METI
Ministry of Economy, Trade and Industry

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REvision2021

Energy Policy
toward net-zero GHG emissions by 2050

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1. PM Declaration toward 2050

- **In Oct 2020, PM Suga declared Japan's intention to aim for net-zero GHG emissions by 2050.**

- **In order to bring about a transformation of industrial structures, GOJ formulated Green Growth strategy in December 2020.**

  (5 policy Tools, 14 Growth Sectors)

- **The Strategic Energy Plan is currently under review.**

2. Points of the 5 policy tools

Grant funding	✓ ***Green Innovation Fund***: **2 trillion yen** over 10 years ✓ Stimulate **15 trillion yen** worth of private R&D and investment.
Tax incentive	✓ Tax incentives to stimulate **1.7 trillion yen** worth of private investment over 10 years.
Guidance policy on Finance	✓ Formulate guidelines for transition finance and establish a scheme for **long-term funds with an interest subsidy (1trillion yen in 3 years** in business scale basis) to attract global ESG investment.
Regulatory Reform	✓ Consider regulatory reform in areas such as **hydrogen, offshore wind power, and mobility/batteries**. ✓ Discuss issues concerning carbon border adjustment and related policies with a view to ensuring global level playing field
International Collaboration	✓ Cooperation with various players, including both developed and emerging countries, on **innovation policy**, **joint projects** including third countries, **standardization and rule-making,** and providing wide variety of **solutions toward de-carbonization** ✓ World wide promotion efforts through "**Tokyo Beyond-Zero Week**"

3. 14 Growth Sectors

Energy

Offshore wind power
Wind turbines, parts, floating wind turbines

Fuel ammonia
Combustion burner (as fuel in transition period to hydrogen-powered society)

Hydrogen
Turbines for power generation, hydrogen reduction steel-making, carrier ships, water electrolyzers

Nuclear power
SMR (Small Modular Reactor), nuclear power for hydrogen production

Transport/Manufacturing

Mobility and battery
EV (electric vehicle), FCV (fuel cell vehicle), next generation batteries

Semiconductor and ICT
Data centers, energy-saving semiconductors (demand-side efficiency)

Maritime
Fuel-cell ships, electric propulsion ships, gas-fueled ships

Logistics, people flow and infrastructure
Smart transportation, drones for logistics, fuel-cell construction machinery

Foods, agriculture, forestry and fisheries
Smart-agriculture, wooden skyscrapers, blue carbon

Aviation
Hybrid electric, Hydrogen-powered Aircraft

Carbon Recycling
Concrete, biofuel, plastic materials

Home/ Office

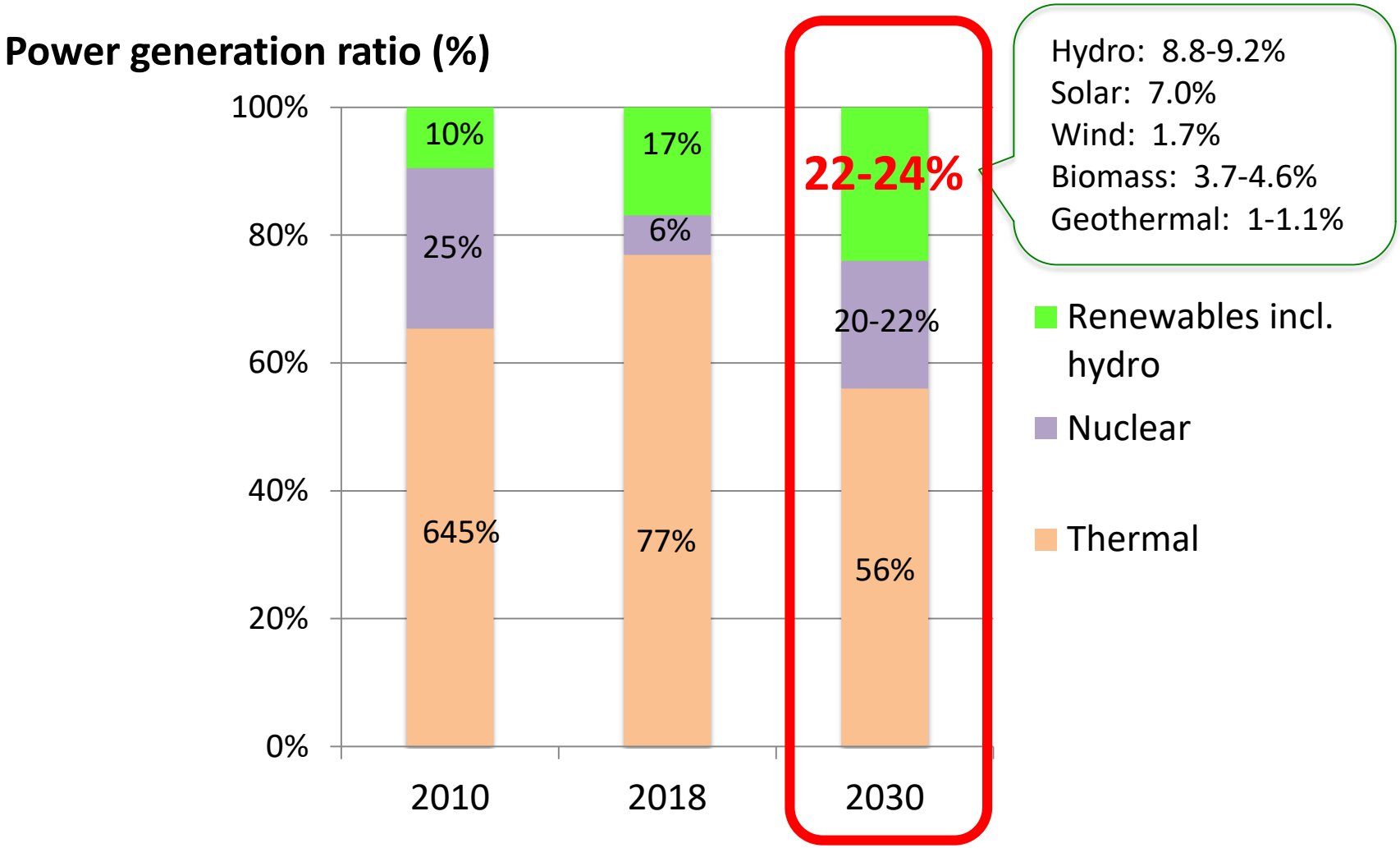
Housing and building, Next generation PV
(perovskite solar cell)

Resource circulation
Biomaterials, recycled materials, waste power generation

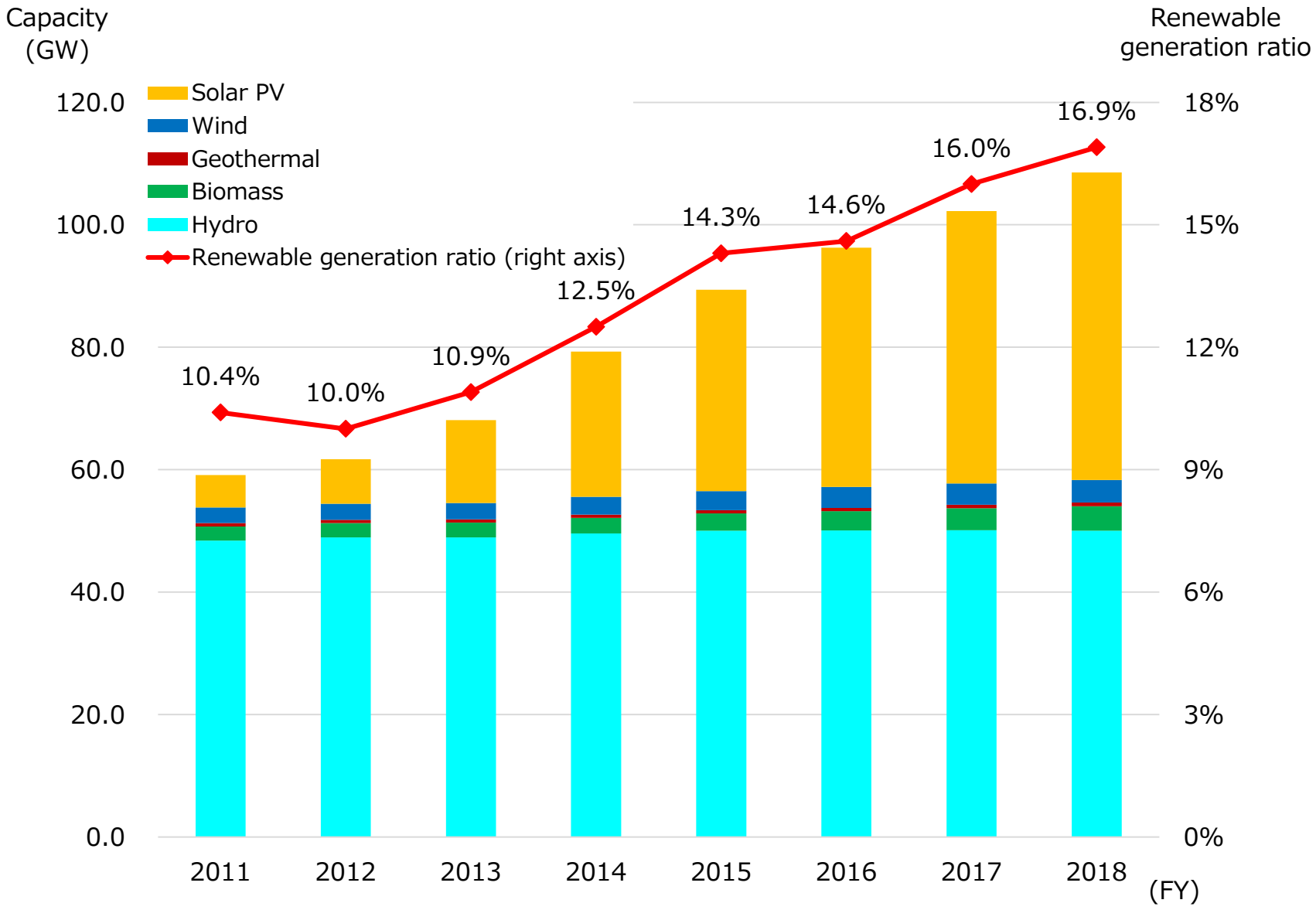
Lifestyle-related industry
Local decarbonization business

4. Political Targets on Renewables by 2030

Japan will aim at increasing power generated by renewables up to 22-24% by 2030 and “will make renewables primary generation source”.



5. Renewable electricity introduction in Japan



Source: Agency for Natural Resources and Energy

6. Renewable Introduction in Progress

	Before FIT (June 2012)	After FIT [A] (as of September 2019)	Target [B] (FY2030)	Progress [A]/[B]
Geothermal	0.5GW	0.6GW	1.4 - 1.6GW	**40%**
Bioenergy	2.3GW	4.3GW	6.0 - 7.3GW	**64%**
Wind	2.6GW	3.9GW	10GW	**39%**
Solar PV	5.6GW	52.4GW	64GW	**82%**
Hydro (middle or small)	9.6GW	9.8GW	10.9 – 11.7GW	**86%**

7. Major Challenges toward further renewables expansion
1) Introduction of Offshore Wind Power

- **Offshore Wind Promotion Act**
  - ✓ came into force in April 2019
  - ✓ Round 1 auctions in four sites are in progress now under this act

- **Japan's Vision for offshore wind power**
  - ✓ The strategy newly formulated in December 2020 in collaboration with the government and private sector
  - ✓ Introduction Target ; **10GW by 2030, 30-45GW by 2040**
    Approx. 1GW awarding capacity per year for 10years
  - ✓ Cost target ; **8-9 yen/kwh by 2030-2035**
  - ✓ Inward investment to build the reliable supply chain
  - ✓ Long-term plan to strengthen the power grid
  - ✓ Technology roadmap including floating

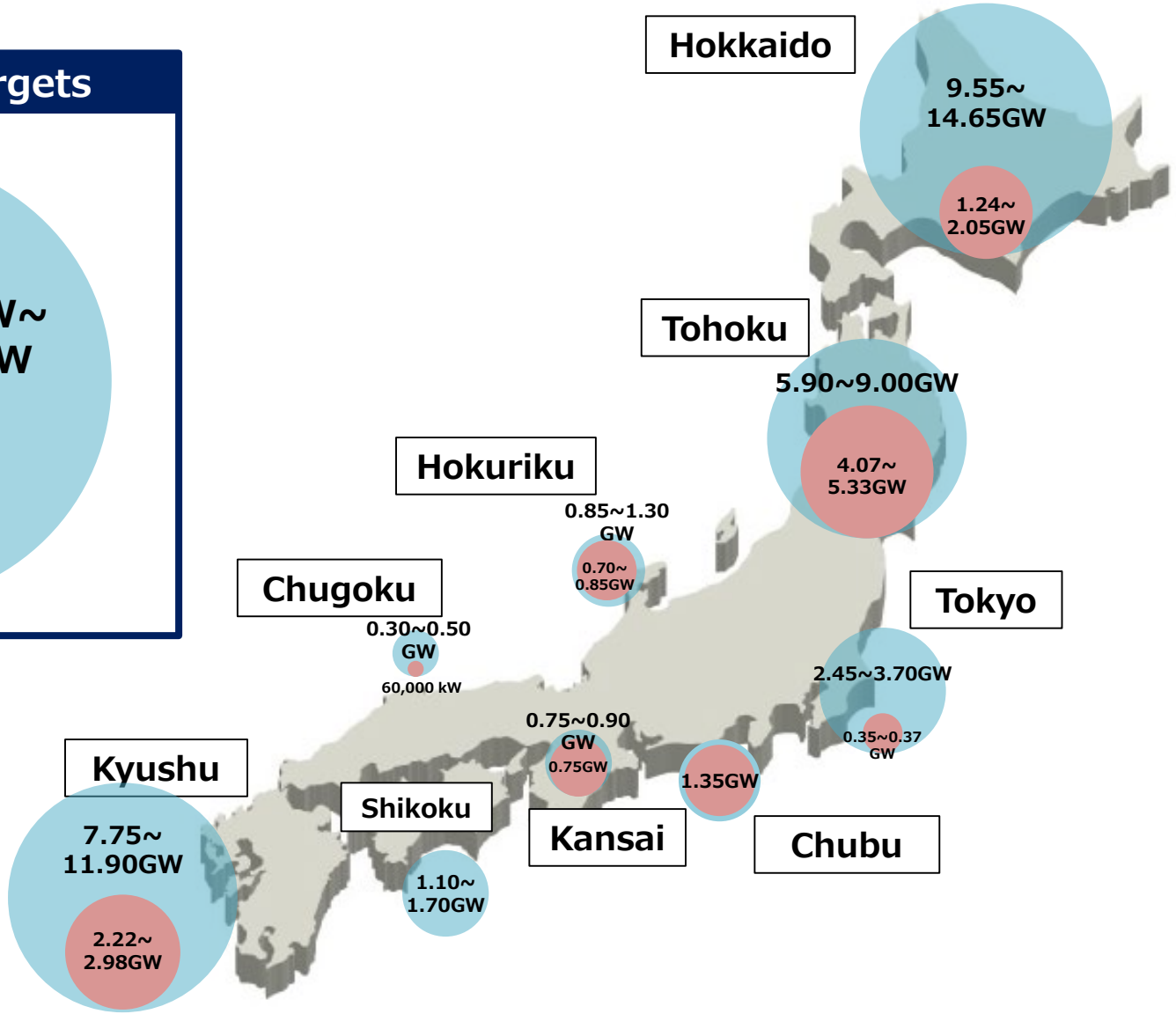
8. Introduction Target by area (images)

Introduction targets

2040

Approx. 30GW~
Approx. 45GW

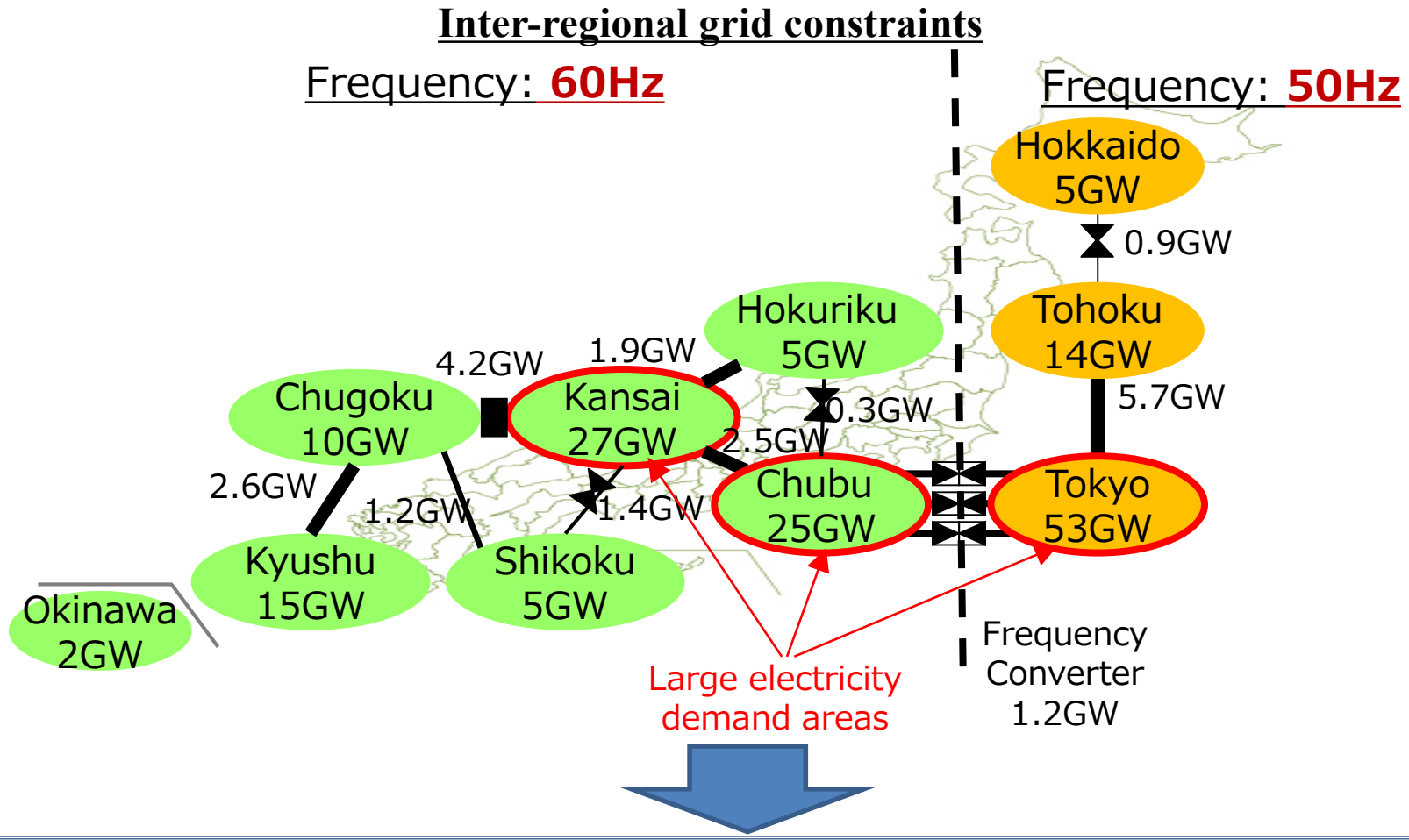
2030
Approx.
10GW



*Figures for 2030 are based on projects that are undergoing environmental assessment (as of end of October 2020, including some projects for which environmental assessment has been completed) .

*Figures for 2040 are based on LCOE (Levelized Cost of Energy) and other data from the NEDO Report on the Support Project for the Development of Floating Wind Farms (Study of Offshore Wind Power Generation Costs), reviews by experts, and the status of environmental assessments by power producers. In preparing this map, the potential of floating wind power farms was not factored in.

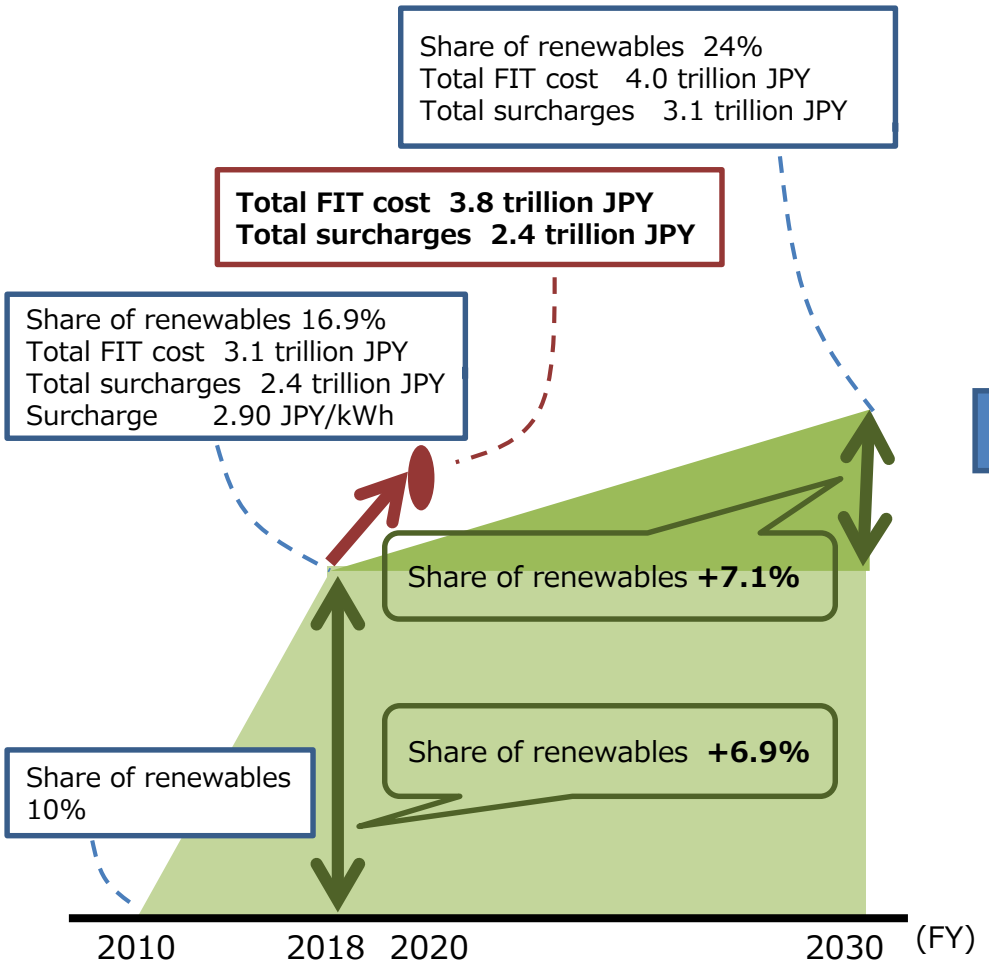
9. Major Challenges toward further renewables expansion
2) Grid constraints



- Long-term Grid reinforcement plan based on cost-benefit basis
- Maximum use of existing grid (“Connect and Manage”)

10. Major Challenges toward further renewables expansion
3) Higher Cost

Increasing FIT Surcharge in Japan

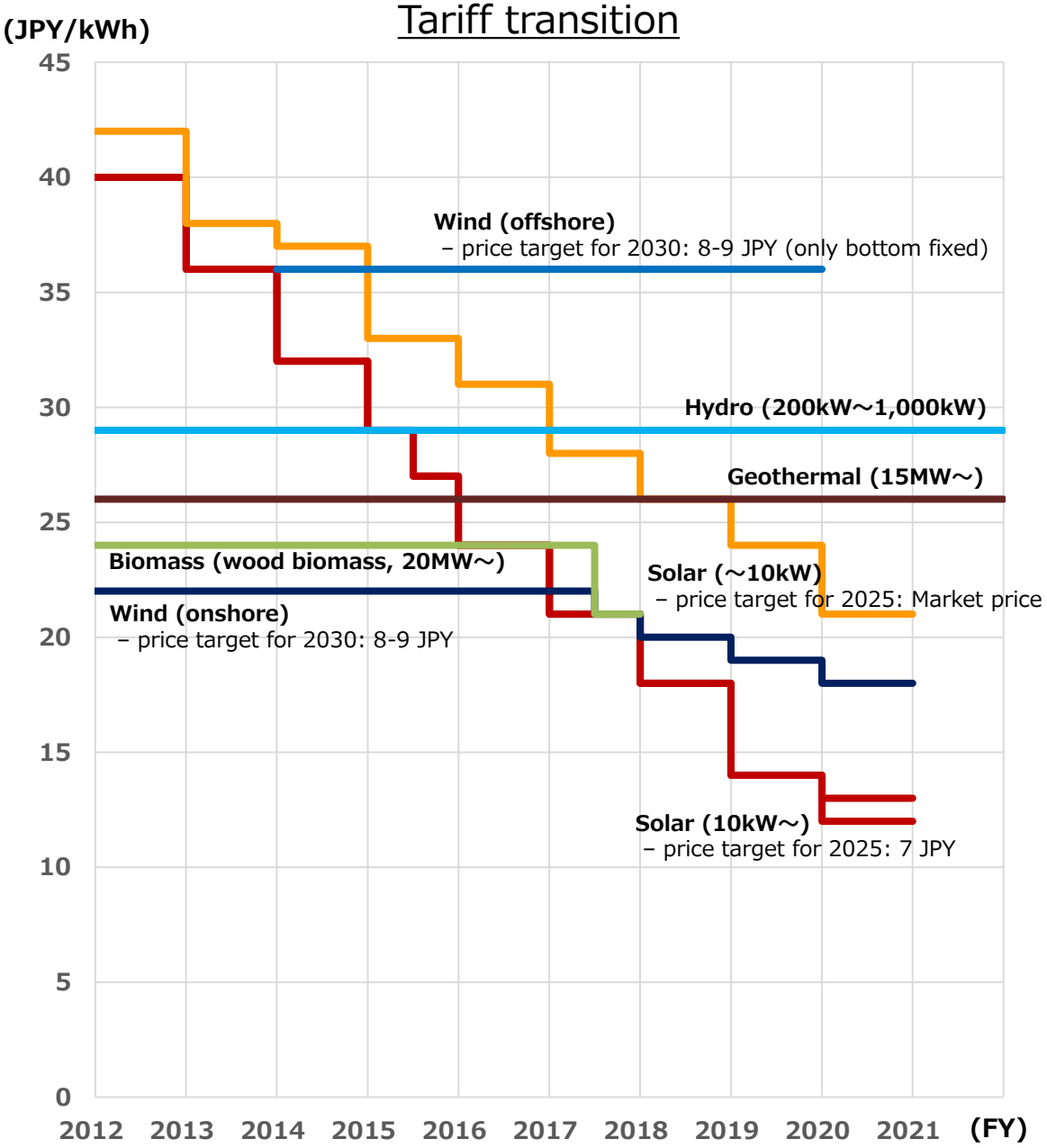


- Expanding auction scheme for solar PV, wind and bioenergy
- Reforming FIT scheme suitable for the characteristic of each power source
- Introduction of FIP

Source: METI, Subcommittee on Massive Integration of RE and Next-Generation Electric Power Network (2019)
https://www.meti.go.jp/shingikai/enecho/denryoku_gas/saisei_kano/pdf/013_01_00.pdf Source: METI, News Release (2020)
https://www.meti.go.jp/press/2019/03/20200323005/20200323005.html

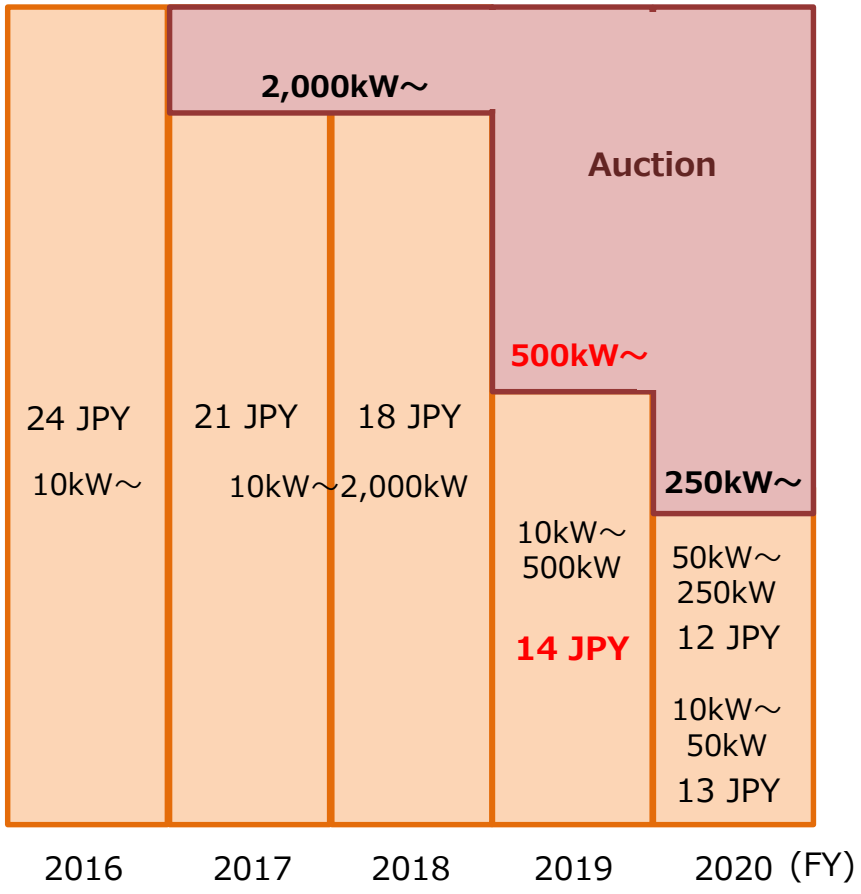
11. FIT tariffs

Tariff transition



Target of auction

< Solar for non-residential >

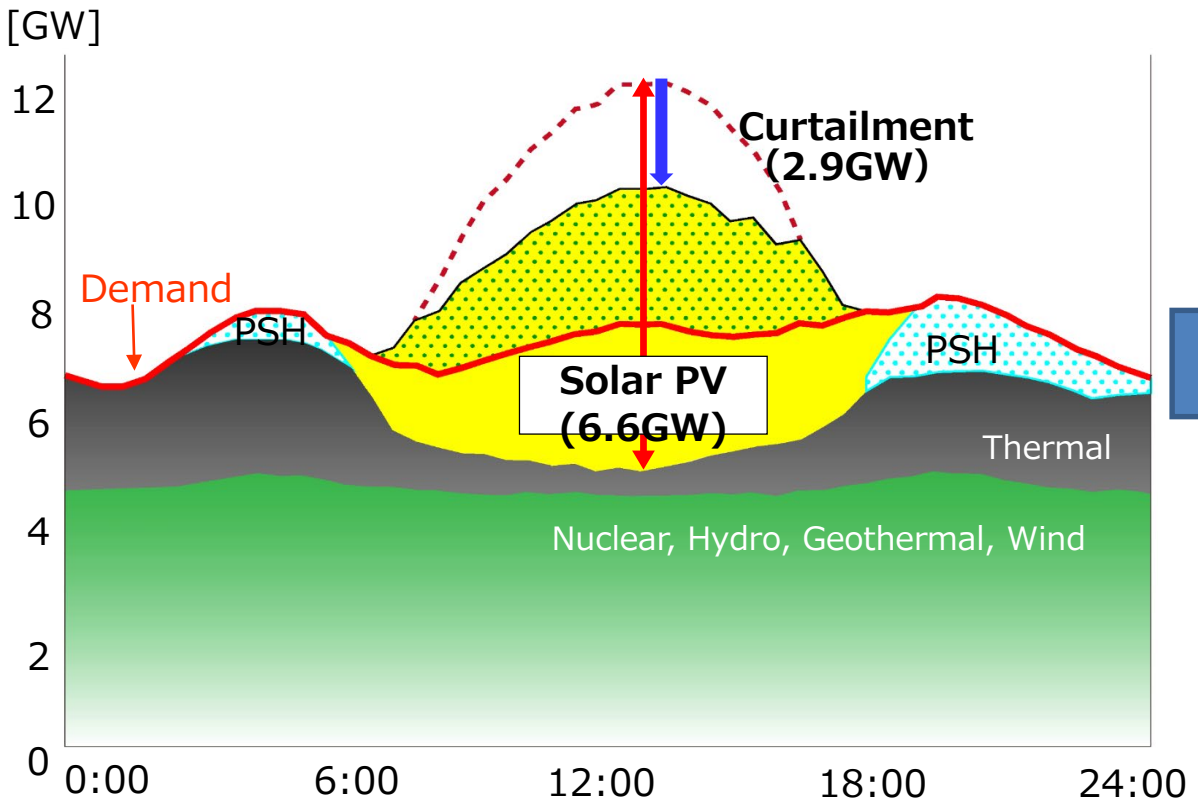


< Biomass>

- for biomass liquid fuel: since 2018 FY
- for wood biomass over 10MW: since 2018 FY

12. Major Challenges toward further renewables expansion
4) More flexibility needs

Supply and demand balance in Kyushu
(8th March 2020)

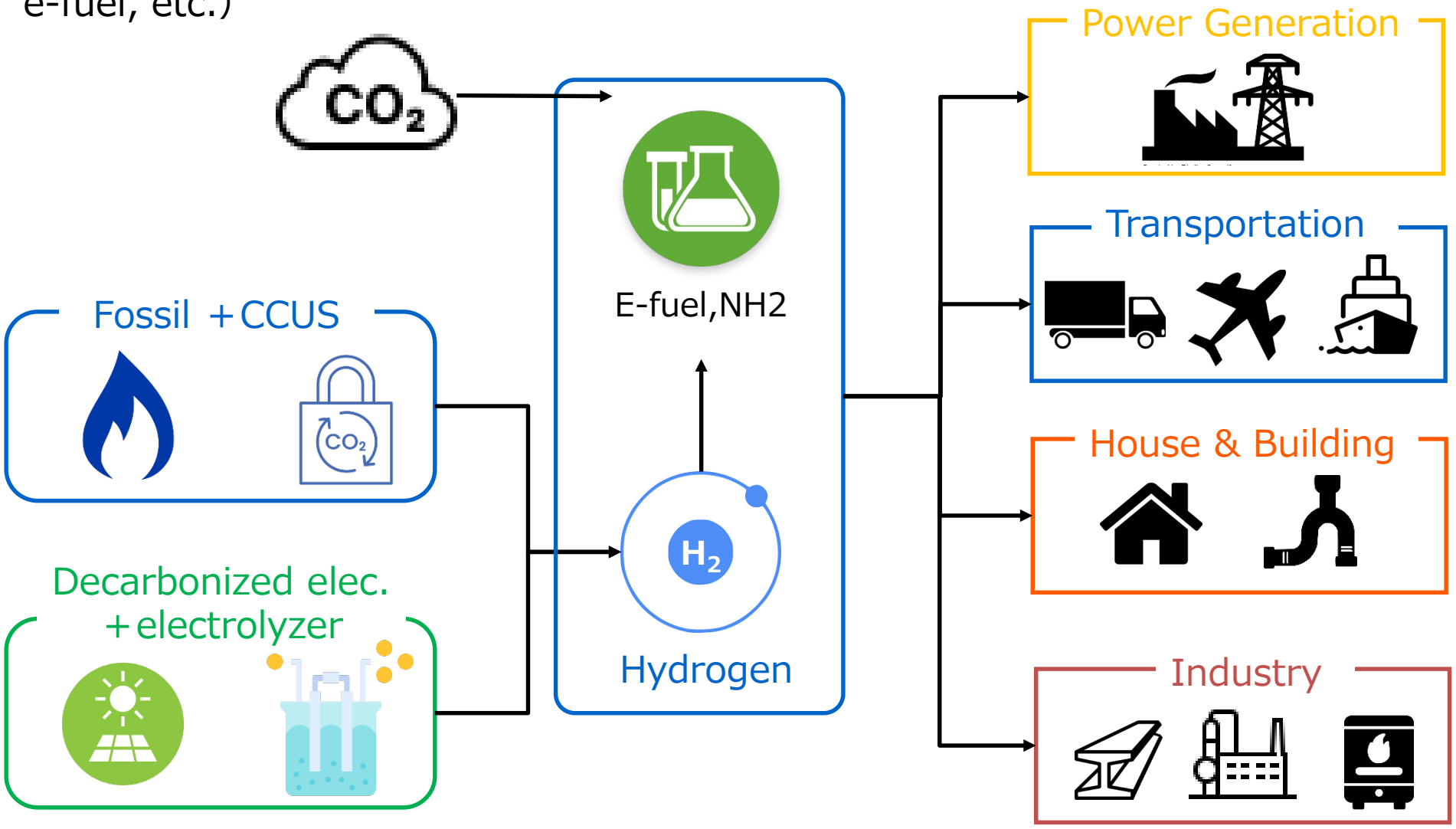


- Enhancing conventional flexibility sources
  (Thermal power, pumped storage, interconnection, etc.)
- Exploring new flexibility sources
  (Renewables, virtual power plant, demand response, etc.)

Source: Kyushu Electric Power Co.,INC

13. Hydrogen ; Key technology for carbon neutrality

- **Decarbonized electricity** (Grid flexibility and storage, generation)
- **Effective utilization of Fossil Fuel** (+ CCUS/Carbon recycling)
- **Development of sector-coupling** (decarbonizaztion of heat, methanation, e-fuel, etc.)



14. Hydrogen Roadmap (under consideration)

Current

- **FCVs & stationary fuel cells** already commercialized
- Hydrogen used in the desulfurization process in oil refinery
- Almost all of the hydrogen is fossil-fuel based, with CO2 emission

- 2030

- Fuel cells in other mobility, such as **commercial vehicles**
- **Hydrogen power generation** (starting demo by the first half of 2020s)
- International **large-scale supply chain** (starting demo after FY 2025)

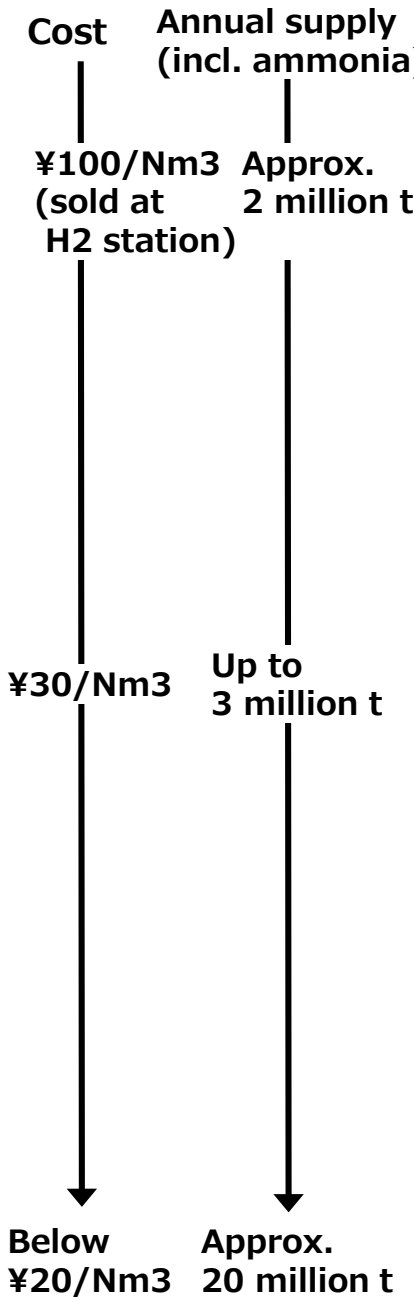
2030-2050

- **Reduce cost through increasing use of hydrogen in power sector**
- Establish technology to use hydrogen in industry, such as hydrogen-based reduction for steel making
- Expand domestic **Green hydrogen** by deploying **electrolyzers**

2050

- Contribute to the carbon-neutrality by **expanding use of hydrogen in a variety of sectors, including steel industry and heat using process**

*** A revision of the National Hydrogen strategy is being considered.**

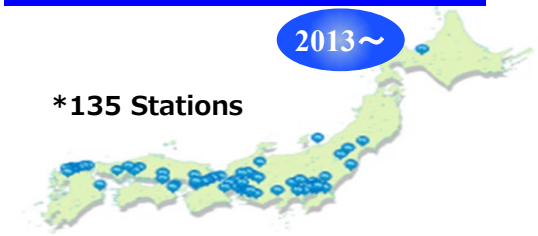


15. Development of Hydrogen technology/projects

H_2 Mobility

H_2 Station Network

2013～



*135 Stations

H_2 Applications

2016～

101 FC buses

R&D

2019～

MIRAI 2 on Sale”

2019～

Source:JR east

FC train

ISUZU HONDA The Power of Dreams

2020～

FC Truck

HINO TOYOTA

Source:HINO

2020～

FC Truck

Joint Venture for H_2 Infrastructure Development

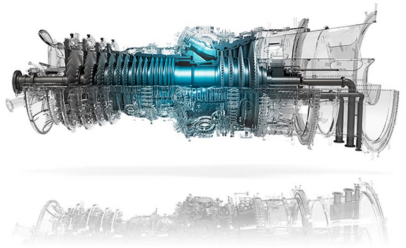
2018～

NISSAN JXTG Group IDEMITSU HONDA Iwatani JAPAN H₂ MOBILITY JHyM TOYOTA TOKYO GAS DBJ TOHO GAS Air Liquide TOYOTA TSUSHO

Hydrogen power generation

30% H2 blending by 2025 and 100% H2 by 2045

2025～



MITSUBISHI POWER

Local/regional projects

Fukushima prefecture

2020.3

FH2R FUKUSHIMA HYDROGEN ENERGY RESEARCH FIELD

10MW Electrolyser started operation

Creating Hydrogen Hubs

“Hydrogen Utilization Study Group in Chubu”

2020

Sumitomo Corporation TOYOTA SMBC

and 7 companies

“Hydrogen Utilization Council in Kobe/Kansai area”

Iwatani Marubeni

and 9 companies

16. Development of International Hydrogen Supply Chain

◆ Hydrogen Energy Supply Chain Poject

Launching “SUISO FRONTIER ” in Kobe

LH2 storage tank for marine transportation

- The World’s first liquefied Hydrogen carrier ship launched in December 2019.
- The LH2 carrier ship plans to transport hydrogen to Japan in 2021.

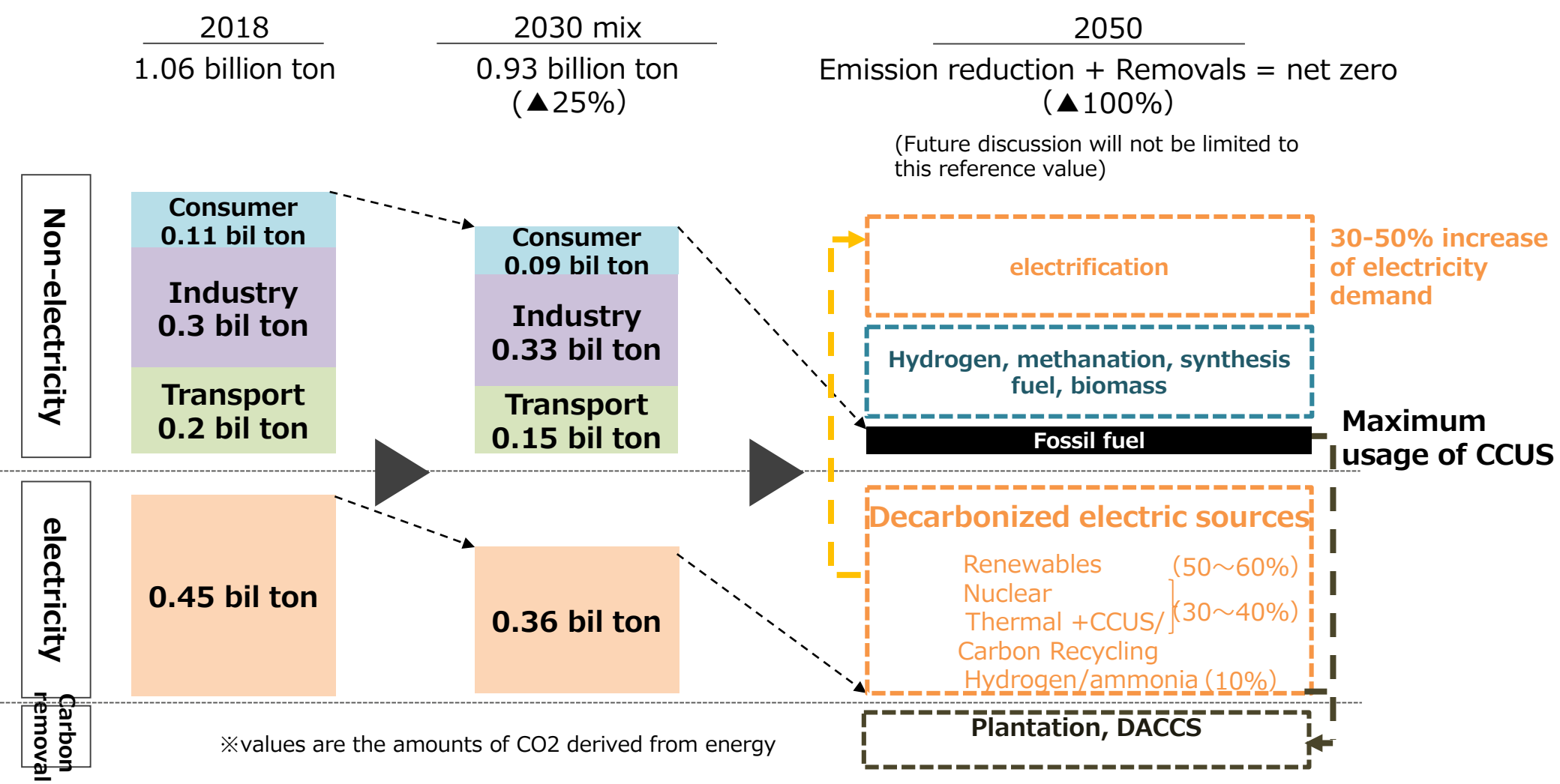
◆ Brunei Project

Hydro-genation(TOL→MCH)

Dehydro-genation (MCH→TOL)

- Dehydrogenation Plant in Japan completed in May 2020.
- Integrated supply chain has been established.

17. Energy Outlook of net-zero GHG emissions in 2050



＊Analyzing scenarios further, discussion continues towards revision of the Strategic Energy Plan.

Thank you

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