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Nuclear Policy Outlook and Challenges for 2023

~ Can Ambitious Policy Objectives Be Realized? ~

<Executive Summary>

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Global nuclear energy market trends

1. In 2022, China launched commercial operation of two nuclear reactors. It also put into commercial operation the third reactor of the Karachi Nuclear Power Complex in Pakistan under an export project. Construction started for four reactors in China in 2022.
2. The Republic of Korea launched commercial operation of one reactor in 2022, while proceeding with a nuclear plant export project for the United Arab Emirates.
3. In Finland, Unit 3 of the Olkiluoto nuclear power station launched operation in December 2021 and achieved a grid connection in March 2022, but troubles have left its full-fledged operation in the balance.
4. Egypt started construction of its first commercial nuclear power plant in El Dabaa.

Remarkable European and North American trends

5. Remarkable developments have been seen in Europe and North America that give priority to nuclear energy from the viewpoints of global warming countermeasures and energy security. The United States has launched support for existing reactors facing the danger of being closed and has continuously promoted the development of new reactors. Poland and Ukraine announced their adoption of the Westinghouse AP1000 reactor.
6. The United Kingdom published its energy security strategy in April 2022, setting out the goal of developing up to 24 GW in nuclear power generation capacity by

2050 to boost nuclear energy's share of power generation to 25%. It is considering supporting new nuclear plant construction projects with the nuclear regulated asset base (RAB) model, which provides some income even before the power generation stage to reduce uncertainties for business operators.

7. In France, President Emanuel Macron in February 2022 announced an energy policy seeking to realize carbon neutrality by 2050. The policy indicates that at least six (additionally, up to eight) large light-water reactors will be constructed. In July, Prime Minister Elizabeth Borne announced a plan to fully nationalize French utility EDF to strongly promote energy security and decarbonization. As some existing reactors have been shut down due to stress corrosion cracking, France plans to check all existing reactors by 2025.
8. The above three countries are promoting the development of small modular reactors (SMRs) and fourth-generation reactors. Some relevant projects seek to construct demonstration reactors around 2030.
9. As indicated above, France and the United Kingdom have announced ambitious goals regarding nuclear energy. We would like to pay attention to how these goals will be materialized in 2023. In the United States and France, new nuclear reactor construction projects have been delayed substantially, causing excessive costs. Whether future projects would take advantage of lessons learned from such delays will be questioned.

Outlook and remarkable trends in Japan

10. Given published nuclear plant operation plans, prospects about the restart of reactors and safety measures for restarted reactors, nuclear power generation is expected to increase in FY2023 due to progress in the restart and the completion of counterterrorism facilities. However, the risks of prolonged safety screening and measures cannot be ignored.
11. In Japan, the Strategic Energy Plan has positioned nuclear energy as an important low-carbon electricity source. In response to the recent significance of greenhouse gas emission cuts and energy price spikes, talks toward nuclear energy use have been activated.
12. Latest nuclear energy policy trends include talks on the service life of existing reactors. Under the current rules, a nuclear reactor's service life is set at 40 years in principle and is to be extended for 20 years once on condition of passing certain examinations. The Ministry of Economy, Trade and Industry is considering subtracting a total operation suspension period from the 40-year (or 60-year) service life and extending closure deadlines for such period. Separately, the

Nuclear Regulation Authority is considering a new plan to test anti-aging measures 30 years after the operation start, admit a 10-year service on condition of passing the test, and conduct such test every 10 years thereafter.

13. New nuclear reactor development has been discussed in Japan as well. In July 2022, a technology roadmap for innovative reactor development was published, indicating that innovative light water and high-temperature gas-cooled reactors will be demonstrated in the early and middle 2030s. Among nuclear plant manufacturers, Mitsubishi Heavy Industries Ltd. announced the SRZ-1200 innovative light water reactor in September 2022. In November, the Japan Atomic Energy Agency announced its participation in a high-temperature gas-cooled reactor project in Poland. While such important developments have been seen, foreign countries such as the United States, the United Kingdom and Canada are moving to construct new demonstration reactors. We would like to pay attention to whether such a move would arise in Japan in and after 2023.

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