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## **Outlook for Renewable Energy Market**

### **<Summary>**

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#### Overview of Global Market Trends

1. Global renewable energy power generation capacity exceeded 1,800 GW in 2015. Renewable power generation accounted for 24% of total power generation (the share includes 17 percentage points for hydro, 4 points for wind and 1 point for solar energy). While wind and solar photovoltaics generation capacity is growing in each region of the world, the center of the expansion is shifting from Europe to Asia (particularly China) and North America.
2. In the European Union, renewables' share of the power mix in 2015 increased by 0.3 percentage points to 28.8% (including 10 percentage points for wind and 3 points for solar PV). From 2010 to 2015, renewable power generation grew by 243 terawatt-hours, while natural gas power generation declined by 282 TWh. As renewable power generation increased, high-cost natural gas power plants lost opportunities.
3. Major European countries are exploring how best to hold down surcharges, as the burden on consumers, and integrate renewable energy into the electricity market in a bid to break away from their past policies including the feed-in tariff system, resulting in a slowdown in renewable energy expansion. The slowdown, though being temporary, is likely to continue for several years.
4. Meanwhile, renewable energy is expanding rapidly in developing countries thanks to government policy support and substantial cost cuts in solar PV and other renewable power generation. The elimination of subsidies for fossil fuels also supports renewable energy expansion. However, developing countries are required to address a great number of challenges including grid stabilization, the rising burden on consumers under the FIT system and an industrial shakeout under

excessive competition.

### Institutional Reform in Western Countries

5. In Germany, renewables' share of the power mix topped 30% (including 14 percentage points for wind and 6 points for solar PV) in 2015. However, renewable energy expansion decelerated due to the compulsory implementation of the market premium system, the establishment of annual expansion targets, a shift to a bidding system, and surcharges on private power generation for private consumption. In the United Kingdom, renewables' share of the power mix reached 25.7% (including 12 percentage points for wind and 2 points for solar PV) in 2015. However, renewable generation capacity growth is decelerating on the launch of the CfD (Contract for Difference for facilities with 5 MW or more in capacity), a subsequent end to the RO (Renewables Obligation), the substantial reduction of feed-in tariffs (for facilities with less than 5 MW in capacity), etc. In the United States, renewables' share of the power mix stood at 13.4% (including 5 percentage points for wind and 1 point for solar PV). Future renewable energy expansion will depend on the next president's decision on the PTC (Renewable Electricity Production Tax Credit) and the ITC (Business Energy Investment Tax Credit) known as major renewable energy promotion policies.
6. How to secure stable electricity supply in a deregulated market has been a traditional challenge and is growing more important amid renewable energy expansion. Fossil fuel power plants required to stabilize the grid have been plagued with deteriorating profitability amid electricity price drops and capacity utilization ratio declines through massive renewable electricity inflow into the wholesale market. Some of such plants have been shut down. In such circumstances, major Western countries are introducing or considering capacity mechanisms to secure supply and reserve capacity for stable supply.

### Trends in Japan

7. Operating capacity approved under the FIT system in Japan increased from 19 gigawatts at the end of March 2015 to 28 GW at the end of March 2016 and is expected to reach 65 GW at the end of FY2017. Approved FIT capacity has remained unchanged over the past year (at 87 GW at the end of March 2016) as the cancellation of non-residential solar PV approvals offset new approvals for other renewable power sources.
8. The revised FIT Act was promulgated on June 3, 2016. Before its effectuation on

April 1, 2017, government panels have launched discussions on how to build specific systems under the law. If 87 GW in all capacity approved under the FIT system is in operation, cumulative surcharges over 20 years may total 56 trillion yen (or 3.2 yen per kilowatt-hour). How to reduce the burden on consumers is a key challenge. Attracting attention is the cost efficient introduction of new facilities, as well as how to cope with non-operating approved FIT capacity affecting the later introduction of more efficient facilities.

9. In order to eliminate non-operating approved FIT capacity, the government has decided to require feed-in contracts for such capacity to be signed by the end of the current fiscal year. The requirement will help expel undesirable projects. The timing for the acquisition of a FIT approval has been changed from “after the submission of a business plan” to “after the signing of a feed-in contract.” In addition, deadlines between the approval acquisition and the operation launch are under consideration.
10. As for the cost-efficient introduction of renewable energy facilities, higher Japanese FITs than foreign ones must be lowered. In this respect, policymakers are considering a bidding system for commercial solar PV and a FIT reduction schedule for residential solar PV. Bidding systems are being tested in Germany and the United Kingdom, indicating cost-saving effects. Challenges regarding a bidding system in Japan include how to set project sizes and maximum bid prices, how to control project concentration in optimum locations (with good solar radiation and wind conditions) and how to cope with the possible stagnation of new investment under excessive competition.
11. As the FIT system reform makes progress with measures enhanced against non-operating approved FIT capacity under the revised FIT Act, approved FIT capacity is expected to decline. So, renewable power generation capacity growth will decelerate over a short term. By the end of FY2017, however, the capacity will reach 65 GW.
12. How to design the bidding system and the FIT reduction schedule holds the key to maintaining an appropriate renewable energy expansion pace to achieve the best mix for 2030. Given that the capacity imbalance between renewable energy sources in Japan is greater than in other countries, wind and geothermal capacity expansion must be enhanced.