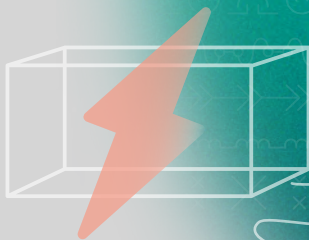


SE Integrator





| Upper reservoir of pumped-storage hydropower plant Čierny Váh

Slovenské elektrárne is the largest electricity producer in Slovakia

We operate 31 hydropower plants, 2 nuclear
power plants and 2 photovoltaic power plants.



31

hydropower
plants



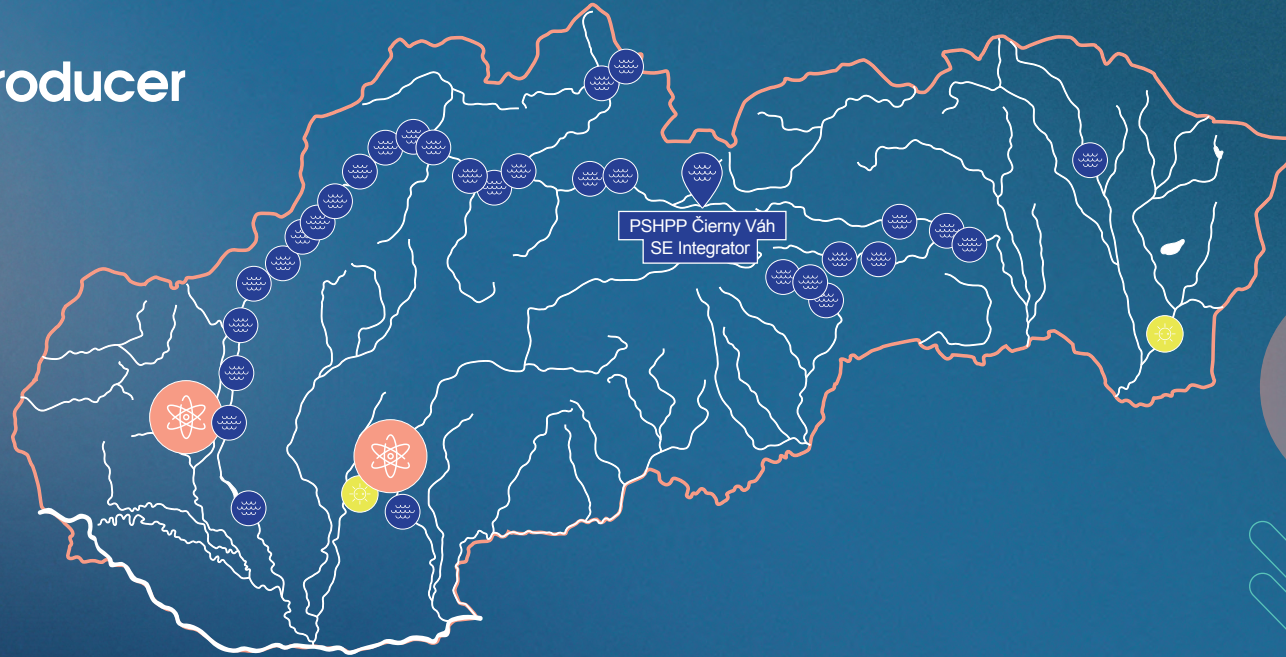
2

nuclear
power plants



2

photovoltaic
power plants



Thanks to this mix, we generate 100% of our electricity without
direct CO₂ emissions, placing us on The Financial Times'
Europe's Climate Leaders list.

100%

**we produce electricity
without direct CO₂ emissions**

Čierny Váh

The largest electricity storage facility in Slovakia

735 MW

The pumped-storage hydropower plant (PSHPP) Čierny Váh with a current installed capacity of 735.16 MW is the largest electricity storage facility in Slovakia and due to its parameters belongs to a unique type of pumped-storage hydropower plants. It has been in operation since 1982. It consists of an upper reservoir, three penstocks, a lower reservoir and the pumped-storage plant itself. It houses six Francis turbines and one Kaplan turbine. For the production and storage of electricity, it uses the volume of water stored in the upper reservoir, which is pumped from the lower storage reservoir. The Čierny Váh PSHPP provides flexibility to the Slovak electricity grid in the form of ancillary services and balances out deviations.



Project SE Integrator

The ambitious modernisation of two turbines along with a battery energy storage system will extend the power plant's service life by at least 30 years and increase its regulation range. The two existing turbines together with the motor-generators (TG1 and TG2) will be upgraded with variable speed drives controlled by two frequency converters, each with a minimal output of 122.4 MW. The output of the battery energy storage system (BESS) will be 80 MW with a capacity of 160 MWh. In practice this means that the Čierny Váh PSHPP will be able to fulfil its key role for the Slovak electricity grid for a longer period and on a much larger scale.

Flexibility

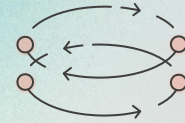
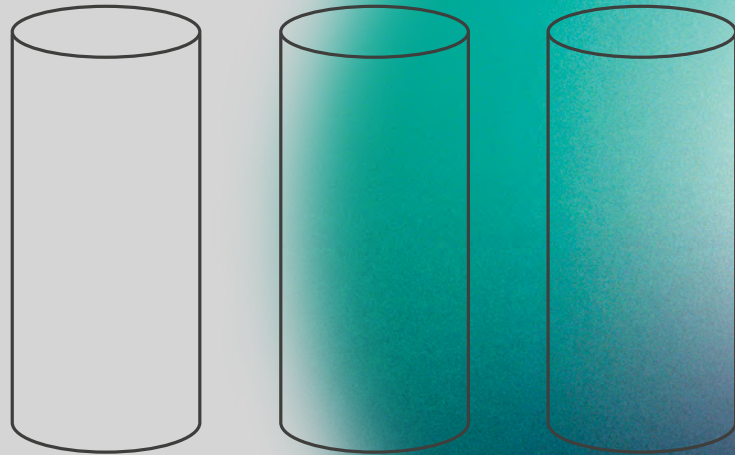
Where will the construction and modernisation take place?

- The mechanical and technological equipment will be upgraded in the area of the power plant itself and in its close vicinity, outside the built-up area of the Východná municipality.
- The construction of the battery energy storage system with accompanying facilities will be built on vacant land adjacent to the power plant site, outside the built-up area of the Východná municipality.

Primarily, by improving its operational parameters, the project will increase the possibility of providing ancillary services to the Slovak electricity grid. At the same time it has the potential to reduce the amount of CO₂ emissions produced and enable greater integration of electricity generation from renewable sources.



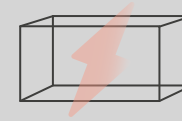
3 pillars of SE Integrator



1 Variable revolutions of two turbines

Upgrading TG1 and TG2

Upgrading the pump, turbine and a variable speed motor-generator controlled by two frequency converters.



2 Building the battery energy storage system

BESS

Battery storage with an output of 80 MW and a capacity of 160 MWh.



3 Upgrading the power plant control

Control algorithm

Optimal use of frequency converter, battery storage and pumped storage technologies.



EU Project of Common Interest

The significance and importance of the project was also confirmed by the European Commission, which in 2023 included it in the sixth list of projects of common interest, which underlines its key importance not only for Slovenské elektrárne, but also for the Slovak Republic and the European Union. In addition, the preparatory part of the project is supported by a European Connecting Europe Facility (CEF) Studies grant.

The SE Integrator project is also fully in line with the vision set out in the strategic national document “Integrated National Energy and Climate Plan of the Slovak Republic for 2021 – 2030” (INECP), which comes under the responsibility of the Ministry of Economy of the Slovak Republic. Within this plan, the Slovak Republic has set a goal to ensure sufficient flexibility in the electricity market, especially in connection with the increasing share of renewable energy sources (RES) in electricity generation. The Slovak electricity transmission system operator anticipates an increase in RES production to as much as 7 TWh by 2032, representing 18% of the Slovak Republic’s consumption.



**Co-funded by
the European Union**

Why do we need the SE Integrator?

The electricity grid, with the increasing integration of renewable sources, faces large and difficult-to-predict differences between planned and actual electricity generation from these sources. At times of peak photovoltaic production (especially during the day) and simultaneous minimum consumption, there are large surpluses and, conversely, at times when these sources are not generating, there is a deficit of electricity in the system.

Any surplus or deficit of electricity must be compensated by controllable electricity facilities that can store the electricity and then quickly deliver it to the electricity grid. This is one of the roles the SE Integrator will fulfil.



Environment

Environmental protection is one of the fundamental priorities of Slovenské elektrárne. All major production processes and activities are subordinated to it with the aim of continuously maintaining and improving this trend. Hydropower plants utilise a renewable energy source – water – the hydroenergetic potential of our rivers. Electricity generation in these facilities produces no by-products that would impact the environment. The energy potential from watercourses is a clean, ecological, and naturally self-renewing energy source. Its utilisation produces no direct emissions, waste, or demands for extraction, processing, and delivery of raw materials.

Slovenské elektrárne submitted the project SE Integrator to the Ministry of Environment of the Slovak Republic for a **screening procedure as part of Environmental Impact Assessment (EIA)**. In this regard, the Ministry of Environment issued a positive decision in February 2025.

Furthermore, in terms of the project's potential impact on nearby protected areas, the District Office in Žilina assessed that the project will not affect the areas within the **NATURA 2000** network. Given the location of the proposed site and its sufficient distance from national borders, the project will also not have any transboundary environmental impact.



Project timeline

08	2021	TYNDP 2022 submission
11	2023	Inclusion of the project in the 6th list of EU Projects of Common Interest
02	2025	Awarded CEF Energy grant for project studies phase (2.11-SK-S-M-24-SE Integrator)
02	2025	Obtained EIA Screening Decision
05	2025	Public consultation in Kráľova Lehota, Slovakia
1Q	2031	Planned project completion

Further information about the project



Project website
<https://o.seas.sk/IntegratorEN>



Transparency Platform
<https://o.seas.sk/PCI-PMI-TP>



