, temperatures reach approximately the same values as on the ridges of the Czech mountains.

One of the first visits led to a museum dedicated to local history in Hafnarfjörður. The settlement of Iceland began in 874, when the Norwegian chief Ingolfur Arnarson became the first permanent settler of the island.

We have noticed that many Icelanders are fair-haired or red-haired because their ancestors were Vikings and Scottish and Irish Celts.

In view of the relative isolation of the Icelandic population, a large proportion of them have reportedly given their consent to the processing of personal data, and their data is collected by deCODE genetics. These data are valuable for scientific research, especially heredity, hereditary diseases and subsequently in the development of drugs. The tour of this company with the interpretation of its employee was very interesting.

Icelanders a lot and love to travel. In primary school, children are required to learn Danish and English in addition to their native Icelandic. Waste sorting is debatable, energy is cheap and, thanks to geothermal sources, environmentally friendly.

To discover the natural beauty, we often drove along Hringvegur or Þjóðvegur 1 (Ring road), which is the main road in Iceland. In the length of 1339 km, it encircles the entire island, connecting its individual regions. Most of the road surface is asphalt, only a smaller part is covered with gravel.

At first, we were very fumbling in names. People usually do not have family surnames, but they create so-called patronyms by adding the ending -son (son) or -dóttir (daughter) after the first name of the father (in modern times sometimes even the mother - then it is a matronymum). They have much more weight to the big name in Iceland than in our country and therefore they need much more space on bells and boxes. The Icelandic family writes all the first names of its members on them, see Figure 1.



Figure 1 Names on bells

Their sense of humor is quite specific, similar to Czech humour. It is therefore probably no coincidence that Hašek's *The Good Soldier Švejk* is one of his favourite books. The grave of the author of this book was visited by Icelanders during their autumn stay in the CR.

People give a relatively closed impression, sometimes they are (by our standards) a little impolite and at first glance they may seem a little distant. But when you get to know them

better, you will find that they can be very friendly and hospitable.

2 Tækniskólinn (Technical College)

It is a professional, private school for pupils from 16 years of age. It was formed in 2008 by merging its two predecessors: *Iðnskólinn í Reykjavík* and *Fjöltækniskólinn*. It is divided into 13 vocational schools, which together form one of the largest schools in the country. The school is owned by the following Icelandic business organizations: Federation of Icelandic Fishing Vessel Owners, Federation of Icelandic Industry, Samorka – Icelandic Energy and Utilities, Icelandic Shipowners Association.

3 Lectures

During our stay at the school, we had the opportunity to see and hear some very interesting and stimulating lectures, for a list see Table 2. We have realised how big the differences are between our countries not only in energy sources, but also in the approach to nature conservation. Icelanders value their natural wealth very much.

Table 2 Presentation

Presentation title	Presenting
ON Power	Svanborg Hilmarsdóttir
Final project	Haukur Georgsson
The future of energy potential in Iceland	Mr Guðlaugur Þór Þórðarsson, Minister for the Environment and Natural Resources
A Sustainable Energy Future	Dr Þröstur Þorsteinsson, professor of environmental and natural resources studies
Sustainable Energy Options	Throstur Thorsteinsson
Wind turbines	Gísli Sigurgeirsson
Nature's Map	Erla Guðný Helgadóttir

4 Hellisheiði

Visiting the geothermal power plant was a great experience. Not only because the Hellisheiði power plant see Fig. 2 is the largest geothermal power plant in Iceland and the second largest in the world, but also because this way of using natural resources is very unusual for us. It is located near Mount Hengill. It currently has a capacity of 303 MW of electricity and 133 MW of hot water, 200 MW of installed heating capacity, 61 production and injection wells, with a target of 400 MW, which would make it the most powerful power plant of its kind in the world in terms of installed capacity. In 2014, the reinjection of H₂S and CO₂ into the bedrock began.



Figure 2 GE Hellisheiði

Part Two

1 Reykjavik

On our way to and from school, we got to know the capital. An interesting fact is that it is the northernmost capital of the world and the westernmost within Europe. Approximately 129,000 inhabitants live here. Interesting visited buildings are described in Table 3.

Table 3 Sights in Reykjavik

Hallgrímskirkja the tallest church and also a building in the city (74.5 m)	Symbol of the city
Höfði villa, in which Ronald Reagan and Mikhail Gorbachev negotiated on the so-called Höfði Villa. Reykjavik Summit, which ultimately led to the end of the Cold War	Negotiations continued with the ratification of the Treaty on the Elimination of Nuclear and Conventional Intermediate-Range nuclear and shorter-range missiles on 8.12.1987 in Washington, D.C.
Perlan building monument, decades before that there were hot water tanks.	It is 25.7 meters high. In 1991, the hot water reservoirs were reconstructed and a glass dome was placed on them.
Harpa concert hall and conference, opening concert took place on May 4, 2011.	The building has a distinctive colourful glass façade inspired by the basalt landscape of Iceland.
Národní muzeum Islandu (National Museum of Iceland)	On two floors, it presents the historical and cultural development of the country.
The Reykjavik Maritime Museum is located by the old harbour	The museum documents Iceland's maritime history from early settlement to the end of the 20th century and fishing history.

2 Reykjadalur

The Steam Valley is located near Hveragerði, only about 45 km from Reykjavík. We

understood the name of the valley as soon as we stepped into it. It is full of hot springs and mud ponds and there is even a hot stream in which we bathed. The Reykjadalur Valley is part of the Hengill Mountain area, which last erupted about 2,000 years ago and is still active.

3 Vestman Islands

A really powerful experience was a trip to these wonderful islands. It is actually a small volcanic archipelago consisting of about 15 islets. Inhabited is only the largest island Heimaey with the town of Vestmannaeyjar, which has less than 4,000 inhabitants, which is really a lot by Icelandic standards.

The Icelandic eruption in Heimaey in 1973 buried around four hundred houses. According to our guide, there were concerns about the local port. If the narrow entrance was closed by lava, it would destroy the fish factories (important for Icelandic industry) and the entrance to the island itself. With the help of water cannons, the lava flow was slowed down and the port saved. Around the remains of one of the houses was built the entire Eldheimar Museum. The red-coloured gravel can be followed by a path to the still active Volcano Eldfell. From here we had incredibly beautiful views of the huge crater, the city, the islands, the sea and the 5000-year-old neighboring volcano Helgafell.

4 Reykjanes Peninsula

The very unusual character of this peninsula is caused by strong volcanic activity, therefore it is only sparsely overgrown with vegetation. Especially in the southern half of Reykjanes there is a large number of hot springs, solfatar and lava fields.

4.1 Fagradalsfjall

Indeed, it is still an active volcano. At its cooling lava field, we looked at formations formed by lava only a few months old. It belongs to the so-called shield volcanoes. (A type of volcano with very slightly inclined slopes, which form many layers of highly mobile and therefore low-viscous lava with a small content of SiO₂.) They are not explosive in nature and their eruptions are manifested by the outflow of a significant amount of lava into the surroundings. Volcanic gases can easily escape to the surface and thus do not increase tension, and their release does not lead to a devastating explosion. It is located in the zone of active volcanic activity on the border between the Eurasian and North American plates about 40 km from Reykjavik.

4.2 Bridge between continents

A rarity of this part of the island is that the Eurasian and North Atlantic plates meet here. Over the years, a gap is formed between them, which means that after the "Bridge between continents" we could literally cross between Europe and Asia.

4.3 Gunnhver

Gunnhver is the collective name for the entire area of mud ponds that we have also seen. The entire peninsula, but especially this southern part of it, is strongly marked by volcanic activity, which creates many hot and sulphur springs and thermal pools. The associated lava fields allow only very small vegetation to grow, making the whole landscape feel like a lunar one.

4.4 Reykjanesviti

Reykjanesviti is the oldest lighthouse in Iceland. It serves mainly for orientation to the cities of Reykjavik and Keflavik. The tower is 31 meters high. The original structure was built in 1878, but it was destroyed by an earthquake 8 years later. In 1929, the lighthouse was built in its current form. Light signals are always sent from the beacon twice in a row every 30 seconds.

4.5 Blue Lagoon (geothermal baths)

The Blue Lagoon is a geothermal mineral spa located in lava fields near the town of Grindavík. It is located about 13 kilometers from Keflavik International Airport and 39 kilometers from the capital Reykjavik.

From the sludge tanks of the Svartsengi geothermal power plant, a pipeline deliberately leads to the nearby Blue Lagoon mineral baths. It is used for medicinal purposes. The warm waters of the lagoon (about 37–39 °C) are rich in minerals such as silicon dioxide and sulfur, making bathing suitable for people suffering from skin diseases.

5 Golden Circle

These natural beauties have concluded our acquaintance with the completely different nature in Iceland. Þingvellir National Park, together with the Gullfoss waterfall and the gushing Geysir thermal current, form the so-called "golden triangle". These are the most important places in Iceland that every visitor should see.

5.1 Þingvellir National Park (Thingvellir)

Þingvellir lies within a huge rift valley off the Reykjanes peninsula and is protected by UNESCO. The North American and Eurasian continents are moving away from each other right here at a rate of 7 to 20 mm per year. The Öxará River flows through the park, and there are also several streams and lakes that surround breathtaking natural scenery.

5.2 Geyser

The Haukadalur Valley (Icelandic Geyser Valley), occupying about 3 km², is located between the foothills of the Laugarfjall Mountains and the shores of Lake Laugarvatn. Several geysers are abundant here. The most famous of them is Geysir. It is from the Icelandic name that the geological term geyser is derived. The last major earthquake in 2000 caused water explosions up to 122 meters high. However, more than 10 years ago, geysir's activity began to subside, and today it is considered dormant. At present, Strokkur is much more active. They regularly spew boiling water every 5–10 minutes to a height of more than 20 meters. In addition to them, we can admire smaller hot springs, mud pools and fumaroles.

5.3 Gullfoss Waterfall

The Golden Waterfall is located in the upper part of the Hvítá River. The water cascades down on two floors. The first floor is 11 meters high and the second floor forms a gradient 22 m high, water drains into a 2.5 km long canyon.

Finally, a specialty

The Icelandic specialty hákarl, or pickled shark, is not very popular in Iceland. Previously, it

was prepared in a sand pit, where the meat gradually decomposed and acquired its unique aroma. Today, special plastic containers are used for fermentation, which takes about six weeks. Subsequently, the meat is hung, and then dried for another five weeks. When asked if it was really that bad, many colleagues admitted that they had never eaten this "delicacy".

The cooperation project brought many answers, questions, new information and ideas not only in the field of energy and nature conservation. It was very inspiring to get to know this wonderful country and its inhabitants closer. Participation in this project greatly enriched all participants with valuable experiences and experiences.



Figure 3 Visit to GE Hellisheiði

Tento projekt byl realizován za finanční podpory Fondů EHP.

Za obsah sdělení odpovídá výlučně autor. Sdělení nereprezentuje názory Fondů EHP. Současně Fondy EHP neodpovídají za použití informací, jež jsou jejím obsahem.

Additional resources

Island

<https://www.mundo.cz/island/obyvatelstvo>

Plants

<http://old.allforpower.cz/clanek/island-zeme-ledu-ohne-a-energie/>

School

https://en-m-wikipedia-org.translate.goog/wiki/T%C3%A6knisk%C3%B3linn?_x_tr_sl=en&_x_tr_tl=cs&_x_tr_hl=cs&_x_tr_pto=sc

Reykjadalur

<https://guidetoiceland.is/connect-with-locals/regina/reykjadalur-hot-spring-valley-in-south-iceland>

Hellisheiði

<https://guidetoiceland.is/travel-iceland/drive/hellisheidarvirkjun>

Thingvellir National Park

<https://www.mundo.cz/island/thingvellir>

Gullfoss Waterfall

https://cs.wikipedia.org/wiki/Zlat%C3%BD_vodop%C3%A1d

Geyser

<https://www.radynacestu.cz/magazin/geysir/>

Vestman Islands

<https://visitwestmanislands.com/tour/eldheimar-museum/https://www.turistika.cz/cestopisy/island-vestmannaeyjar-vestmanske-ostrov-ostrov-zapadnich-muzu/detail>

Bridge between continents

<https://cs.wikipedia.org/wiki/Reykjanes>

Blue lagoon

[https://cs.wikipedia.org/wiki/Modr%C3%A1_laguna_\(geoterm%C3%A1ln%C3%AD_l%C3%A1zn%C4%9B\)](https://cs.wikipedia.org/wiki/Modr%C3%A1_laguna_(geoterm%C3%A1ln%C3%AD_l%C3%A1zn%C4%9B))

Gunnhver

<https://www.radynacestu.cz/magazin/gunnhver/>

Reykjanesviti

<https://www.alvarez.cz/encyklopedie/island/reykjanesviti>

Fagradalsfjall

<https://cs.wikipedia.org/wiki/Fagradalsfjall>