

## Summary of Estonian Nuclear Energy Working Group's Interim Report

September 2022

Nuclear energy produces around 10% of global electricity and it is the world's second largest low-carbon energy source after hydropower. In 2022, according to the IAEA, there were a total of 441 nuclear reactors in operation in 32 states and 53 new reactors were under construction.

In 2021, according to the IAEA, 26 states were planning to utilise nuclear energy, 10 of which have already made a decision to implement nuclear energy, and 16 states, including Estonia, are in the analysis stage. The IEA estimates that the global capacity of nuclear power will double by 2050 – from 415 GW in 2020 to more than 810 GW in 2050.

The war in Ukraine, Russia's unstable conduct as an energy exporter and the imposition of sanctions on Russia have exacerbated the need to ensure energy security across Europe. Investment in and development of renewable energy will therefore be increased and accelerated. The suitability of nuclear energy is being considered by a number of countries, as it is seen as part of the diversification of energy production.

As the proportion of renewable energy increases, the ability of the power system to reliably and cost-effectively cope with the volatility and uncertainty of demand and supply becomes an increasingly important factor in electricity security. In July 2022, natural gas and nuclear energy were added to the taxonomy category of transitional activities by a Delegated Act of the European Commission, as it was stated that, in the context of the green transition, the balance of the power system has to be ensured when increasing the capacity of renewable energy, which in turn requires controlled capacities in the system.

The long-term development strategy Estonia 2035, which was adopted by the Riigikogu in 2021, sets the goal of achieving climate neutrality by 2050. Considering global trends, Estonia has to keep moving towards climate-neutral electricity production in order to maintain the competitiveness of our electricity production. Estonia's 2030 National Energy and Climate Plan and the Analysis of the Opportunities to Increase Climate Ambition in Estonia have proposed the implementation of nuclear energy after 2030 as a potential solution. Before submitting a proposal to the *Riigikogu* for the construction of a nuclear power plant in Estonia, we need, in addition to developing technical knowledge in the field, thorough political preparation and to involve the public in the analysis and decision process.

With a decision of the cabinet meeting of the Government of the Republic of 5 November 2020, the Ministry of the Environment and the Ministry of Economic Affairs and Communications, together with other relevant ministries, were instructed to convene the national Working Party on Nuclear Energy. The composition of the WPONE was approved at a cabinet meeting on 8 April 2021. The working party is led by the Secretary General of the Ministry of the Environment and, in addition to the Ministry of the Environment, the working party includes the Environmental Board, the Ministry of the Interior, the Ministry of Finance, the Ministry of Justice, the Ministry of Education and Research, the Ministry of Economic Affairs and Communications, the Ministry of Defence, the Ministry of Foreign Affairs, the Ministry of Social Affairs and the Government Office.

The ultimate goal of the WPONE is to form coordinated views with the public on the possibilities of adopting nuclear energy in Estonia and to submit its conclusions and proposals

to the Government of the Republic. With a decision adopted at a government cabinet meeting of 8 April 2021, the deadline for the submission of the first interim report on the results of WPONE's work was set for no later than September 2022. A comprehensive report, on the basis of which the state can make a decision of principle on the implementation of nuclear energy, has to be completed by the end of 2023 at the latest, as stipulated by a decision of the cabinet of 7 April 2022.

Commissioning a nuclear power plant, regardless of the technology used, requires at least 10-15 years of preparation and at least 100 years of continuous activities. Before making a decision of principle at the end of the first phase, all 19 aspects of nuclear energy utilisation prescribed by the IAEA have to be analysed, including the identification of potentially suitable locations for a nuclear power plant. States have to establish a national framework for nuclear safety requirements, the issuance of licences for nuclear power plants, and supervision and enforcement that involves both competent authorities and legislative drafting. In regard to the legal framework, international obligations and the development of infrastructure to ensure nuclear safety, it makes no difference whether a nuclear power plant is developed by the state or a private developer. In order to implement the nuclear programme, a separate nuclear act would have to be adopted, establishing legal bases for nuclear energy and activities related to the management of nuclear material and fuel, the fundamental safety requirements and the rights, obligations and liability of persons in relation to nuclear installations. In order to develop licencing and safety requirements, the relevant know-how should be developed/brought to Estonia and specialists should be trained.

In order to assess whether the state is ready to adopt nuclear energy, the IAEA offers member states an INIR (integrated nuclear infrastructure review) mission. In March 2022, Estonia made an official request to the IAEA to conduct the INIR mission in the second half of 2023. In the course of the INIR, the IAEA personnel and international experts will assess whether the state has analysed all 19 aspects of nuclear energy adoption in sufficient depth and whether the schedules and action plans for the necessary activities are realistic.

In January 2022, in order to support the WPONE, the Subsidiary Working Party on Spatial Planning was established, which deals with the preparation of the procurement of a preliminary study on the locations for a nuclear power plant and disposal site and verification of results. The subsidiary working party is led by the Deputy Secretary General for Regional Affairs of the Ministry of Finance and its work will continue at least until the preliminary analysis of locations is completed in the second quarter of 2023.

Until the end of 2022, the budget of the Ministry of the Environment includes €124,250 for the activities of the WPONE (€100,000 from the research and development budget and €24,250 from the main budget) and, by a decision of the cabinet meeting of 7 April 2022, additional funds in the amount of €250,000 have been allocated from the state budget for the following activities:

- a preliminary analysis of potential locations for a nuclear power plant and a disposal site for spent nuclear fuel – total cost €100,000; will be completed in the second quarter of 2023
- an analysis of security and readiness for emergencies – €50,000; will be completed in December 2022

- an expert analysis by the Finnish nuclear regulator STUK for the WPONE interim report – €20,000; will be completed in November 2022
- Study on public opinion – €4,250. In February 2022, AS Emor carried out a survey "Awareness of the field of nuclear energy and readiness for its adoption in Estonia" to analyse the population's knowledge of nuclear energy, their fears and expectations as well as preferences as to which channels they receive information from.
- 2022-2024 communication activities – €50,000.
- preparation of a human resources development strategy for the WPONE and mapping of a regulatory framework – €150,000. The deadline for its completion is December 2022.
- mapping the legal framework required to start the nuclear programme, updating the draft nuclear legislation and preparation of an explanatory memorandum – €100,000 in the first quarter of 2023.

The main international cooperation partner in all topics related to radiation and nuclear safety continues to be the IAEA, which offers various training sessions, consultations, and expert missions, compiles guidance materials and international standards. Cooperation and assistance on nuclear energy has been offered by the US, France, Germany, Japan, Canada and Finland.

In the period from September 2022 to December 2023, the WPONE will continue to analyse the 19 aspects of adopting nuclear energy prescribed in the IAEA guidelines and, at the same time, will prepare the final report to be submitted to the Government of the Republic and the self-assessment report required to prepare for the INIR mission.

In addition to activities planned from the 2022 budget, in order to prepare the final report it is necessary for the state to analyse matters regarding nuclear programme management, power grid development, financing, procurement, environmental protection, radiation protection, safeguards, nuclear fuel cycle and waste management. Greater involvement of stakeholders and the commissioning of expert assessments requires funding. When preparing the report, the WPONE will take into account the practices of other states as well as the analyses (e.g. the supply chain and funding strategies analysis, the macroeconomic analysis) commissioned by the private sector (Fermi Energia AS), which require validation by independent experts. It is necessary to develop additional capacities at research institutions to ensure that the state has competent partners and more support from universities.