

426<sup>th</sup> Forum on Research Works on 25 July 2017

## **Outlook for Renewable Energy Market**

### **<Summary>**

Yasushi Ninomiya

Senior Researcher

New and Renewable Energy Group

New and Renewable Energy & International Cooperation Unit

The Institute of Energy Economics, Japan

#### Further growth of global market for renewable power generation capacity

1. Global renewable power generation capacity including hydro capacity is expected to expand from 2,130 GW at the end of 2016 to 2,400 GW (1,280 GW in hydro and 1,120 GW in non-hydro renewables) at the end of 2018. Of total power generation capacity in 2016, hydro accounted for 16.2% and non-hydro renewables for 7.5%. Growth in renewable power capacity hit a record high of 161 GW in 2016 and would decelerate to 120-130 GW in 2017 and 2018 due to slower expansion in the U.S. and China. Of the annual growth, Asia including China and India will account for 70-80 GW. Asia will thus lead global renewable power capacity expansion.
2. The U.S. in 2016 recorded the highest ever renewable capacity growth of 20 GW. While renewable energy policies by the Trump administration including tax incentives have been uncertain, its renewable power generation capacity is assumed to increase by around 15 GW per year in 2017 and 2018 thanks to the state-level promotion of renewable energy through RPS (Renewable Portfolio Standard) and other regulations associated with growing competitiveness of onshore wind and solar PV power generation amid cost cuts.
3. In Europe, annual renewable generation capacity growth peaked at more than 30 GW in 2011 and has slowed down to around 20 GW in a stable growth stage. In 2017 and 2018, the annual growth would remain around 20 GW. As offshore wind power generation costs have rapidly declined partly due to helpful government-led environmental assessment and to government support for grid connection, offshore wind is likely to lead further growth of renewable power generation capacity in Europe.
4. China's renewable generation capacity growth from 2015 to 2016 hit a new high close to 70 GW, accounting for about a half of the global growth. Annual growth would slow to 50-60 GW due to a pause in hydro capacity growth in 2017 and an increase in curtailment of solar PV and onshore wind power in 2018.
5. Since the inauguration of the Narendra Modi administration in 2014, India has been rapidly expanding renewable generation capacity, including solar PV capacity supported by rich solar radiation, under the national target of 175 GW excluding large-scale hydro plants for 2022. Annual capacity growth exceeded 12 GW in

2016 and would remain around or exceed the level in 2017 and 2018. In 2018, India's renewable generation capacity would reach to 120 GW overtaking the Japanese level.

#### Substantial falls in prices for solar PV and onshore wind in auctions

6. The auctioned prices of solar PV and onshore have substantially declined in the world over the years. Factors behind the substantial falls have included market growth and technological progress. According to the report by IRENA, the global average prices for solar PV in auctions dropped from 25 US cents/kWh in 2010 to around 5 cents/kWh at the end of 2016. Similarly, the average prices for onshore wind power plunged from 8 US cents/kWh in 2010 to around 4 US cents/kWh at the end of 2016. With these lower price levels, solar PV and onshore wind have become as cost-competitive as or more than fossil power generation in some areas in the world where sunlight and wind resources are wealthy. As the market continues expanding, with further technological progress being made, renewable generation costs will decrease further.

#### Japanese renewable energy market and policy trends

7. Japan's renewable generation capacity, excluding more than 30 MW capacity of hydro plants, would increase by 6.5 GW in FY2017 and by 5.5 GW in FY2018 to 63.3 GW at the end of FY2018. As a result, the renewable capacity would reach to 127.3 kWh in FY2018, doubling its share of Japan's total power generation from 7% in FY2012 to 13%. This would be 16% if more than 30 MW capacity of hydro plants are included. Solar PV will continue to account for some 90% of renewable generation capacity growth in Japan, indicating a globally rare case.
8. Japan's feed-in tariff (FIT) rate currently applies to large scale solar PV at about 19 US cents/kWh<sup>1</sup> is remarkably higher compared to the world level. That for wind power generation is about 20 cents/kWh<sup>2</sup>, also far higher than international levels. Behind these excessively higher FIT rates are the country's tougher climate conditions with earthquake, typhoon and storm at regular basis, and complex structure of solar PV industry. Japan is lagging far behind other countries in reducing renewable generation costs. As a result, FIT surcharges are rising, meaning growing burdens on electricity consumers.
9. In April 2017, Japan fully implemented its revised FIT law. Under the law, a massive number of non-operating solar PV plants, 27.7GW, which already received FIT approvals but without having grid connection contracts, were all cancelled at once. In order to reduce costs, Japan will launch renewable auctions for more than 2 MW solar PV plants from October 2017, setting long-term cost targets to prompt early independence of these PV plants from the FIT scheme. At the same time, for

---

<sup>1</sup> The exchange rate of 110 Japanese Yen/USD applies.

<sup>2</sup> Ditto.

renewables other than large scale solar PV, the FIT rates applied over the next several years are given in well advance, implying that the business risks for these non-solar PV renewable generation projects with longer lead times could be reduced.

10. Japan's total solar PV capacity, including operating plants and non-operating which received FIT approvals has almost reached to 64 GW, which is the target volume of the 2030 energy mix. This suggests that the target for solar PV is fully achievable. Compared to the solar PV, onshore wind has grown very slowly so far. However, the onshore wind projects of around 7.5GW are in the pipeline, most of them are currently subject to the environmental assessment, allowing the 2030 target for wind power to be achieved. Their actual implementation will highly depend on the grid operators' acceptance. Biomass power capacity, including non-operating approved projects, has well exceeded the lower limit of the 2030 target of 6 GW, meaning that the target has effectively been attained. Nevertheless, some degree of uncertainty remains whether biomass fuel procurement would be secured over a long term of 20 years. Meanwhile, geothermal is only renewable which has failed to expand effectively under the FIT scheme. However, by and large, Japan is making steady progress in expanding renewable energy and could attain the 2030 target for renewable generation capacity even in the first half of the 2020s.