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Ukraine's Energy System Approaching a Transition Period

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Russia's invasion of Ukraine, which commenced on February 24, 2022, will soon enter its third year, and from the end of 2023, Russia's attacks on Ukraine have been continuing on an unprecedented scale. Day after day, Ukraine is being forced to restore or replace energy facilities and equipment subjected to destruction and damage by missiles and drones. For the countries supporting Ukraine, adopting an emergency response through the provision of mobile gas turbines, high-voltage transformers, power cables, batteries, and so forth in order to protect the country's energy life is a pressing issue.

At the same time, however, a discussion is progressing between Western countries and various international organizations, and those involved in Ukraine's energy sector, regarding how to go about rebuilding the country's energy system. A key phrase in that discussion is green transition. Ukraine and the European Union (EU) have an interest in common to aim for reaching net zero by 2050 against the background that while Ukraine intends to deepen its integration with the EU market from the standpoint of energy security, the EU pays a great deal of attention to Ukraine's untapped potentials of producing carbon-free energy. For example, Ukraine is positioned as a priority partner in relation to renewable electricity and hydrogen in the EU Hydrogen Strategy, adopted in 2020.

The Statement from the G7+ and Government of Ukraine Clean Energy Partnership for the Sustainable Recovery and Reconstruction of Ukraine's Energy System, which was released by the G7+Ukraine Energy Coordination Group (hereafter referred to as G7+CG) on December 4, 2023, in conjunction with the of COP28, clarified ongoing and large-scale emergency support for the crisis confronting Ukraine, including by repairing and stabilizing the country's energy grid, while also once again emphasizing a plan to align reconstruction support for Ukraine with the EU's energy and environmental policies¹.

¹ This Statement adheres to the G7 Leaders' Statement on Ukraine, which was announced on the occasion of the G7 Hiroshima Summit in May 2023. The Coordination Group consists of Ukraine, Poland, Czech, Slovakia, Romania, Bulgaria, Norway, Sweden, Estonia, Latvia, Lithuania, the

In April of the same year, the Ukraine government secured Cabinet approval of the Energy Strategy of Ukraine until 2050. That strategy sets out two major goals – ensuring energy security and energy independence, on the premise of gradually phasing out coal by 2035 and aligning with the goals of the European Green Deal. It incorporates the aim of having nuclear power and renewable energy each accounting for a 50% share of the country’s electricity mix by 2050. The damage the current war has wrought on Ukraine’s many thermal power plant facilities and its extensive transmission network, which were already decrepit, is also serving to heighten the country’s awareness of the importance of introducing dispersed power systems. Incidentally, as of 2021 nuclear power represented 55% of Ukraine’s electricity mix, coal 23%, renewable energy (including hydro) 13% and natural gas 9%, according to the statistics of the International Energy Agency (IEA).

Two scenarios that hypothesize Ukraine achieving carbon neutrality by 2050 – (1) Net Zero Base scenario and (2) Net Zero Intense scenario, are illustrated in *Clean Energy Roadmap: From Reconstruction to Decarbonization in Ukraine*. This report, commissioned by the Ministry of Energy of Ukraine prior to COP28, was prepared by national laboratories under the U.S. Department of Energy². (1) is a scenario that pursues “all technological change capabilities; additional sectorial targets (e.g., in buildings, transport, and industry); developing bioenergy, nuclear, green and clean energy options; and integrating European energy and climate obligations” in order for Ukraine to realize net zero in the energy sector with an eye on the country joining the EU. (2) is a scenario in which Ukraine becomes an exporter of green power and green hydrogen etc. from 2035, in addition to fulfilling all the contents of (1)³. Both (1) and (2) estimate that Ukraine’s renewable energy as a component of its electricity mix will reach around 65% by 2050, but in the case of (2), the scenario estimates the total power generated to be around twice that estimated in (1).

European Union (EU), the World Bank Group, the European Bank for Reconstruction and Development (EBRD), the United Nations Development Programme (UNDP), and the International Renewable Energy Agency (IRENA).

² Actually, this report also sets the Reference scenario, assuming no fundamental changes in Ukraine’s energy sector, to be compared with the Net Zero scenarios. For the definitions of the three scenarios, see page 12 of the report. The research was implemented by Argonne National Laboratory, Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, and Pacific Northwest National Laboratory in cooperation with Institute for Economics and Forecasting of the National Academy of Sciences of Ukraine, DiXi Group, etc. They consulted experts at World Bank, EBRD, IEA, International Atomic Energy Agency (IAEA), Energy Community Secretariat, specialized institutions in Denmark and Germany, etc. However, the views and opinions in the report do not necessarily represent the official positions of any of the government and non-government participating institutions, including from the U.S. and Ukraine. <https://www.pnnl.gov/sites/default/files/media/file/Ukraine%20NZW%20COP28%20report%202023.pdf>

³ Ibid., p.12.

Making progress with various internal reforms in Ukraine, including strengthening the country's measures to counter corruption, will also be a major key for the international community to mobilize both public- and private-sectors' efforts to strengthen support for the country's economic reconstruction. The above-mentioned G7+CG statement made it clear that the government of Ukraine will need to continue to drive transparent reforms in relation to the country's energy sector (including the further liberalization of the electricity market, introduction of an auction scheme for the renewable energy market, and private-sector participation in the construction of high-voltage power transmission and modernization of district heating systems), in a format that follows the recommendations in the World Bank Group's report, *Private Sector Opportunities for a Green and Resilient Reconstruction in Ukraine*, published in October 2023.

The Ukraine War is showing signs of dragging on, and more time will be needed before a blueprint for rebuilding the country's energy system comes into being. Depending on the outcome of the war, a range of physical conditions are likely to change. Nevertheless, it is necessary to consolidate our support that would pave the way for Ukraine's post-war recovery.

The Japan-Ukraine Conference for the Promotion of Economic Reconstruction will be held in Tokyo on February 19, 2024. In addition to serving as an opportunity for Japan to exhibit its distinctiveness, including in energy-related sectors, let us hope that it serves as an opportunity to find new ways to advance multilateral cooperation and collaboration with international organizations.

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