Iceland Liechtenstein Norway grants

DZS

Ministerstvo financí České republiky

TOPIC: Hydroelectric power plants

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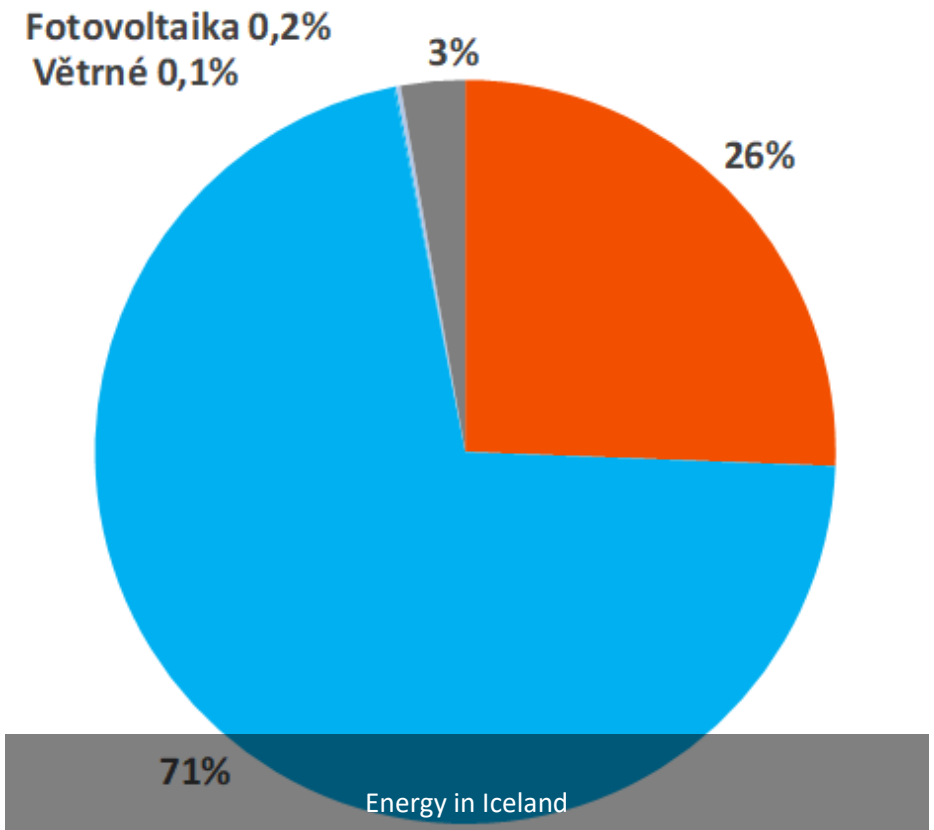
PROJECT: Comparison of energy potencial of Iceland and the Czech Republic

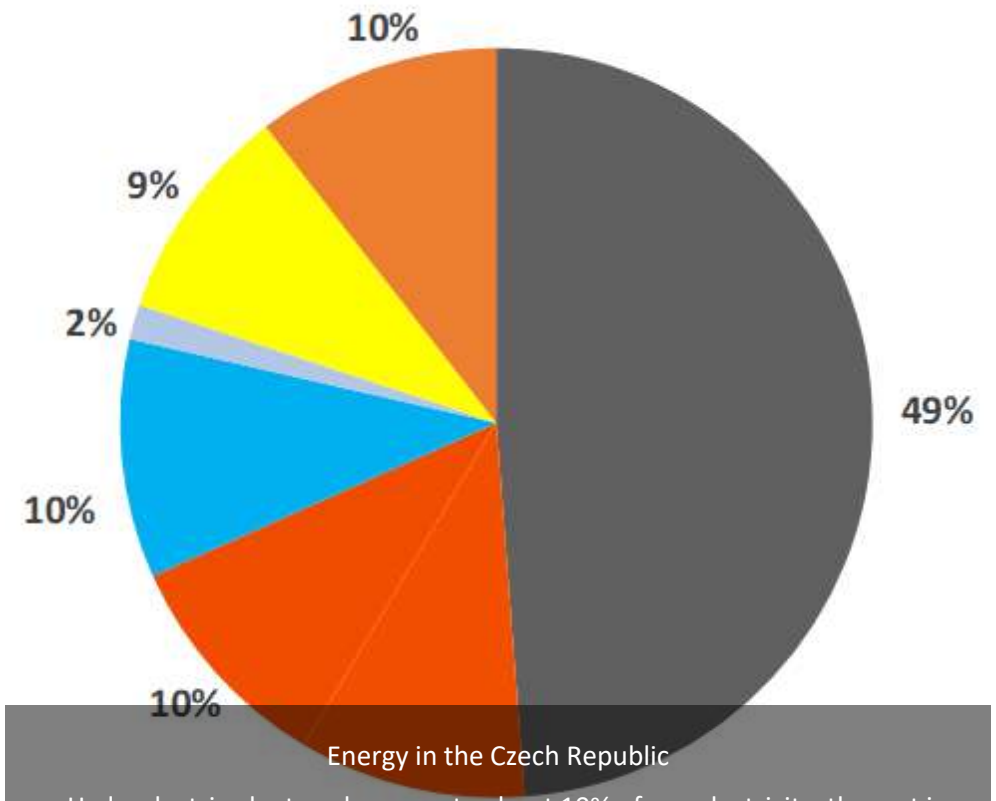
DATE: 1/ 8/2021 – 31/ 8/ 2022

Comparison of energy



Energy in Iceland

- 71% of Icelands energy is generated by hydropower plants



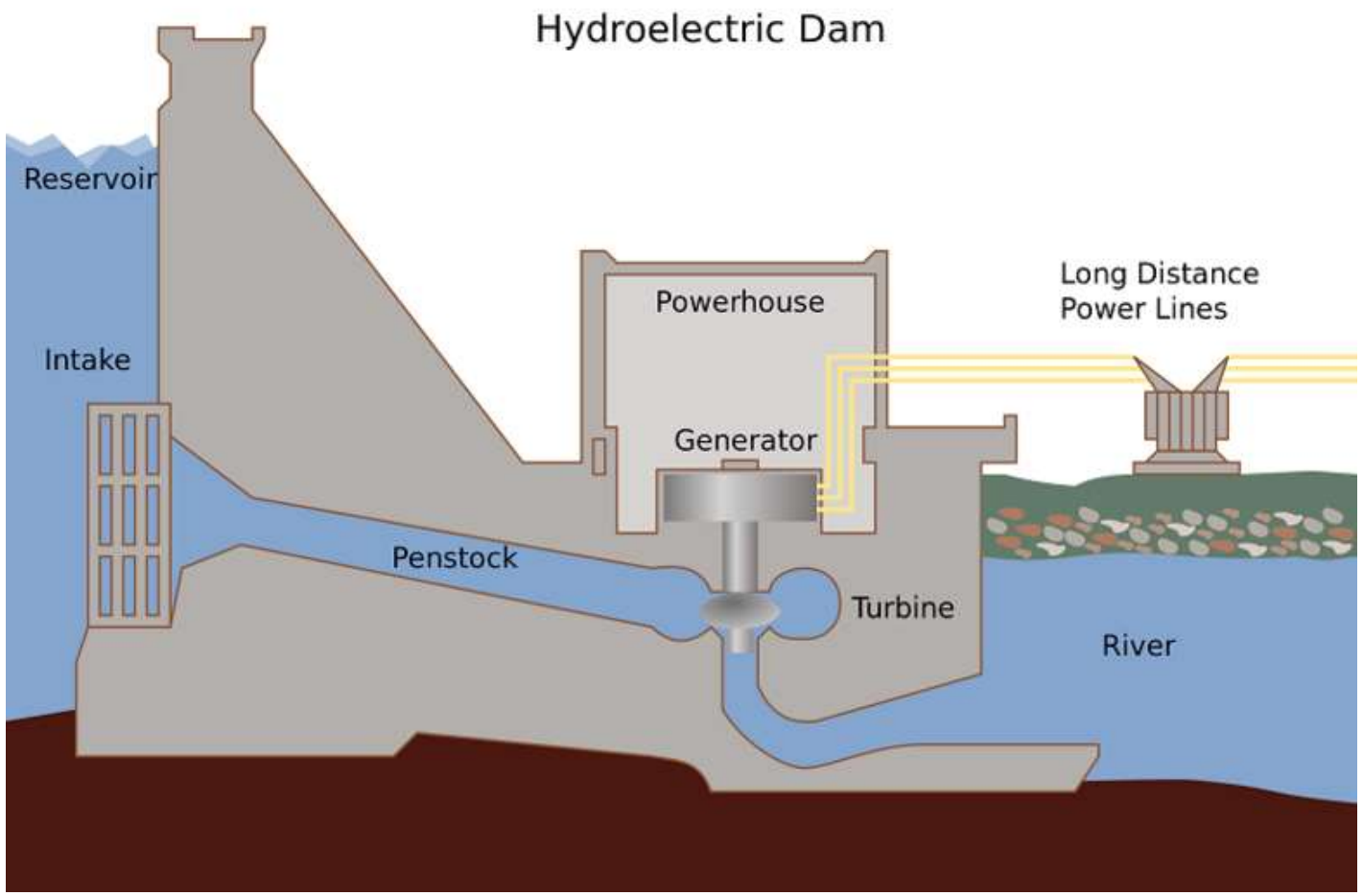
Energy in the Czech Republic

- Hydroelectric plants only generate about 10% of our electricity, the rest is generated by coal plants and others

Function

- Hydroelectric plants consist of a dam and an engine room. The dam holds water, which is then gradually released through water turbines that generate electricity.

Construction



- The hydroelectric power plant consists of a tank with water, where there is also a cap that admits the water into the supply channel, which leads to the turbine that turns it. The turbine is connected to the rotor of the generator and it creates an electric current which is discharged into the network. The water from the turbine flows further into the river further into the world.

Distribution

- According to installed power
- According to the used slope
- According to the use of water flow

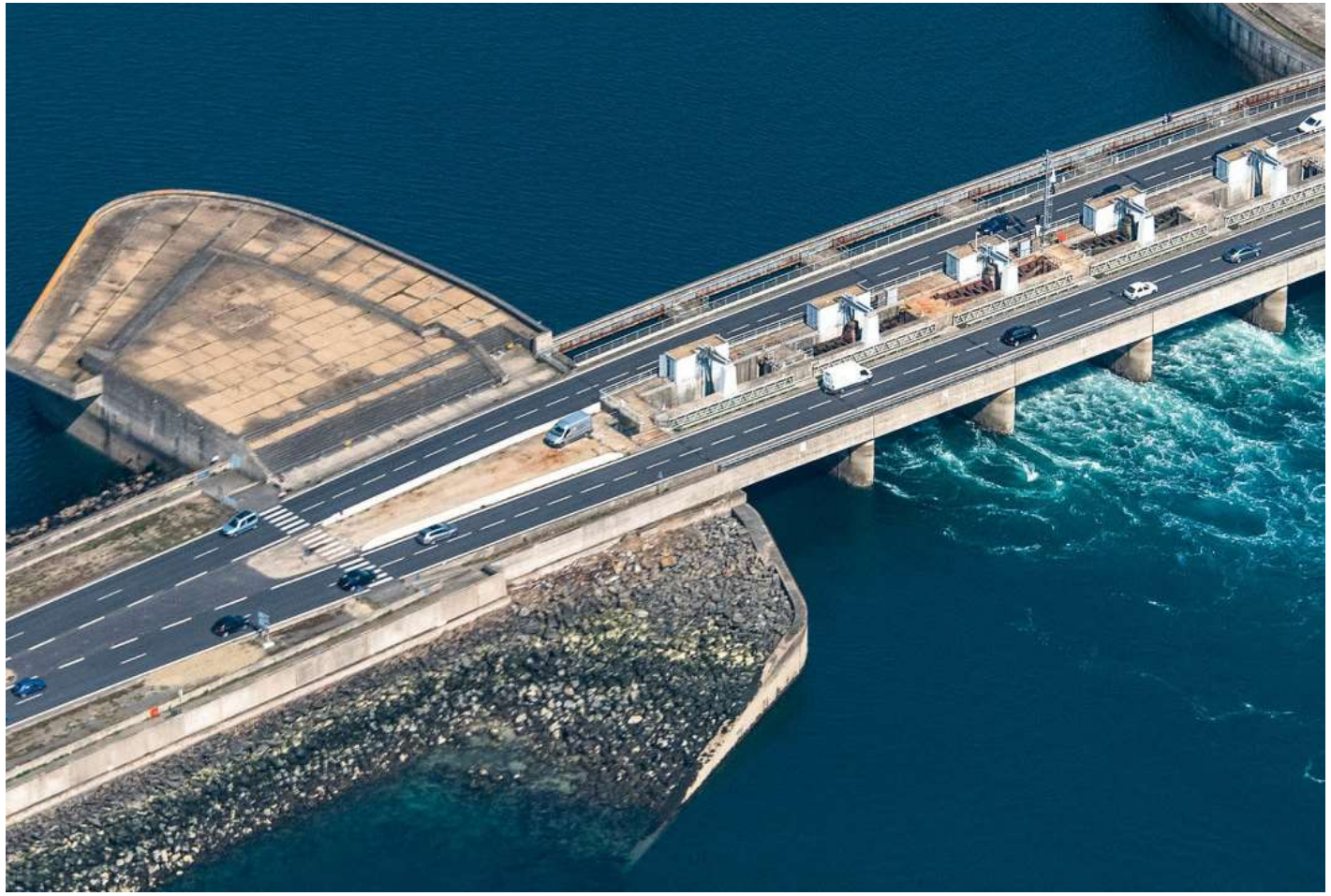
According to installed power

- Small hydropower plants up to 10 MW
- Medium hydropower plants up to 100 MW
- Large hydropower plants over 100 MW (e.g. Dalešice)

According to the used slope

- Low-pressure (fall up to 20 m) - on dams, they use a Kaplan turbine (from a fall of around 0.6 m)
- Medium pressure (head from 20 m to 100 m) - typically valley dams, use a Francis turbine (head from 40 m)
- High-pressure (head over 100 m) - with a head over 400 m, they use a Pelton turbine (e.g. Dlouhé stráně)

According to the use of water flow



- Flow-through – basic hydropower plants with a dam
- Accumulative
- Pumping - a special water reservoir high on a hill releases water through a turbine that creates energy, later the water is pumped back into the reservoir and the process is repeated whenever more electricity is needed
- Tidal – uses the ebb and flow of the sea

Dlouhé stráně

- Pumped water power station
- It can generate up to 3.7 GWh in one pumping cycle
- The cycle usually starts in the morning, when there is a large increase in energy consumption

Kárahnjúkar hydropower plant

- It can generate up to 4.6 TWh per year
- It consists of 5 dams located on rivers that are higher in the mountains
- Water tunnels lead from the dams to the power plant, these water tunnels are 73 km long

Micro hydropower plant

- In Reykjavik, we came across an interesting small hydroelectric plant
- It was built under a bridge almost in the middle of the city on a small river
- When there is a larger water current, it starts up and creates electrical energy

Resources used

- https://cs.wikipedia.org/wiki/P%C5%99e%C4%8Derp%C3%A1vac%C3%AD_vodn%C3%AD_elektr%C3%A1rna_Dlouh%C3%A9_str%C3%A1n%C4%9B
- https://en.wikipedia.org/wiki/K%C3%A1rahnj%C3%BAkar_Hydropower_Plant
- https://cs.wikipedia.org/wiki/Vodn%C3%AD_elektr%C3%A1rna