

**Challenges to Increase Renewable Energy
under Resources Price Spikes
<Summary¹>**

Yasushi Ninomiya
Senior Researcher, Manager, Renewable Energy Group
Electric Power Industry & New and Renewable Energy Unit
Institute of Energy Economics, Japan

Under the resources price spikes, renewables maintain the advantage over fossil power generation despite cost hikes

1. Manufacturing and transportation costs for renewable power generation facilities have risen due to resources price spikes since 2021. Solar PV and wind power generation costs entered into an uptrend for the first time after continuing to decline over more than 10 years. As the Ukraine crisis has added fuel to cost hikes, power generation facility installation costs in 2022 are projected to increase by around 15 % for solar PV and by around 20% for onshore wind.
2. At the same time, resources price spikes associated with the Ukraine crisis have led fossil power generation costs to increase substantially. Solar PV and wind power generation cost hikes have been less than those for fossil power generation, maintaining a cost advantage over fossil power generation.

Global renewable power generation capacity to post record growth in 2022

3. Growth in global renewable energy power generation capacity increased from 270 GW (including 130 GW in solar PV and 110 GW in wind) in 2020 to a new high of 280 GW (including 150 GW in solar PV and 95 GW in wind) in 2021. As renewable power generation capacity continues to expand even amid resources price spikes and the Ukraine crisis, capacity growth is likely to surpass 300 GW (including 180 GW in solar PV and 90 GW in wind power generation). From 2022 and on, the annual growth of 300 GW in renewable energy power generation capacity is likely to become a baseline.

Solar PV to continuously cover 60% of global renewable capacity growth

4. Solar PV accounts for a dominant share of annual growth in renewable energy power generation capacity. Solar PV's advantages, including cost competitiveness, high versatility and easy maintenance, will remain unchanged even under resources price

¹ This summary is based on the information available as of July 2022.

spikes. Therefore, solar PV will continue to account for some 60% of growth in renewable energy power generation capacity in 2022 and 2023. As well as solar PV capacity, offshore wind power generation capacity is posting a year-on-year increase of more than 20%.

5. China rapidly increased its offshore wind power generation capacity in 2021 to 26 GW, the highest national level in the world. Europe as a whole was the largest offshore wind power generation market in 2021, commanding 28 GW, including 13 GW for the United Kingdom, 8 GW for Germany, 2 GW for the Netherlands and 2 GW for Denmark. From 2022 and on, China will thus drive global market growth for offshore wind power generation, as well as solar PV and onshore wind.
6. Renewable energy's share of global power generation has expanded at an annual pace of 1 percentage point and is expected to reach around 29% in 2022, including 15 % for hydro, 4 % for solar PV and 7 % for wind.

Japan's renewable generation capacity growth decelerates while ensuring power grid flexibility becomes an urgent challenge

7. In Japan, growth in renewable power generation capacity has been decelerating remarkably since 2021 due to a gradual transition of public support scheme from the Feed-in Tariff to the Feed-in-Premium, a decline of tariff rates for the existing feed-in tariff, a decrease in suitable lands for large scale solar PV and local residents' opposition to renewable energy development. Therefore, the government needs to enhance policy measures to achieve the renewable target for 2030.
8. While renewable power generation capacity grows in Japan, ensuring power grid flexibility to accommodate a massive volume of variable renewable energy (VRE) has become an urgent challenge. A range of measures from short- to long-term are required to apply. Immediate short-term measures are almost limited to demand side energy management (DSM) through demand response (DR) and virtual power plant (VPP). Among medium-term measures are securement of dispatchable power plants, deployment of storage batteries and improvement of grid operations. Long-term measures can be enhancement/reinforcement of grid capacity and grid connection, possibly including innovative technologies such as P2G to produce hydrogen from surplus renewable electricity. These various measures represent additional costs accompanying VRE expansion.

Need for diversifying renewables supply chains and securing stable rare mineral supply

9. The Ukraine crisis has demonstrated the national security risk of depending heavily on certain countries for energy supply. Regarding renewable energy, concern has

grown about China's dominance of the global solar PV supply chain. Diversification of the solar PV supply chains is globally viewed as indispensable for energy security. Interest is also growing in reusing and recycling massive used solar PV modules and other waste equipment for renewables in the future.

10. Solar PV and wind power generation equipment depend more on rare mineral resources than fossil power generation. Initiatives to reduce such dependence will be required along with global cooperation arrangements for a stable supply of rare minerals.

Contact : report@tky.ieej.or.jp