

REPORT ON THE PROJECT OF COOPERATION IN EEA GRANTS

Name:	Olga Buršíková
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I joined this project, focused on the exchange of knowledge and information in the field of environment and energy between the Czech Secondary School of Industrial, Technical and Automotive in Jihlava and the Icelandic Technical College in Reykjavík, in its second half. In a situation where some educators decided to leave the project for personal reasons, I started as an alternate for one of them. Therefore, my report will not describe the visit of Icelandic students to the Czech Republic, which took place in the autumn of 2021. The report covers only the second part of the exchange - stay in Iceland.

As already mentioned, the project is thematically focused on energy and the environment, more precisely its goal was:

- To compare and evaluate the structure of energy sector, especially the representation of individual types of resources.
- Compare how the two countries are prepared for the challenges in the form of a demand for low-emission resources, clean energy and, consequently, carbon neutrality - the European Green Deal.

- Compare the stability of the network and the way it is affected by new low-emission sources and at the same time the growing demand for electricity in the form of a growing number of electric cars.

An unspoken but at the same time very significant benefit was the opportunity have in insight into another Western European society in another part of the world, and to evaluate cultural, social and geographical differences.

Already since the the stay of Icelanders in the Czech republic, I have heard a few such interesting things:

- Do you want to easily prepare an extraordinary experience for Icelanders? Take them on a trip to the forest. There are no forests in Iceland.
- How do Europeans and Icelanders treat nuclear energy? At worst, Europeans are protesting against nuclear power plants, at best, they don't care about them. Icelanders are looking forward to them - it's something exotic for them that, given its volcanic presence, will probably never stand up in Iceland.

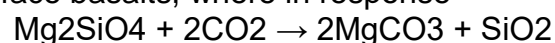
Well, now let's see what the Czechs found in Iceland.

The first cultural differences appear before departure. The first victim is a traditional gift, which is usually a success abroad - the Czech Republic's agricultural wealth in liquid form, in quantities that are perfectly acceptable to our standards, does not match the Icelandic import criteria and most will remain at home. Yes, this is the reality of all the Nordic countries, forced by the long winter darkness, including Iceland.

First impressions are extraordinary for people from the inland country. Nordic architecture and the cool open ocean in sight. This is a different world.

The next day we will have a tour to the partner school. Yes, SŠPTA is a relatively large school, but Technical College provides education for 3,000 students. There are also obvious differences in terms of the concept of the pedagogical process. The relaxation center at school and relaxation corners in the classrooms allow students to "recharge the batteries on the run", the creativity center supports the opportunity to show extraordinary creative talent already at school. From the perspective of a pedagogue accustomed to Czech standardized teaching, it is definitely an interesting experience to think about.

Another attraction is the swimming pool with water at a temperature of 44°C, powered by thermal springs - a view that will accompany us quite often during our stay. The heat of the earth's core is not driving only swimming pools here. Our next steps lead to the Hellisheidi geothermal power plant - 303 MW of electrical and 200 MW of thermal power would place it among the smaller sources in Czech terms and efficiency of around 10% among the worst, but zero fuel price and zero emissions rank it in today's energy perception among the most valuable sources. At the same time, thanks to suitable conditions, they are testing the opposite process here - in the Carbfix project, they store CO₂ in subsurface basalts, where in response



two stable solids are formed.

In a smallest group I'll ask a question that I've been given by my husband who works in energy sector. Is a geothermal power plant a renewable source? The interviewee hesitates for a while, but then admits the truth. Yes, they know that a geothermal power plant is not a renewable resource, it drains extra heat from the earth's core, and its solidification will one day have dramatic effects on life on the planet. But the day is so far away and the impact is so negligible - who would care? And today it is a clean and cheap source. Geothermal energy here in Iceland heats 90% of households and produces a third of electricity.

Another typical example is Reykjadalur, a valley of subarctic nature, through which flows a stream with a temperature of some 30-35°C. If you have a swimsuit, the natural swimming pool is always ready. The last breathtaking experience from the geothermal area are the natural geysers, which we will set out for a few days later.

And finally, the dark side of geothermal energy - the Vestman Islands, where a volcano erupted 50 years ago. The lava flooded the houses, but there was also a threat of flooding the strait connecting the city with the ocean. To prevent this, the US military had to help. Another such reminder is the Reykjanes peninsula, a peninsula adjacent to the capital. Since 2020, lava has surfaced here, fortunately mainly in the form of non-eruptive outflows, which will most likely not endanger Reykjavík. However, no one can say that with absolute certainty.

The second element that provides enough electricity in Iceland is water.

Hydropower plants generate the remaining two thirds of electricity production, again with free fuel and no emissions. There are even so many suitable locations that they could afford to build a Kárahnjúkar hydroelectric power plant with an output of 690 MW, which does not supply the population with its output, but rather a smelting furnace for aluminum processing, which is a highly energy-intensive industry. There are three such furnaces and together they consume an incredible 80% of the electricity produced. There is only one fifth left for everything else. Strangely, when the hydroelectric power plant was built, it was under heavy protests of ecologists. Although it is the most environmentally friendly possible source of electricity, it still floods ecologically interesting habitats.

But they are looking further on in Iceland. Another source of electricity is the ocean, or more precisely the tides. At high tide, the tidal power plant lets water flow into the reservoir via a turbine and produces electricity by the difference in water levels, at low tide the same. Again free and without emissions. And again there's a trick. The same question - is a tidal power plant a renewable resource? A moment of hesitation, then an honest answer. Yes, they know that's not true here either. It takes energy from the rotation of the Earth and from the Earth-Moon system. One day, the Earth stops spinning and the Moon sails somewhere into the depths of space. But the day is so far away and the impact is so negligible - who would care? And today it is a clean and cheap source.

Wind and solar energy are also being experimented with in Iceland. However, compared to hydro and geothermal power plants, these sources are significantly less

reliable and their representation in the energy mix corresponds to this - less than one percent of installed capacity and less than one per mille of production.

But let's not just talk about energy - another iconic experience was a visit to deCODE, a biopharmaceutical company whose flagship is decoding the human genome - the Holy Grail of Medicine and Pharmacology. The cost of the equipment is unbelievable, and even ordinary laboratory equipment costs as much as a luxury car (for example, an analyzer for 100 thousand USD). Also unbelievable are the energy requirements of the data center, which maintains the collected information - currently there are some 200 petabytes of data stored and the data highway to the backup data center has a capacity of 100 GB / s.

Last but not least, we've had also a negative experience from the social level, quite surprising for us. After the farewell party, one of the Icelandic girls declared that one of our students had treated her "inappropriately". While we would probably solve everything at home by apology and agreement, in Iceland they take this very problematic extremely seriously, and so the current situation has slightly damaged the final days of an otherwise wonderful stay.

Overall, the stay and the experience gained were highly enriching both socially and professionally. I'm glad that I could take part in this project.

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