

Outlook on the Global Renewable Energy Situation –Summary Report–

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Continued Expansion of the Global Renewable Electricity Market

1. In 2017, renewable energies excluding hydropower accounted for 8.4% of the global electricity production: wind power for 4.4%, solar PV for 1.7%, and biomass and geothermal for 2.3%; a total of 24.5% when including hydropower of 16.0%.
2. In terms of the global installed power capacity, renewable energies including hydropower are projected to increase from 2,290 GW at the end of 2017 to 2,600 GW at the end of 2019 in which 1,300 GW from hydro, 1,300 GW from other renewable power sources. The increase in installed capacity was a record-high of over 160 GW p.a. for two consecutive years in 2016 and 2017 but is expected to fall to around 150 GW in 2018-2019 as the pace of increase of solar PV eases in China. Asia including China and India accounts for approximately 50% of the total increase while Europe and the United States account for around 30%.
3. The year-on-year increase in China's¹ installed renewable capacity reached a record 79 GW/year in 2017, with solar PV posting a record annual growth of 53 GW p.a. However, the larger-than-expected increase squeezed the financial resources for the FIT scheme, and at the end of May 2018, a policy to reduce new FIT contracts was announced. Accordingly, the increase in solar PV capacity will lose momentum and is projected to remain at around 30 GW p.a. in 2018-2019.
4. India² has been rapidly building up its renewable power capacity since the inauguration of the Modi administration in 2014, aiming to achieve 175 GW, excluding large-scale hydropower, by 2022 mainly with solar PV by taking advantage of the country's favourable sunlight conditions. The increase in capacity of around 16

¹ Renewable energies accounted for 25.2% of China's electricity production in 2017 (hydropower at 17.9% and other renewable sources at 7.3%).

² Renewable energies accounted for 15.5% of India's electricity production in 2017 (hydropower at 9.1% and other renewable sources at 6.4%).

GW p.a. in 2017 is expected to continue in 2018-2019 mainly for solar PV at approximately 18-20 GW p.a. As a result, the renewable power capacity will reach nearly 150 GW at the end of 2019 and is most likely to surpass the expected renewable power capacity of Japan of 125 GW including hydropower in 2019.

5. In 2017, the first year of the Trump administration, the United States³ introduced 18 GW of renewable power capacity, the second highest along with 2013 after the record of 2016. There are many uncertainties including the administration's imposition of the safeguard measures against solar PV module imports and the impact of the tax reforms. However, the growth of renewable capacity has maintained its momentum due to enhanced policies of states to promote renewable energies, direct purchase of renewables by private companies, lower solar PV costs, and last-minute introduction before the phasing-out of PTC and ITC. As a result, growth of 20 GW p.a. for renewable capacity is expected to continue in 2018-2019.
6. Europe⁴ has seen a stable increase of renewable capacities of 20-25 GW p.a. in the past five years, and a similar increase is expected for 2018-2019. Offshore wind has more momentum compared to its onshore version, increasing at around 20% p.a. as opposed to 5% p.a. for its onshore counterpart. Further, solar PV is showing signs of recovery after the amount of new capacities bottomed out due to a rapid decrease in the generation costs.

Generation Cost to Continue to Decrease in 2019 for Solar PV and Wind Power

7. According to the International Renewable Energy Agency (IRENA), the levelized cost of electricity (LCOE) for large-scale solar PV (a global weighted average of 10 cents/kWh in 2017) is expected to drift down to around 6 cents/kWh in 2019. Likewise, the LCOE for onshore wind power (a global weighted average of 8 cents/kWh in 2017) is also likely to fall to around 5 cents/kWh in 2019.

The Renewable Energy Market and Policy of Japan

8. The total renewable electricity production excluding large hydropower plants over 30 MW is expected to increase by around 6 GW in FY2018 and 5.5 GW in FY2019, reaching a cumulative total of 74 GW at the end of FY2019. The total renewable electricity production excluding large hydropower plants over 30 MW is expected to reach 135 TWh in FY 2019, with its percentage in the total power production almost

³ Renewable energies accounted for 17.8% of the US' electricity production in 2017 (hydropower at 6.9% and other renewable sources at 10.9%).

⁴ Renewable energies accounted for 33.8% of Europe's electricity production in 2017 (hydropower at 15.1% and other renewable sources at 18.7%). Europe in this context refers to the EU members as well as non-EU countries such as Switzerland, Norway, and Turkey.

doubling from FY2012 from 7% to 13% (17% when including large hydropower plants). The situation where solar PV accounts for approximately 80% of the growth in renewables is likely to continue for the time being.

9. Solar power capacity has reached 75GW when including the operating capacity and FIT certified capacity, far exceeding the level specified in the 2030 Energy Mix of 64 GW. Biomass capacity is also above the 2030 level of 6-7 GW at 9.5 GW when combining both operating and FIT certified capacities and is projected to meet the 2030 level even when excluding the capacity which will be abandoned due to constraint on fuel procurement. Wind power is also seeing a steady growth in capacity that has completed environmental impact assessments and has been given a FIT certificate, and when combined with the already operating capacity, has nearly reached the 2030 target. Even considering the delay in geothermal power, the 2030 target for the entire renewable energy production, which is 22-24% of the total power output, may be achieved by around the mid-2020s if they are allowed to connect to the grid without a large burden. Meanwhile, the FIT surcharge is expected to exceed 2 trillion yen for 2017 alone and 50 trillion yen in total over the next 20 years.
10. Japan's Fifth Strategic Energy Plan approved by the Cabinet in July 2018 made a clear reference to "aiming to make renewables a key power source" as the long-term direction for the first time. To reduce costs and control the public burden, which were named as challenges to achieve this goal, efforts will be urged to reduce reliance on the FIT scheme such as by using auction and expanding self-consumption going forward. Further, to overcome the other major challenge of grid constraints, efforts are being made to improve the efficiency of the existing transmission facilities and boost the connection capacity by implementing "Japanese Connect & Manage" which is realised by rationalising the anticipated electric current, using the N-1 power control system which connects on the condition of immediate cut-off or limitation if an incident occurs, and using non-firm connection that connects power sources conditional on no-warranty output control during usual congestion periods.