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## Outlook and Issues Concerning Electric Power Business in 2022

### <Summary >

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#### State of electricity market competition in Japan

1. With day-ahead spot trading now accounting for 30% of all electricity sales, day-ahead spot prices have a significant impact on power generation facility profitability and retail competition. Since they began increasing in January of this year, day-ahead spot prices have moved more in step with LNG import prices. Day-ahead spot prices have steadily climbed on the back of raising LNG import prices since the second half of September, a development that bears watching the future.
2. Despite increasing day-ahead spot prices since January of this year, PPS' share of the market has increased in many areas. However, recent rises in day-ahead spot prices have fueled concern about the impact on PPS, which rely heavily on the spot market. Moreover, as the fuel cost adjustment system may not be sufficient for remedying the recent rise in LNG prices, raising electricity rates may be necessary.
3. Given customer interest in renewable value purchasing, the market for trading in non-fossil fuel value will be split into a market for renewable value trade (FIT non-fossil certificates) and market for meeting the obligations of the Act on Sophisticated Methods of Energy Supply Structures (non-FIT non-fossil certificates). FIT non-fossil certificates involve no "additionality," which may be needed to claim renewables value, and assessing such value will require keeping watch on how discussions unfold in the U.S. concerning similar certificates.
4. Regarding electricity supply and demand for this winter, while Japan has secured the 3% reserve margin needed at minimum for stable electricity supply in severe winters, supply could become tight if additional factors come into play. Reserve margin calculations factor in Power Supply I,

which must be maintained in the event of a once-in-a-decade extreme weather event. If not factored in, the reserve margin is under 3% for eastern and central/western Japan. For this winter, in light of last winter's electricity shortage, power producers are working to ensure a stable electricity supply by monitoring efforts by companies in the northeastern U.S. (e.g., ISO New England and PJM) to secure fuel. As such, continued efforts to encourage power saving will be needed.

### Stable supply

5. Electric power crises occurred around the world in 2021. While much of these was the result of heat waves and cold waves, it is conceivable that a declining "energy reserve" needed to ensure a stable supply of electricity is also a factor. Arguably, it is becoming clear that a fuel shortage could spark an electricity shortage if renewable output continues to drop, despite renewable capacity deployment expanding overall.
6. In Europe, rising natural gas prices have seen day-ahead spot prices maintain high levels since September, while in England retail electricity and gas companies are failing or pulling out of the market left and right. In France, a shutdown of nuclear power facilities this winter due to the effects of COVID-19 could create a power crunch. In the U.S., while spot prices may not be going up like in Europe, gradually rising gas prices are impacting the energy situation. In addition to the effects of fuel prices, rising surcharges and costs of transmission and distribution that owe to increasing renewable capacity deployment are making electricity rates go up in more countries. This is making solar PV self-generation profitable for an increasing number of countries and regions.
7. Due to increasing renewable capacity deployment and sluggish wholesale electricity prices, more and more developed countries are seeing decreasing traditional power capacity deployment. This summer, the California ISO asked consumers to conserve energy eight times. The North American Electric Reliability Corporation sees power crunch risk in the event of a severe winter for ERCOT, MISO, and SPP in Texas, while California and ISO New England face the same risk due to natural gas shortages.
8. In Asia, as well, Singapore has recorded several days where average daily electricity prices have exceeded ¥100/kWh. December 2 saw the country's highest price ever: ¥371.9/kWh. This situation has led to many retail

suppliers pulling out of the market. Feeding this development has been power crunches caused by a large-scale decommissioning of superannuated gas-fired power plants in 2019. With gas-fired power accounting for more than 50% of its energy mix, Singapore is mulling over importing additional supply capacity due to the difficulty of building new gas-fired power plants. Japan also needs to consider new investment procurement policies that accord with its decarbonization goals.

9. Ireland, the UK, northern Europe, and the Electric Reliability Council of Texas, which all run relatively small power grids, are formulating additional measures to address the declining capabilities of synchronous generators, which provide inertial force (rotational energy used to stabilize grid frequency) due to the rise of asynchronous generators for energy sources such as wind and solar PV. Despite increasing frequency destabilization in the region, the UK has seen less frequency fluctuation due to a fast frequency response implemented in October 2020. Japan will need to consider its own measures in light of steps now being taken by other countries.

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