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Renewable Energy Outlook of Japan and the World
Report Summary

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The global renewable energy market will continue to expand in 2019–2020

1. In 2018, the share of non-hydropower renewable generation in the total global power generation reached 9.4%, with wind power accounting for 4.8%, solar PV 2.2%, and biomass and geothermal 2.4%. Combined with hydropower at 15.8%, the total for renewable energy reached 25.2%, surpassing 25% for the first time.[1] The share of renewables has grown 0.7 percentage points per annum on average for at least the past five years and is expected to account for one-third of total global power generation (including hydropower) in 2025 if the installed renewable capacity continues to grow at the current rate.
2. In terms of installed power capacity, renewables including hydropower are expected to increase from 2,470 GW (hydro: 1,300 GW, non-hydro: 1,170 GW) at the end of 2018 to around 2,800 GW (hydro: 1,300 GW, non-hydro: 1,500 GW) by the end of 2020.
3. Installed renewable capacity increased by 171 GW in 2018, the second largest growth to date after 174 GW in 2017. It has increased by more than 160 GW for three consecutive years since 2016. Growth in new capacity remained generally on par with 2017 levels in 2018 despite forecasts of a slowdown to around 150 GW resulting from changes in China's renewable energy policy, as the growth of China's solar PV remained steadier than expected and the capacity of solar PV increased sharply in countries other than China.[2]
4. Solar PV and wind power are expected to become more competitive in 2019–2020 as their generation costs continue to decrease. Renewable power is expected to grow by around 170 GW/year, similar to 2017–2018 levels, due to the accelerated growth especially of solar PV in not only China but also the Middle East, Australia, Africa, Southern Europe, and the United States. For solar PV, the growth of distributed PV systems for self-consumption is increasing faster than utility-scale solar PV which has

[1] The share of variable renewable energy (VRE) for 2018 is 7%.
[2] New solar PV capacity dropped by 17% from 2017 levels in China whereas it grew by 23% in other countries. The latter surpassed the former in total installed capacity as well.

so far accounted for most of the solar PV output[3], giving rise to a gradual global shift from "selling to the grid" to "self-consumption."

Driver of global growth in renewables to switch from wind power to solar PV as costs decline

5. According to IRENA, the levelized cost of electricity (LCOE) for utility-scale solar PV projects commissioned in 2018 was $0.085/kWh for the global weighted average which is expected to decrease further by 44% to $0.048/kWh in 2020. Likewise, the LCOE for onshore wind is also expected to decrease by 31% from $0.065/kWh in 2018 to $0.045/kWh in 2020. Both of them expected to become even more cost-competitive as their costs fall approaching the lower bounds of thermal power costs by 2020.[4]
6. Solar PV has unique advantages unlike any other renewables, including scalability to meet the size of demand, simplicity, and ubiquity of sunlight as a resource. These, combined with the narrowing cost gap with onshore wind power each year, are driving the increase in solar PV worldwide. Solar PV overtook wind (including on- and offshore) as the main driver of the growth of renewables in 2016. This trend is expected to strengthen from 2019 onwards.[5]

The renewable market and policy of Japan

7. Installed renewable capacity, excluding large-scale hydropower capacity above 30 MW, is expected to increase by 5.5 GW in FY2019 and by 4.7 GW in FY2020, reaching 78 GW in total by the end of FY2020. The above-defined renewable capacity would generate 152 TWh of electricity in FY2020. Combined with the output of hydropower capacity above 30 MW, renewable energy output is estimated to reach 18.7% of the overall electricity production in 2020.
8. As of the end of 2018, the solar PV capacity, including both in operation and certified under FIT, reached 78 GW, far exceeding the 2030 energy mix target of 64 GW. The capacity of biomass, including in operation and certified under FIT combined, has also exceeded the 2030 levels (6–7 GW) with 11 GW, and is expected to meet the lower bounds of the 2030 target even if part of the capacity will not be operating due to fuel procurement. Wind power capacity has also mostly reached the 2030 levels when combining both in operation and certified under FIT, which is expected to gradually start operation going forward. Though geothermal alone is falling behind,

[3] The share of distributed PV systems for household consumption in the installed solar PV capacity has grown from 25% in 2016 to 38% in 2017, and the increase is expected to continue (IEA, 2018).
[4] Note that additional costs (integration costs) for grid reinforcement, power output suppression, and power storage, etc. will arise in the long term with the growth of the share of variable renewable energy (VRE).
[5] However, it should be noted that this trend may differ by country and region depending on climate conditions and construction costs.

overall, the installed renewable capacity seems well on track to reach the 2030 levels.

9. There are two major policy challenges: controlling the public burden by reducing renewable energy costs and overcoming grid constraints. Regarding the former, the burden on consumers would reach around USD 550 billion if all of the 90 GW of certified under FIT capacity enters operation. A major revision of the FIT law scheduled for 2020 is likely to include an introduction of the FIP (Feed-In-Premium) system, which will replace the FIT programme by direct marketing of solar PV and wind power electricity, and largely diminish the scope of the FIT. Regarding the latter, discussions on how to allocate the cost burden of network expansion/reinforcement are under way, as well as the introduction of the Japanese “Connect & Manage.” Recognising that renewable energy is required to become “an economically-independent key power source”, discussions currently focuses on a nationwide allocation of the cost of enhancing inter-area connection lines and setting transmission tariffs in a way that encourages appropriate investments in grid maintenance and enhancement.

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