TOUR OF THE HUČÁK SMALL HYDROELECTRIC POWER PLANT

Auditorium

Hello, welcome to the Hučák small hydroelectric power plant and renewable resources information centre.

What to expect today? We will present you with a short video presentation to start with, and then we will go outside, take a look at the power plant's engine room, and end our tour in the interactive exhibition.

Presentation

You have just seen a short intro, now let us talk about the sources from which we are able to generate electricity. Let's divide them into two basic groups – emission and emission-free. Emission-free sources include renewable sources (sun, water, wind) and nuclear energy. Emission sources include coal and gas. Renewable sources of energy are clean, emission-free, non-exhaustible, but are weather-dependent. Nuclear power plants are also an emission-free source and, furthermore, they are stable and able to produce large amounts of power, making them an essential source for the future of our energy sector. Gas and coal are sources from which the energy sector has been gradually turning away. The new strategy of the ČEZ Group, Clean Energy for Tomorrow, is based on sustainability and on achieving carbon-neutrality.

ČEZ Group not only produces, sells, and supplies electrical power and gas, but also provides financial and mobile services. Last but not least, it supports charitable projects through the ČEZ Foundation.

We are at a hydroelectric power plant, so let's learn how it works. First, there are three different types of hydroelectric power plants: a run-of-the-river power plant works with the natural flow of water; conventional plants use water retained in a reservoir; a pumped-storage power plant has two reservoirs at different elevations (higher and lower) – during peak power-demand periods, water is released from the higher reservoir to the lower reservoir, generating electricity and filling the lower reservoir, while subsequently, primarily at night, the water is pumped back up.

Various types of turbines are used in hydroelectric power plants. The Pelton turbine best serves for high drops and low flows, while the Kaplan turbine is used for small drops and large flows, and the Francis turbine for medium flows and medium drops. In every hydroelectric power plant, water turns the turbine, the turbine turns the generator, and the generator makes electricity. This set is called a turbogenerator. All types of power plants use this principle, with the exception of photovoltaic power plants.

Courtyard – turbine

We are in the courtyard of our power plant. Let's say a few words about Hučák's history and how it operates. The power plant dates back to the early 1900s, when the city council decided that they did not want the city to be flooded every year. Work began to regulate the river, which involved moving the original weir 150 meters away, making it deeper and wider, and turning it into a movable, collapsible weir. The locals found the weir's original name 'Hučavý'

so intriguing that they named the power plant after it: Hučák. The power plant's official name is the Elbe Small Hydroelectric Power Plant.

Both the power plant building and the engine room are national technical monuments. The exterior of the building was designed by the architect Professor František Sander, in the Art-Nouveau style, to match the style of the city at the time, when architects Jan Kotěra and Josef Gočár were active there. The technical features were designed by ing. Karel Novák. The hydroelectric power plant has been generating electricity since 1912. There was also a coal power plant in the building, which began generating electricity two years earlier and then later served as a back-up until the 1940s. Today, the engine room of the hydroelectric power plant is still operational. We have a Francis turbine on display, and three identical turbines are in our operations. Let's see where they are fitted.

The intake structure

This is the intake structure, where water from the river enters and flows under the power plant. Behind the debris screen (a grille that protrudes out of the water and filters away large debris), there are two pillars dividing the incoming water between 3 fountains, each featuring one turbine (similar to the one we saw a moment ago). This means that each turbine has its own supply of water, making it possible for us to put them into operation one by one, depending on the current flow. We need 10,000 l/s to spin one turbine, meaning that 30,000 l/s is required for all three. If the flow in the Elbe is higher than 30,000 l/s, this is noted by the Elbe Basin Management Organisation (the building directly across the way from us), and using cogged wheels and chains, they collapse the weir to allow water to flow onward. This means that water runs not only through the power plant but also over the weir and hence, does not go on the shores causing floods. The primary purpose is thus fulfilled: to help protect Hradec from floods.

Inside the engine room

We are inside our power plant. Everything that you see here is original. At the back, there are three generators spun by Francis turbines, each with a capacity of 250 kW. They turn at the speed of 125 rev./min, with phasing taking place at those revolutions. Under the windows there is a sluice-gate that we use during maintenance, to close the flow of water to the fountain to the turbine. The sluice-gate lets down a three-tonne panel. Our power plant was overhauled in 2019. The room next to the engine room is a modernised control room featuring modern control units.