Japan's Electricity Market :Status and Next Steps Forward

Sept. 6, 2022

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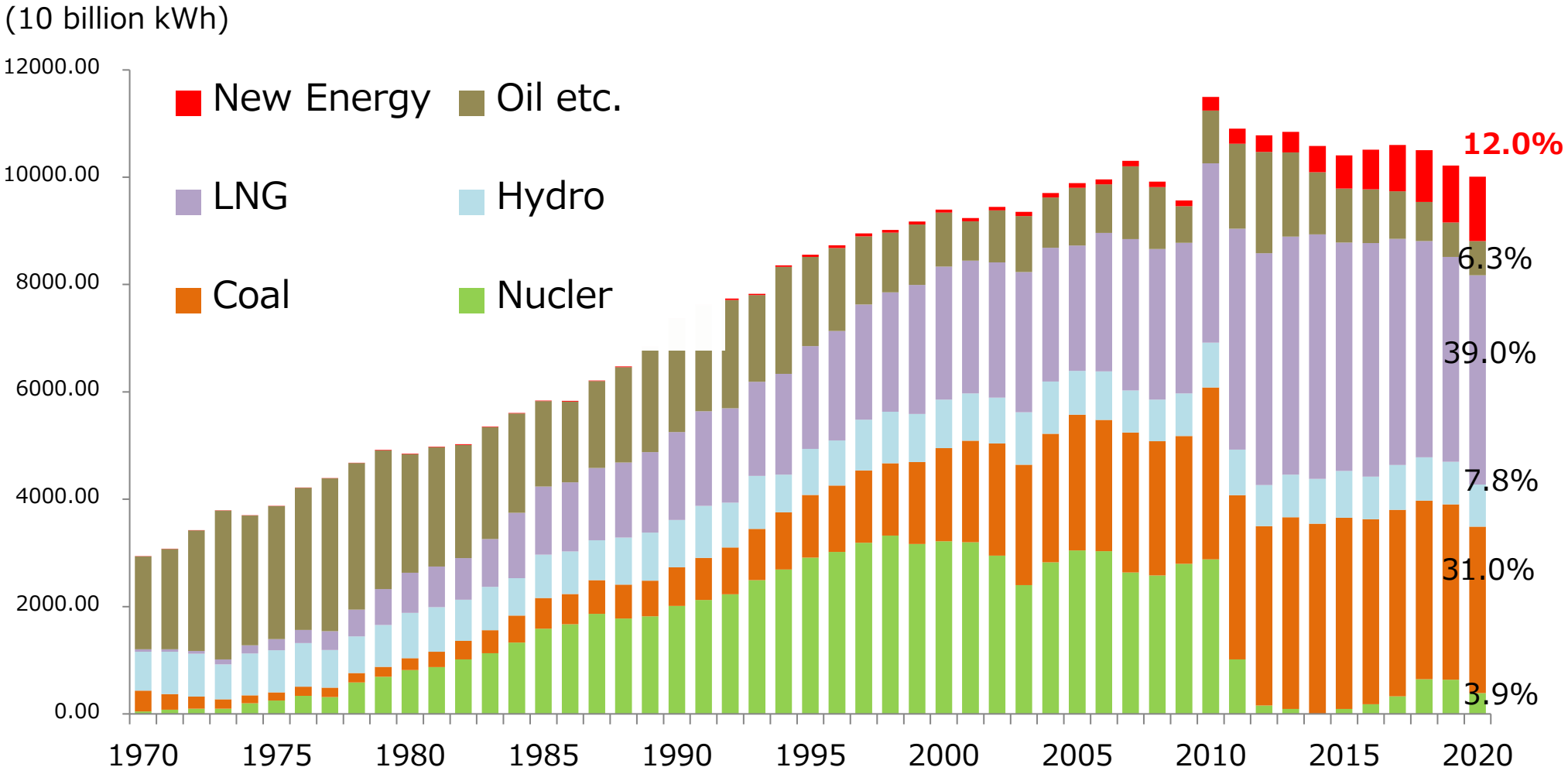
Power Production in Japan | 1970-2020

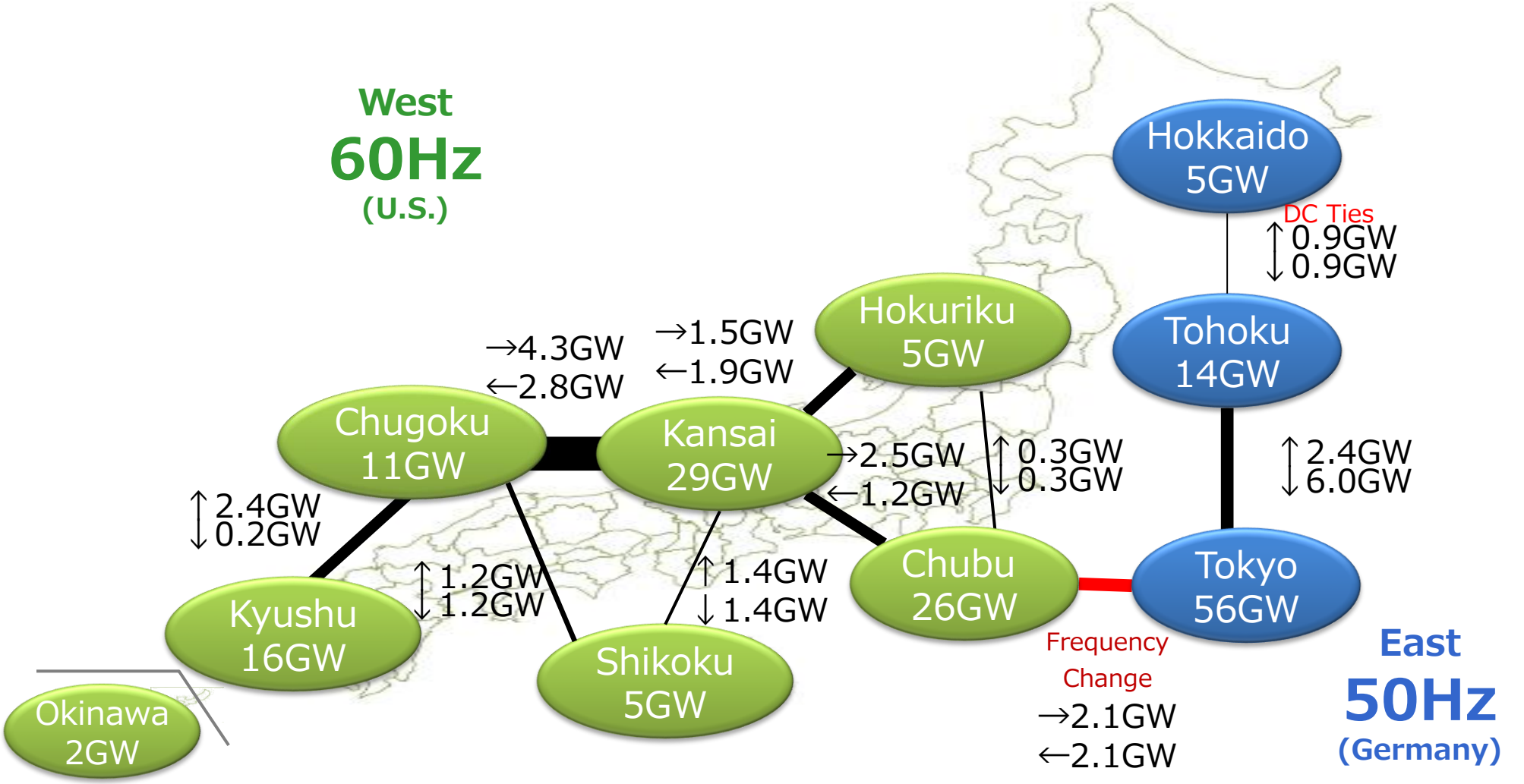
- Power production in Japan mainly consists of LNG and coal.
- The share of renewable energy has been increasing in recent years.



https://www.enecho.meti.go.jp/about/whitepaper/2021/html/2-1-4.html

Power Grid in Japan

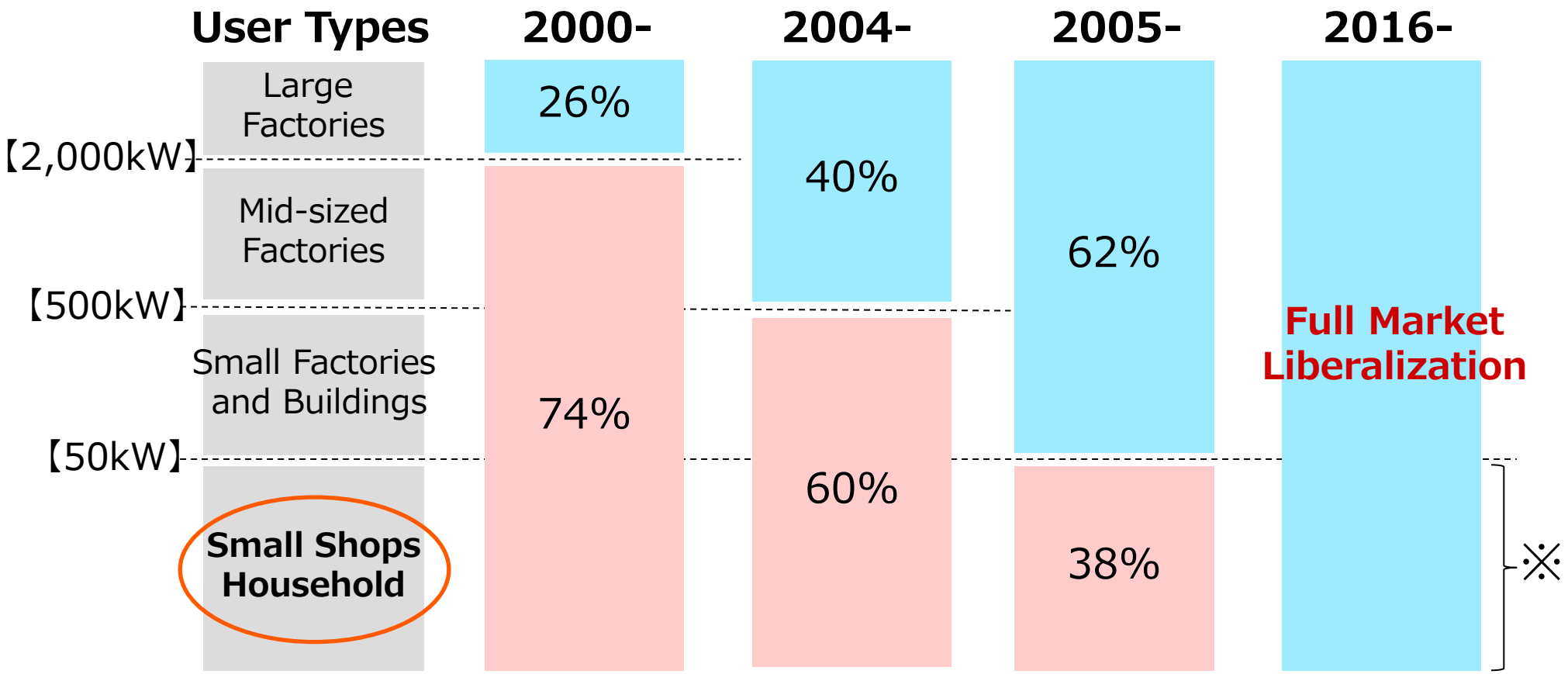
- 2 Frequencies (50Hz and 60Hz) and 10 TSOs.



** The figures above indicates the maximum electricity demand in 2020.*

Electricity Retail Market Liberalization in Japan

- Retail market had gradually been liberalized since 2000.
- Full market liberalization was completed in 2016.



※Regulated retail tariffs can be abolished in 2020 or later.

Roadmap for Market Reform

Sep. 2015

EGC
Established

Apr. 2016

Full Liberalization of Retail Market

imbalance settlement based on the spot price

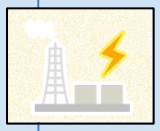
Apr. 2017

Open procurement of balancing power

Apr. 2020

Legal Unbundling

Apr. 2021



Generators, Retailers

Transmissions and Distributors

Establishment of Balancing Market

Apr. 2022

imbalance settlement based on Cost

挿絵：https://www.fepc.or.jp/sp/pikaru/basic.html

Imbalance Settlement in Japan

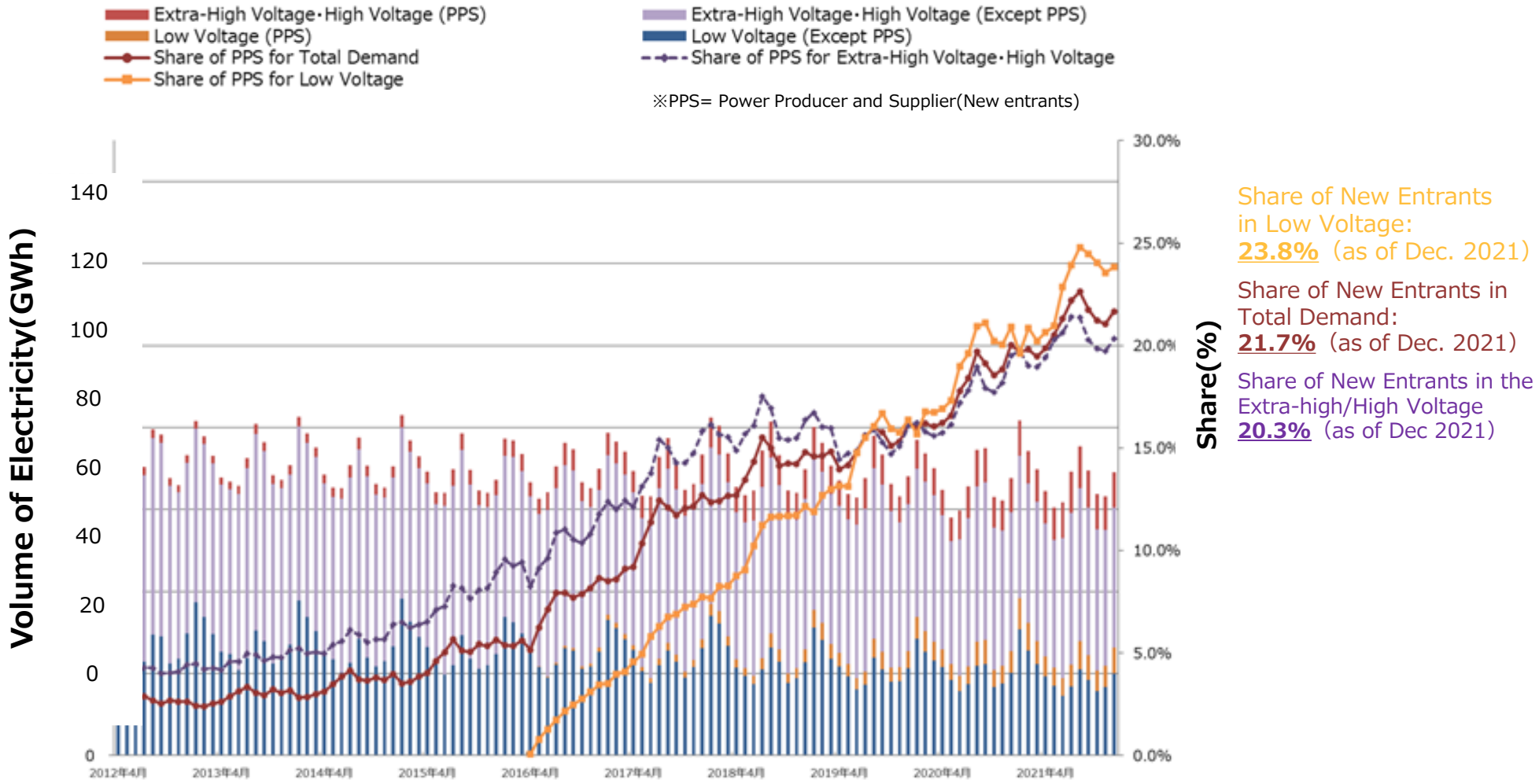
- Japan's Electricity System is based on Balancing Group Model from April 2016.

<table>
<tr><th></th><th>New Entrants</th><th>Utilities</th></tr>
<tr><td>2000 – Mar. 2016
Third Party Access
(TPA Model)</td><td>Penalty for Imbalance</td><td>No fees and No penalties</td></tr>
<tr><td>Apr. 2016 -
Imbalance Settlement
(Balancing Group Model)</td><td colspan="2">Settlement Price Based on the spot price</td></tr>
<tr><td>Apr. 2022
New Imbalance Settlement
(Balancing Group Model)</td><td colspan="2">Settlement Price Based on Cost</td></tr>
</table>

Market Share of New Entrants (Retailers)

- The market share of New Entrants has been gradually but steadily increasing.
- Since last year, the number of new entrants suspending or abolishing their businesses has been on an upward trend.

Market Share of New Entrants (Apr.2012-Dec.2021)



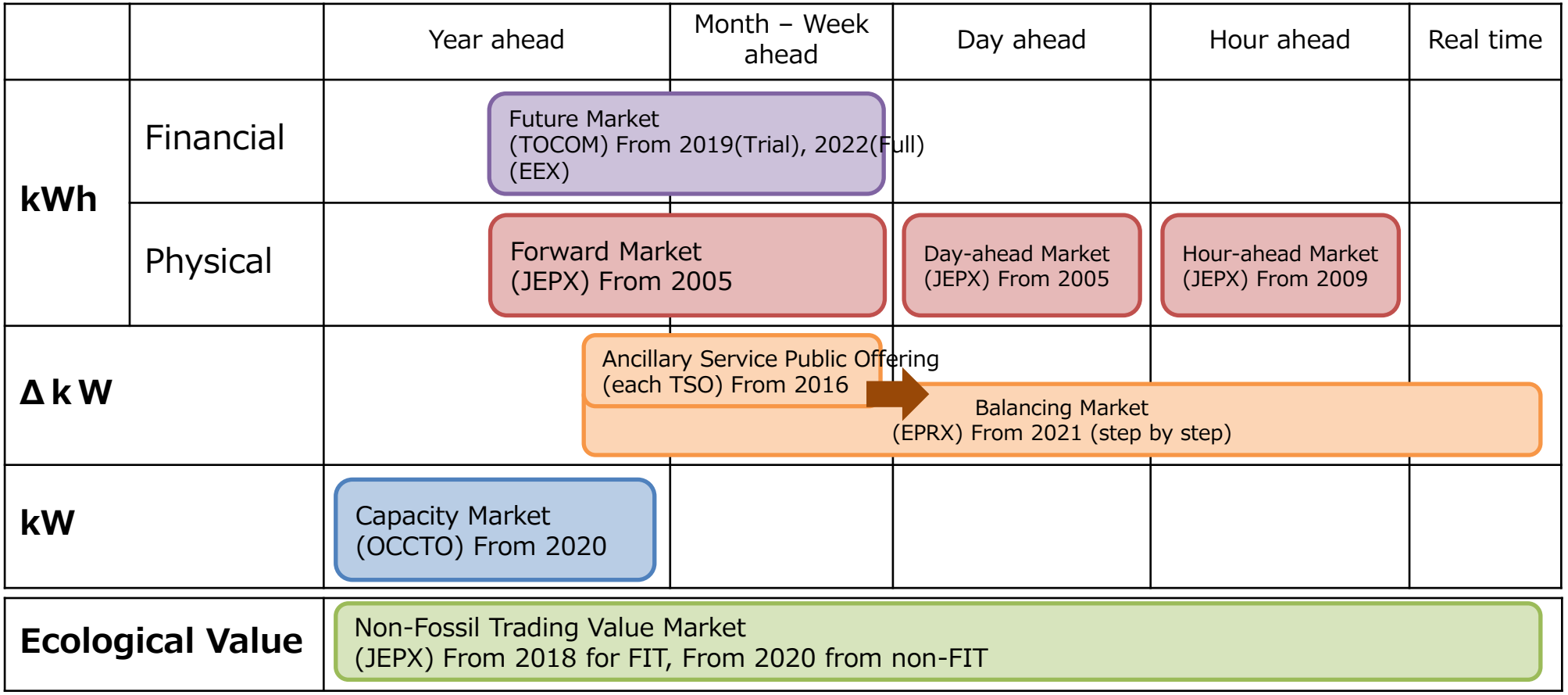
Share of New Entrants in Low Voltage:
23.8% (as of Dec. 2021)

Share of New Entrants in Total Demand:
21.7% (as of Dec. 2021)

Share of New Entrants in the Extra-high/High Voltage
20.3% (as of Dec 2021)

Japan's Electricity related Market

- JEPX established Day-ahead Market and Forward Market from 2005, and Hour-ahead Market from 2009. And several related market opened in recent years.
- Public Offering for Ancillary Service by each TSO was started from 2016. Now Balancing Market for nation wide is started from 2021 in step by step.



Japanese Connect and Manage + Re-dispatching method

- Congestion Management is the key for future Japan's Electricity System.

N-1 Inter-Trip scheme	The N-1 inter-tripping scheme began to be applied to new power sources to be connected to a special high-voltage network in October 2018 (prior application). System design work is being carried out to enable the N-1 inter-tripping scheme to be applicable to new power sources to be connected to the high-voltage network sometime during fiscal year 2022.
Non-firm access	In January 2021, it became possible to apply a non-firm access connection to a backbone grid network in any area lacking available capacity.

+

Re-dispatching method	Re-dispatching method is a methodology to manage congestion which TSO implement utilizing balancing capacity when it judges that congestion of network occurs, or likely to occur, without specifying congested line.

→ Market Based Congestion Management → Nodal? Zone?

Recent Events with EGC attention (1)

➢ Tight supply and demand and High Electricity Price

- Since the last year, LNG prices have started to rise gradually worldwide in line with the revival of economic activity from the COVID-19, and LNG prices have soared especially amid growing global interest in the disruption of natural gas following Russia's invasion of Ukraine in March. The LNG price (JKM) on August 17 was 59.06 dollars / MMBtu, which is 48.15 yen/kWh when converted to combined gas power generation.
- In this March, the earthquake followed by multiple power plants shut down and METI’s power saving request has revealed the vulnerability inherent to the supply side. And the supply and demand has been tight since late June due to the increase in cooling demand by the temperature rising.For this reason, the Ministry of Economy, Trade and Industry has been warning about supply and demand, and announced to save electricity to the people.
- General Electric Utilities* are subject to the strict EGC surveillance in terms of whether or not they appropriately sell their electricity to the market (e.g. price and volume).

*10 major electric companies (Hokkaido, Tohoku, Tokyo, Chubu, Hokuriku, Kansai, Chugoku, Shikoku, Kyushu, and Okinawa Electric Power Companies)

Recent Events with EGC attention (2)

➢ Consumer Protection under the Volatile Market

- Under the current market volatility, increasing number of retailers have been facing difficulties in continuing their business activity.
- In light of consumer protection, EGC has been strengthening the activity of the consultation desk, as well as guiding retailers, if necessary.

➢ Review of the Last Resort System (LR)

- In Japan, TSO bears final supply obligation vis-à-vis consumers. Under this system which is temporary last measure, consumers who can't have contracts with any suppliers can be supplied by TSO at the price with additional charges of 20% of the standard rate of major suppliers.
- In the meantime, as a result of price hike of the spot market, unexpected events that LR price might become lower than some retail price have been witnessed. This situation has brought about the necessity to review the system around the LR system.

Recent Events with EGC attention (3)

- **Introduction of the new Network Tariff Regulation**
  - New network tariff regulation system called “Revenue Cap” would be introduced in FY 2023. Under this system, TSO will be expected to achieve both maximum cost efficiency and sufficient investment toward resilient transmission and distribution network.
  - 10 TSOs will be under the new tariff examination by EGC in FY 2022.