

# The Nuclear Review

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Spotlight Interview:  
Nuclearelectrica

Government Policies Drive  
Nuclear Power Industry  
Developments—Part II



# Spotlight Interview— Nuclearelectrica



## *A Story of Nuclear Power's Remarkable Comeback in Romania*

*The National Company “Nuclearelectrica” SA is a government-owned company listed on the Bucharest Stock Exchange (BVB:SNN) since 2013, and in its current shareholding structure the Romanian State owns 82.49 percent of the shares. Its main activities include electrical power, heat production, and nuclear fuel fabrication. The company has an important role at the national level, supplying about 20 percent of Romania's electricity and 33 percent of the total low-carbon energy production.*

*Nuclearelectrica owns and operates two CANDU reactor units with a total combined capacity of 1,300 MWe, which commenced operations in 1996 (Unit 1) and 2007 (Unit 2) at the Cernavoda Nuclear Power Plant. The Cernavoda Plant was the first and only nuclear power facility in Europe to adopt CANDU (Canadian deuterium uranium) technology. The Cernavoda Plant is located in the Dobrogea region of southeast Romania, near the Danube River and the Danube-Black Sea channel.*

*Romania is planning to expand its nuclear power program, including both large reactors (two additional CANDU reactors—Cernavoda Units 3 & 4) and small modular reactors (SMRs). Nuclearelectrica also plans to extend the operating life of Cernavoda Unit 1 to 60 years.*

*On the fuel cycle side, Nuclearelectrica owns a nuclear fuel fabrication plant (Pitesti Nuclear Fuel Factory), as well as a uranium concentrate processing line (Feldioara Uranium Concentrate Processing Factory), which was recently acquired in order to support the fuel supply for Romania's long-term investment in nuclear projects.*

*TradeTech's "The Nuclear Review" recently had the opportunity to interview Nuclearelectrica CEO Mr. Cosmin Ghita, who shared his views on various opportunities and challenges confronting the company and also the global nuclear industry.*

**TNR:** *Let's kick off our conversation with a recent agreement involving your company, which was signed in mid-November 2024 during the COP29 climate conference*

*in Baku, Azerbaijan. The Engineering, Procurement, and Construction Management contract for the completion of Romania's Cernavoda Units 3 and 4 has been signed with*



**Cosmin Ghita**  
CEO, Nuclearelectrica SA

*a joint venture including Fluor, AtkinsRéalis, Ansaldo Nucleare, and Sargent & Lundy Energie. The estimated value of the contract is about €3.2 billion (US\$3.4 billion). Notably, this isn't just a contract—it's a story of nuclear power's remarkable comeback in Romania. Can you share with us the history of these two reactor units, the milestones of the project, and the benefits of this investment for Romania?*

**Cosmin Ghita:** Indeed, the Engineering, Procurement, and Construction Management contract signed in November 2024 in Baku marks a major milestone in the advancement, and ultimately completion, of Romania's strategic Cernavoda Units 3 and 4. The contract represents the foundation of the project, providing the overall coordination

of project implementation through design and engineering, technical assistance, quality assurance, project management, and procurement support services by a consortium made of experienced, internationally recognized partners.

As for the history, the Romanian civil nuclear program started in the early 1980s when construction of a multi-unit, CANDU technology nuclear plant began on the Cernavoda site. Currently, there are two units in operation—Unit 1 being in commercial operation since 1997 and Unit 2 since 2007 (**Figure 1**). The civil structures of Cernavoda Units 3 and 4 are 40-50 percent completed and have been in preservation since cessation of works in 1991.

After several attempts to relaunch the construction program during the last three decades, in 2021, a new strategy for the completion of the project was adopted. Finally, in June 2023, the “Support Agreement”

between the Romanian government and Nuclearelectrica, with respect to the Cernavoda Units 3 and 4 completion project, was signed. And once these units are connected to the grid, 66 percent of Romania’s low-carbon energy will be provided by nuclear.

The EPCM contract, with an estimated duration of 108 months, is structured in two stages, namely the Preliminary Works Phase (24-30 months) and later, subject to commercial terms being further refined, and the final investment decision being taken, the Construction Phase (80-84 months).

Notably, this is a strategic project for Romania’s long-term energy security and deep decarbonization, a supply chain “developer” and a new generation of nuclear experts’ “incubator.” Actually, with the concluding of the EPCM contract, the project is on track to become a reality in the early 2030s.

**TNR:** *It is important to note that in recent years government policies worldwide have evolved to acknowledge and support nuclear power's critical role in achieving energy security and carbon reduction goals.*

*What significant moves were taken by the Romanian government (e.g. updated energy policy, international collaboration, etc.) to support reshaping the local and European nuclear landscape, especially in the current geopolitical context?*

**Cosmin Ghita:** First, I would like to outline that without more nuclear power, the transition to a low-carbon economy becomes more difficult and costly—requiring an additional US\$1.6 trillion of investment in advanced economies over the next two decades.

In this context, Romania took measures to smooth the path towards decarbonization—from supportive standpoints to the European Commission on the role of nuclear in the energy transition—to the national energy strategy update, and the development of supportive financing mechanisms such as “Contract for Difference” (CfD). The Romanian government also provides support towards state-of-the-art technologies able to facilitate the replacement of coal-based facilities (e.g. SMRs) and puts strong emphasis on developing international cooperation and partnerships in order to have robust deployment of nuclear projects.

Nuclearelectrica, as Romania’s state-owned company, stands as a cornerstone of regional energy



**Figure 1 Cernavoda Nuclear Power Plant, Romania**  
Source: Nuclearelectrica

security, playing a pivotal role in ensuring a stable and clean energy supply in an increasingly dynamic and challenging geopolitical environment (especially with Ukraine as a neighboring country). By delivering reliable baseload electricity through nuclear power, Nuclearelectrica not only strengthens Romania's energy independence but also reduces reliance on imported energy sources, contributing to greater resilience across the Southeast Europe region.

In the current nuclear landscape, I think that strategic international partnerships are also essential. Romania's collaborations with partners such as Canada, the United States, Italy, and South Korea represent far more than investments/contracts—they signify alliances that advance cutting-edge technology, expertise, and shared values of energy security and sustainability, paving the way for future nuclear advancements and ensuring operational excellence.


**TNR: Another important part of the Romanian nuclear power program expansion is represented by the refurbishment project for Cernavoda Unit 1, which is planned for 2027-2029 at an estimated cost of €1.9 billion.**


**As a reminder for our readers, CANDU reactors have an initial lifecycle of 30 years. Following a refurbishment process, this lifecycle may be extended by another 30-35 years. Unit 1 at the Cernavoda Plant began commercial service in 1996.**


### ***What are the milestones for the Cernavoda Unit 1 reactor life extension, and how will you prepare to ensure timely and quality completion of this project?***

**Cosmin Ghita:** Yes, just recently, on December 19, 2024, Nuclearelectrica signed the Engineering, Procurement Construction (EPC) contract, a critical milestone for the completion of this project. The contract focuses on the development of the detailed design and execution steps, procurement of equipment and materials, execution of retubing works and refurbishment works, as well as construction of the infrastructure necessary for the Cernavoda Unit 1 Refurbishment Project.

The Unit 1 life extension is a complex phased project that started more than 10 years before the actual planned shutdown for refurbishment, with the first phase of the project being approved by Nuclearelectrica's shareholders back in September 2017.

 Phase 1 of the project consisted in the identification and definition of the activities necessary for the refurbishment, so that it can operate for another 30-year life cycle, and signing a contract with the current technology owner, CANDU (AtkinsRéalis).

 Phase 2, the current one, started after the approval of the initial feasibility study in February 2022, and focuses on securing financial resources, preparing the execution of the refurbishment activities, and obtaining all the necessary approvals and permits required for the implementation of this project.

 Phase 3 of the project will start with the shutdown of Unit 1 in 2027, and will focus on the execution of the works for the refurbishment in the unit's facilities, as well as its return to operation.

The entire process is based on pre-project contracts, which already ensure sufficient deliverables for the initial phases of the EPC. Additionally, we secured the tools necessary for retubing approximately two years ago, and deliveries to the site will begin soon. All these preparatory works and efforts ensure an optimal roadmap for the project and a solid readiness for a refurbishment straight start in Q4 2027.

I would also like to add that we are keen to work with internationally renowned and experienced partners, which have historically contributed to the current operational performance of Cernavoda Units 1 and 2.

As a reminder, Cernavoda Unit 1 marked the beginning of the Romanian nuclear program. From 1996 to the present, the operation of Unit 1 has resulted in the avoidance of 140 million tons of CO<sub>2</sub> emissions, and has safely delivered more than 142 million MWh, at a capacity factor of over 90 percent. This refurbishment project for Unit 1 will further support Romania's decarbonization goals (**Figure 2**).

**TNR: At the global level, given the ambitious objective to double and even triple the nuclear capacity by 2050 to boost energy security and reduce carbon emissions, nuclear energy investment must increase to about US\$125-150 billion annually,**

*with a total cost that could approach \$3-4 trillion.*

*What are your views on the challenges and opportunities regarding the financing of nuclear projects? And what solutions are you exploring for the financing of Romanian nuclear projects?*

**Cosmin Ghita:** Regarding the financing of our nuclear projects, I would like to mention the support of the Romanian government in the form of state guarantees, financing mechanisms such as Contract for Difference, in kind contribution, as is the case of Units 3 and 4, and the international interest of our Euro-Atlantic partners.

In terms of financing solutions that are proven to work in our context, I will briefly refer to three points:

One, the role of the state. The nuclear industry is currently witnessing an attempt to shift from entirely state-financed and -owned nuclear investment projects, towards private financing and the setup of support financing mechanisms. Practice has proven to us that entirely private financing is rather impossible in our context with current new build, and that such strategic projects, given their nature and features combined with additional external risk-related elements, still require government support, involvement, and guarantees. The support of the state can take different forms, which comply with the European Union legislation on state aid. This leads me to the second point.

Employment of support mechanisms to unlock financing-transparent, predictable, market-based and competitive support

mechanisms, which strictly address the nuclear development. These need to be robust two-way pay mechanisms which could be destined to develop a wide array of low-carbon energy generation projects. Like the CfD... a two-way “Contract for Difference” is a contract signed between an electricity generator and a public entity, typically the State, which sets a strike price. The generator sells the electricity in the market but then settles with the public entity the difference between the market price and the strike price. Thus, it allows the generator to receive stable revenue for the electricity it produces, while at the same time it provides a revenue limitation for generators when market prices are high.

And three, Export Credit Agencies (ECA) financing, for either new build or refurbishments. Many countries have export credit agencies for their domestic industry, including the nuclear industry. A lot of projects, in hundreds of billions of dollars, are supported worldwide through ECA means—from direct lending to intermediary loans, to interest rate regulation. Nuclear, based on the fulfilling of OECD requirements, is the perfect candidate, considering the longer payback periods and the accompanying financing maturities (often over 15 years, which usually exceeds the commercial banking preference). In conclusion, ECA financing can be an engine to restart major investments in nuclear new build.

**TNR:** *In the southern part of Romania, at Doicesti, on a former coal plant site, a new kind of nuclear reactor is taking*



Figure 2 **Cernavoda Nuclear Power Plant, Unit 1, Romania**  
Source: Nuclearelectrica

*shape. The small modular reactor (SMR) Doicești project aims to develop Europe's first nuclear power plant with SMR NuScale power technology.*

*What is the status of the SMR project, and can you share some details on the progress that has been made on various levels (Technical, Licensing, Supply Chain, Financing, etc.)?*

**Cosmin Ghita:** The SMR project is currently at an early stage, with a series of initial engineering and design activities and technical analysis of the site of the former Doicești coal plant ongoing. We have recently begun Front-End Engineering and Design (FEED) Phase 2 studies with an estimated duration of 15 months, at the end of which we will understand more about the feasibility and the economics of the SMR technologies.

We estimate that the first modular reactor of the Doicești SMR project will be commissioned by the end of this decade, but the schedule will be further developed after the finalization of the FEED studies by the project company, RoPower Nuclear.

Globally, there is a lot of focus on SMR technologies, and the European Commission (EC) also recently announced the creation of an Industrial Alliance dedicated to SMRs, which will focus on accelerating their deployment and ensuring a strong European supply chain, including a skilled workforce. The EC recognizes the contribution that SMRs can make to decarbonizing the energy sector, as well as other benefits, including job retention and creation.

Strategically, the Doicești project will demonstrate the feasibility of transitioning from coal to nuclear, and in the process, Romania has a unique opportunity to build a strong expertise in nuclear construction and project management, as well as commissioning and operations.

Lastly, the project will also support the country's efforts to re-industrialize, whilst, potentially, becoming a production and assembly center for components and a hub for training future operators, as well as the preferred operator for other SMR plants under development elsewhere in Europe.

Romania has the experience to be involved in the development of a project of this scale: it has 28 years of safe operation at the Cernavoda Plant, it has a rigorous regulator, which has already approved the Basic Authorization Document that will facilitate all stages of the SMR project implementation in Romania, a chain of nuclear industry suppliers, and an education system with the highest engineering standards.

The SMR plant project with six 77 MWe modular units will have a capacity of 462 MWe and will produce clean and safe energy. Thus, compared to the former, polluting coal-fired power plant in Doicești, the new one will avoid about 4 million tons of CO<sub>2</sub> emissions per year, and will create many jobs in the area—about 200 permanent jobs, 1,500 jobs during construction, 2,300 jobs in production and component assembly, as well as jobs for operation and maintenance of the facilities for the next 60 years.

**TNR:** *When looking at market prices for nuclear fuel*

*components, a primary driver behind increased prices in recent years is the perception of a primary supply shortage, threats to deliveries, inflation in predicted production costs, and general uncertainty around the availability of future supply. These fundamental concerns have been amplified by geopolitical and logistical risks.*

*How does Nuclearelectrica plan to navigate these challenges? What are the plans for enhancing the security of nuclear fuel supply, from uranium to fuel fabrication (for the actual and future reactors)?*

**Cosmin Ghita:** I would first mention the maintenance and development of the nuclear fuel cycle facilities in Romania, a priority project for me since the beginning of my mandate; a project that I consider essential for the security of fuel supply and the development of future nuclear capacity. Very briefly, in 2022, Nuclearelectrica completed the acquisition of a uranium concentrate processing line from the National Uranium Company (CNU) Feldioara Branch, and between January and March 2023, all the necessary steps were taken to authorize and prepare the production process. Currently, Feldioara is the subsidiary of Nuclearelectrica, it is operating at optimal capacity, and we will continue to modernize it.

Also, we have changed the fuel procurement strategy with the main purpose of avoiding dependency on a single supplier (previously, CNU). Today, we acquire U<sub>3</sub>O<sub>8</sub> from the international market (three

suppliers), process it into UO<sub>2</sub> at the Feldioara factory, and use it for the manufacturing of the fuel bundles at the Pitesti domestic plant.

Regarding fuel fabrication, to overcome the challenges in terms of operational safety and security of supply, we have expanded our qualified supplier base, with a minimum of two for each raw material used for the nuclear fuel components. We aimed for relevant companies from different geographical areas, with proven expertise in the nuclear field.

At the same time, we purchase transparently, using public procedures at competitive prices and considering long-term contracts, to limit sudden price variations and to ensure stocks' safety. This allows for advance planning, improving the logistical aspects, and increasing the risk mitigation, quality assurance, quantity, and cost reduction, so finally the security of supply. In addition, we considered expanding raw materials inventory to avoid emergency purchases during volatile periods in the markets.

Doubling the nuclear capacity (with the future Units 3 & 4) will bring other challenges, but it also comes with advantages, by increasing the quantities of raw materials needed and thus increasing the attractiveness and interest among representative suppliers at a global level. Being an almost vertically integrated company is another factor of stability and comfort.

**TNR:** *Nuclear power is a long game, it takes years to build and operate reactors, and an important focus has to be the approach to human capital. What are your company's plans to prepare the actual and future labor for Romania's ambitious nuclear energy program?*

**Cosmin Ghita:** Nuclearelectrica actively identifies, recruits, and trains human resources for the future, and relies on the experience and specialists trained over time, those who also mentor the younger generation of nuclear professionals. We have been actively working for several years to attract manpower for the strategic projects we are developing.

To this end, we have launched the so-called "Excellence Core" platform ("Nucleu de Excelenta" in Romanian), Nuclearelectrica's employer brand, to prepare both for the generational change and to attract and train a new generation of professionals in the nuclear industry. We reached thousands of young people through the programs developed—organizing career fairs, presentations, events, scholarships, dual school, vocational schools, and internships. We partnered with educational institutions, assessing the current curricula and launching first-of-a-kind high education programs, together with our in-house training center.

We are also taking important steps in order to obtain a clear overview of the workers and skill sets which are going to be required in the short, medium, and long term. We work together with other organizations in the nuclear field all over Europe in order to define a long-term nuclear skills strategy, designed in such a way that allows it to be used at national, regional, and European level and adaptable depending on the (local) circumstances (**Figure 3**).

**TNR:** *And finally, what do you consider the main highlights for your company for the year 2024? And what news should we expect from Nuclearelectrica in 2025?*

**Cosmin Ghita:** For this question, I will state the very essential point for Nuclearelectrica: 2024 was the year in which all our strategic projects have reached critical milestones, the point of no return.

And 2025 will see it go smoothly towards completion!



**Figure 3 Engineer at a Nuclear Power Plant Control Room**  
Source: Adobe Stock



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