

Development of Nuclear Energy in the Czech Republic: Contractor Chosen for the Construction of Additional Power Plant Units

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Introduction

The Czech Republic (CR) sees nuclear energy as an important part of its energy sector mix. The country currently operates two nuclear power plants (NPP) - Dukovany and Temelín. The priority of the government is the construction of the new blocks of the NPP Dukovany. One of the reasons for increasing energy producing capacity is the expected growth in electric energy consumption. In July 2024, the government decided to build two new nuclear reactors at Dukovany. The completion of Dukovany represents an opportunity for energy security and the domestic industry of the region. The long-awaited selection of a contractor for the construction of two new nuclear units has thus already taken place. After the American Westinghouse's withdrawal (the government said that its bid did not meet the conditions), South Korean Korea Hydro&Nuclear Power (KHNP) and French company Electricité de France (EDF) remained in the last stage. After a long process of selecting a partner for the construction of these new units, the government decided to choose KHNP. The Czech Energy Company (CEZ) is now negotiating with the Korean side on the form of the contract, which should be signed by March 2025 and the first of the new reactors at Dukovany should be completed in 2036. Now it remains to fine-tune some technical aspects, finalize legislative matters and start with the implementation of construction. In its energy concept, the state declares its intention to gradually phase out coal after 2030. Gas should become a transitional fuel instead. Renewable energy sources and nuclear energy should gradually become the main pillar in energy production. The goal is to achieve more than half of the share of renewable sources in electricity production in 2050.

Energy policy, its goals and challenges in the Czech Republic

Energy policy has been a long-discussed topic. Factors such as changing consumption requirements, the impending end of the nuclear power plants' (NPP) lifespan, the need to limit the operation of coal-fired power plants for environmental reasons, and the increased demand for electricity production have accelerated the decision to build new NPP units.

In the coming years, the Czech Republic is set to undergo significant changes in the energy sector. In the State Energy Policy (SEP) of the Czech Republic for 2030 and the Energy and Climate Plan (ECP), the state assumes a gradual reduction in coal consumption and an increase in the importance of nuclear and renewable energy sources. Both SEP and ECP documents also envisage the construction of the new nuclear reactors. The State Energy Policy is a strategic document that sets out the future goals and priorities of the state in this

sector. The concept is binding for the state administration, and it should show the market the state vision in the energy sector. The updated version envisages a gradual increase in electricity production from 84 TWh (2022) to 95 TWh (2050). The state presented its initial version to the European Commission (EC) in 2023, which responded with own recommendations. The state can implement the recommendation to increase the planned share of renewable sources to 33%.

The country now has six nuclear units, which are in two NPPs. Two units, each with an output of 1000 MW, are located at the Temelín NPP. Four smaller - 510 MW - units are in Dukovany. In addition to new conventional reactors, CEZ is also preparing the construction of small modular reactors. The first of them should be built in Temelín. In the plan, the state envisages an increase in the share of renewable energy sources in final consumption to about 30% by 2030. However, the EC wants the CR to increase the planned share to a third to contribute to the common goal. At present, this share represents 18% of final consumption. Table 1 shows the plan for 2030.

Table 1: Share of renewables – 2030 roadmap (%)

Proposals/objectives	Share (%)
Proposal of the CR	30
EC Recommendation	33
A common EU goal	42.5

Source: MoIT CR; EC

The main point of the future development of the Czech energy sector should be the gradual reduction of greenhouse gas emissions. In 2030, the country could reduce them by up to 63% compared to 1990 and in 2050 it should approach climate neutrality. The state is therefore counting on a transformation of the energy sector. The country has untapped potential for renewables in the electricity sector, especially wind power plants, photovoltaics and biogas plants. Given the coal phase-out, a higher proportion of nuclear energy will be necessary. Solar and wind energy are expected to grow and natural gas will also play a role temporarily. It should serve as a backup source for balancing the grid. Later, biomethane and hydrogen are planned to take its place. In July 2024, the government approved an update to the hydrogen strategy, according to which hydrogen will become an important element of energy policy. Table 2 shows the share of selected sources in electricity production in the CR in 2023.

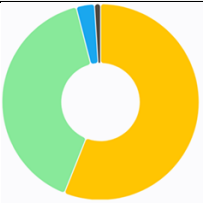





Table 2: Share of selected sources in electricity production in CR in 2023 (%)

Source	Share of electricity production (%)
Nuclear energy	40.2
Lignite	35.2
Natural gas	4.8
Solar energy	3.9
Other sources	15.9

Source: oEnergetice.cz

Already at present, nuclear energy in the country, along with brown coal (the use of which is to be gradually phased out), is an important component of the energy production mix. Looking ahead, two main sources – nuclear and renewables – are expected to dominate electricity production in 2040 (Chart 1). It can be assumed that the influence of external conditions and European changes in regulations may modify decisions on the composition of the energy mix in the future. However, it is realistic to expect that these changes will not be significant under the expected stability of conditions.

Chart 1: Electricity production in CR – assumption for 2040 (shares)

Share in electricity production		Source (min/max)
 <p>Graph of max values</p>		Nuclear energy (47%/56 %)
		Renewable resources (33%/47%)
		Natural gas (1%/5%)
		Coal (0%/0%)
		Other sources (1%/2%)

Source: State Energy Policy

Mutual benefit of cooperation in the field of nuclear energy

A possible shortage of electricity is to be prevented also by the construction of up to four nuclear reactors. EDF and KHNP had previously submitted a binding bid, and the government chose the latter. KHNP is to build two new units at Dukovany, and negotiations will continue to be held on the construction of two more at Temelín. KHNP was the first to submit its bid and the company offered its APR1000 reactor, which meets European standards and was designed for the European market. KHNP has successful projects in Korea and the United Arab Emirates (UAE) and builds in high quality, on time and at a set price. As already mentioned, the objectives of the state documents count on the construction of new NPPs. The decision on construction is expected to bring several benefits to both partner countries.

Benefits for CR: KHNP declared its interest in cooperation with the Czech industry. In this context, KHNP promises significant involvement of Czech companies in the implementation of the entire project. It has already announced more than 200 identified partners and fifty non-binding memoranda of cooperation signed. One of the indirect effects of the nuclear tender could be that South Korea will make room for the Czech Republic in tenders for training aircraft in Asia. The Czech politicians are also striving to gain investment for research. They are not giving up on the possibility that South Korea would invest in semiconductor development.

Benefits for South Korea: Similarly, the Korean side can also gain indisputable effects from this contract. The contract will allow the company to gain a reputation on the European market and will also allow for a mutual exchange of experience between experts. In addition, if the project is successfully implemented and, in a situation where the government decides to increase the number of units under construction, KHNP may eventually win another contract.

Prospects and the possible “post-selection” challenges

In view of the pending contract signing process, expected to be completed in March 2025, several open questions must be resolved by then. The Office for the Protection of Competition (OPC) received proposals from Westinghouse and from the EDF against the contracting authority's procedure in the tender for the construction of nuclear units. The companies are protesting the course of the tender and the selection of KHNP. Both companies submitted their proposals to the OPC in August 2024. Standard administrative proceedings have been initiated in both cases and the Office is now analysing both proposals. Until the first-instance decisions are issued, the Office will not inform about the progress of these administrative proceedings.

Westinghouse has filed an appeal with the OPC against the selection of KHNP as the preferred supplier for the construction of new nuclear reactors at Dukovany. The appeal focused on the use of the security exception, a procedure granted to CEZ, the contracting authority overseeing the project. This exemption, provided by the OPC, allows CEZ to bypass the Public Procurement Act (PPA) to protect the country's basic security interests. Since the beginning of the Czech "nuclear" tender, the security exception has been a part of the contracts. According to CEZ, the Dukovany tender falls under this exemption, making it impossible for the bidder to challenge the process with the Office.

A proposal to review the tender in the CR was also submitted to the OPC by the EDF. In an appeal against the tender for the construction of two nuclear units at Dukovany, the EDF challenged the decision to select KHNP. EDF therefore asks the Office to find a breach of the tender conditions and to annul the contracting authority's actions related to the assessment of the tender.

Both EDF and Westinghouse have a common interest now to challenge the tender. According to CEZ, however, their complaints are unjustified. The Korean company welcomes the contract because this contract will help it gain a foothold on the European market.

Conclusion

The need to build new nuclear power plant (NPP) units arises from several factors, including changing consumption patterns, the limited lifespan of existing NPPs, the need to reduce reliance on coal-fired power plants (PPs), and rising electricity demand. The government aims to gradually reduce coal consumption and increase the use of nuclear and renewable energy sources. Strategic plans project an increase in electricity production to 95 TWh by 2050, with a greater share coming from renewable energy. The energy sector is also expected to reduce greenhouse gas emissions and achieve climate neutrality by 2050. By 2040, nuclear and renewable sources are expected to dominate electricity production. To prevent potential electricity shortages, the construction of new reactors is necessary. Alongside new conventional reactors, CEZ is preparing to build small modular reactors. The government has selected Korea Hydro & Nuclear Power (KHNP) to construct two new units at the Dukovany NPP. This decision will benefit both countries, with the Czech industry involved and KHNP gaining a stronger reputation in the European market.

The Czech political opposition is criticizing the energy market situation. After updating the energy policy, the opposition considers multiplying the output of renewable sources by 2030 to be unrealistic. It lacks a plan, when there will not yet be a substitute for coal power plants. Nevertheless, the ministry is negotiating with manufacturers. There is an effort to ensure that the shift away from the use of coal as an energy source is gradual and that the country does not get into a situation of a shortage of electricity. In the future, the government will decide what the future direction of the nuclear energy programme will be and whether the construction of other nuclear units will continue. Open are issues as whether the contract for the construction of additional reactors will be extended or whether a different model of ensuring the country's energy needs will be chosen.

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