

27 December 2022

The 443rd Forum on Research Works

Outlook and Issues Concerning the Domestic and International Renewable Energy Markets in 2023

~Accelerating Global Deployment and Examining VRE Measures~

< Executive Summary >

Yasushi Ninomiya, PhD

Senior Researcher and Renewable Energy Group Manager

Electric Power Industry & New and Renewable Energy Unit

The Institute of Energy Economics, Japan

Global renewable output increases, the share could reach around 32% in 2023

1. While global energy output in 2022 has been increasing by around 2% over the previous year, renewable output is expected to expand by approximately 10% year over year. In the same year, renewable output reached around 8,700 TWh (of which 4,500 TWh was from hydropower), and the share of renewables in global electricity generation could grow to 30% from 28% in 2021.
2. For 2023, while global energy output is expected to increase by around 2% year over year, the renewable output is projected to grow by about 7% year over year, with annual output reaching nearly 9,500 TWh. As a result, the share of renewables in global electricity generation could reach around 32% in 2023.

Renewable generation capacity to grow even faster in 2022-23

3. Global renewable generation capacity growth in 2021 was 280 GW/year, surpassing 2020, which had been the largest year on record. In 2022-23, deployment of renewable power generation facilities is expected to proceed, with capacity reaching a high level of nearly 350 GW/year, significantly more than in 2021. This is due to the accelerating trend to promote renewable energy deployment in China, Europe, and the U.S., which account for more than 75% of the global renewable energy market, amid growing interest in energy security, rising resource prices, and decarbonization.
4. According to the “14th Five-Year Plan for Renewable Energy Development” (June 2022), China aims to significantly expand its renewable output to 3,300 TWh in 2025, a 50% increase over 2020. In Europe, the “RePowerEU Plan” (May 2022), drafted against the backdrop of the crisis in Ukraine, states a goal of 45% for renewable energy share of final energy consumption in 2030, a major increase over the current

target of 32%. In addition, the U.S. passed the Inflation Reduction Act (August 2022), which extends tax credits for renewable power generation.

5. In 2023, about 90% of global renewable generation capacity growth will be provided by VRE, or “variable renewable energy,” sources like solar PV and wind power. For this reason, the challenge will be to ensure the flexibility of the power grid to accommodate large amounts of VRE and to develop solutions accordingly. There are also growing concerns about the extreme concentration of solar panel supply in a single country, China, and diversification of the supply chain has emerged as an essential energy security issue. Furthermore, along with efforts to reduce dependence on rare minerals and other resources for solar PV and wind power generation equipment, it will be necessary to establish a global cooperative framework to secure a stable supply of these resources.

Renewables market trends in Japan

6. The country’s renewable generation capacity, excluding large hydropower of 30 MW or more, will reach just under 100 GW by the end of FY 2023, and the amount of renewable output by this definition in FY 2023 will be 190 TWh. If large hydropower of 30 MW or more is included, the share of renewables in total power generation for FY 2023 is projected to be 22.5% (7.9% hydropower, 14.6% non-hydropower).
7. The annual growth rate for renewables deployment in Japan peaked in FY 2014 and has been on a long-term downtrend, declining further to 6% per year from FY 2020 onward. The annual increase in FY 2023 is also projected to remain low at just under 6 GW/year, a slight increase over the previous year. This trend runs opposite to the acceleration of global renewables deployment. If the pace of deployment remains at this level, achievement of target renewables share of 36-38% in power generation in FY 2030 will become uncertain.
8. In FY 2023, the amount of solar PV generation deployment will remain at 4.5 GW/year, the lowest level since FY 2012. On the other hand, the amount of onshore wind power deployment could increase to the 800 MW/year level in FY 2023 due to relaxing the scale of environmental assessment subjects. However, although the designation of suitable sea areas and bidding are proceeding, deployment of offshore wind power will not materialize in FY 2023.
9. A number of factors are behind the low level of renewable deployment in Japan. There are structural problems such as the change of support system from FIT to FIP; gradual devaluation of FIT prices; stagnation of the business model shift from a low-risk model with high FIT prices to a price-competition model with FIP/FIT; lack of new business models such as PPAs that do not depend on FIT/FIP; decrease of suitable sites for commercial solar PV generation; and opposition from local

communities against renewables development. Although policy measures are being taken to address these issues, the direct effects of these policies will not become obvious in the form of increased renewables deployment until FY 2023 or later, and additional policies may be necessary to accelerate renewables development in Japan.

Hydrogen trends

10. If all the published projects are implemented, global hydrogen production is expected to reach 24 Mt-H₂ (14 Mt of water electrolysis hydrogen and 10 Mt of fossil CCUS hydrogen) by 2030. A growing number of countries have set goals for the deployment of water electrolysis, and the global target for water electrolysis facility capacity in 2030 has doubled from 74 GW a year ago. Fossil CCUS hydrogen is currently mostly used as a feedstock for industrial processes and chemical production, but by 2030, fuel applications, including ammonia, will dominate.
11. In Japan, concrete moves such as FS by private companies to establish a supply chain for imported ammonia (targeting the U.S., Australia, the Middle East, etc.) are gaining momentum. Also, with NEDO support, a number of studies and technological developments are being conducted to build a model to promote the use of imported and domestic hydrogen locally.

Contact : report@tky.iej.or.jp