Overview of the 7th Strategic Energy Plan

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What is Strategic Energy Plan?

- Strategic Energy Plan (SEP) is formulated by the Japanese government for basically every three years based on the Basic Act on Energy Policy to outline the fundamental direction of Japan's energy policy.

- The first plan was provided in 2003. The existing plan is the 6th plan and was formulated in October 2021. The cabinet endorsed the 7th plan in February 2025.

- The period for public comments for the draft plan has ended. The draft plan is expected to be approved by the Cabinet by the end of February.

What has and has not changed

Surrounding environment has changed significantly.

- Resurgence of **energy security risks**
- Growing importance of **economic security** and **industrial cost**
- Expected **increase in power demand** in Japan
  - Combined with the increased share of VRE (Variable Renewable Energy), the **stability of the electricity supply** becomes even more important.
- Maintaining climate goal while seeking for **realistic approaches**

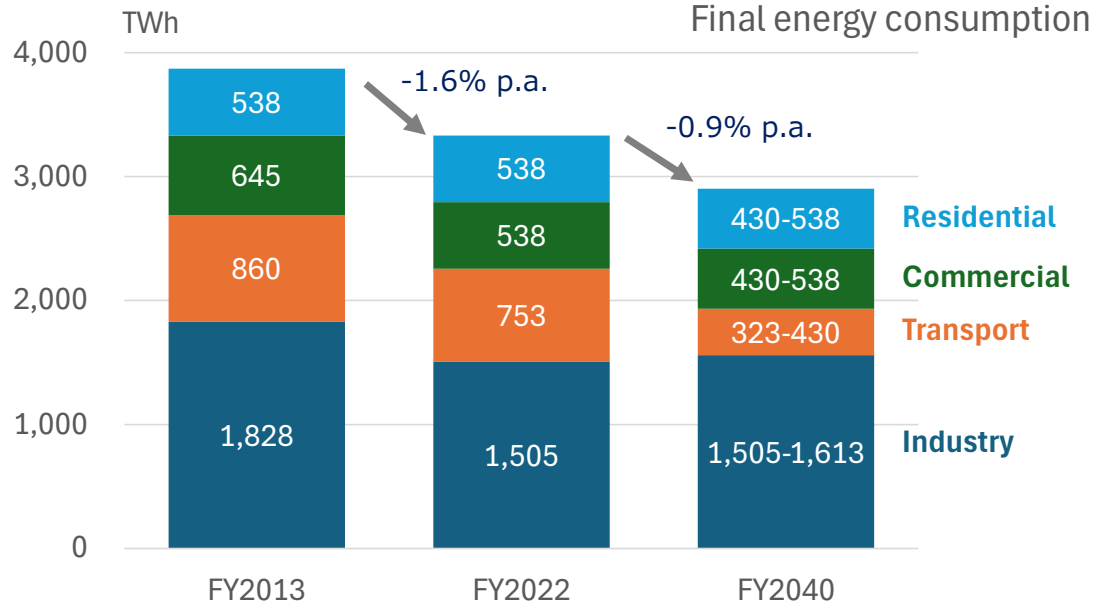
Principles and ambitions has not changed. But changed in emphasis.

- **S+3E = Safety, Energy Security, Economic Efficiency, Environmental sustainability**
- The plan places **more weight on energy security and economic efficiency**
- Reduce GHG emissions by 70% (energy sector only) from 2013 levels by 2040, which is **consistent with the 1.5 ℃ target**.

Final energy consumption is expected to decrease

- Steady improvement in efficiency is expected, especially in the transport sector.
  - 100% xEVs in new car sales by 2035 for passenger vehicle and by 2040 for light duty vehicle. (xEV includes hybrid vehicle)

Outlook of total final energy consumption in the 7th Plan

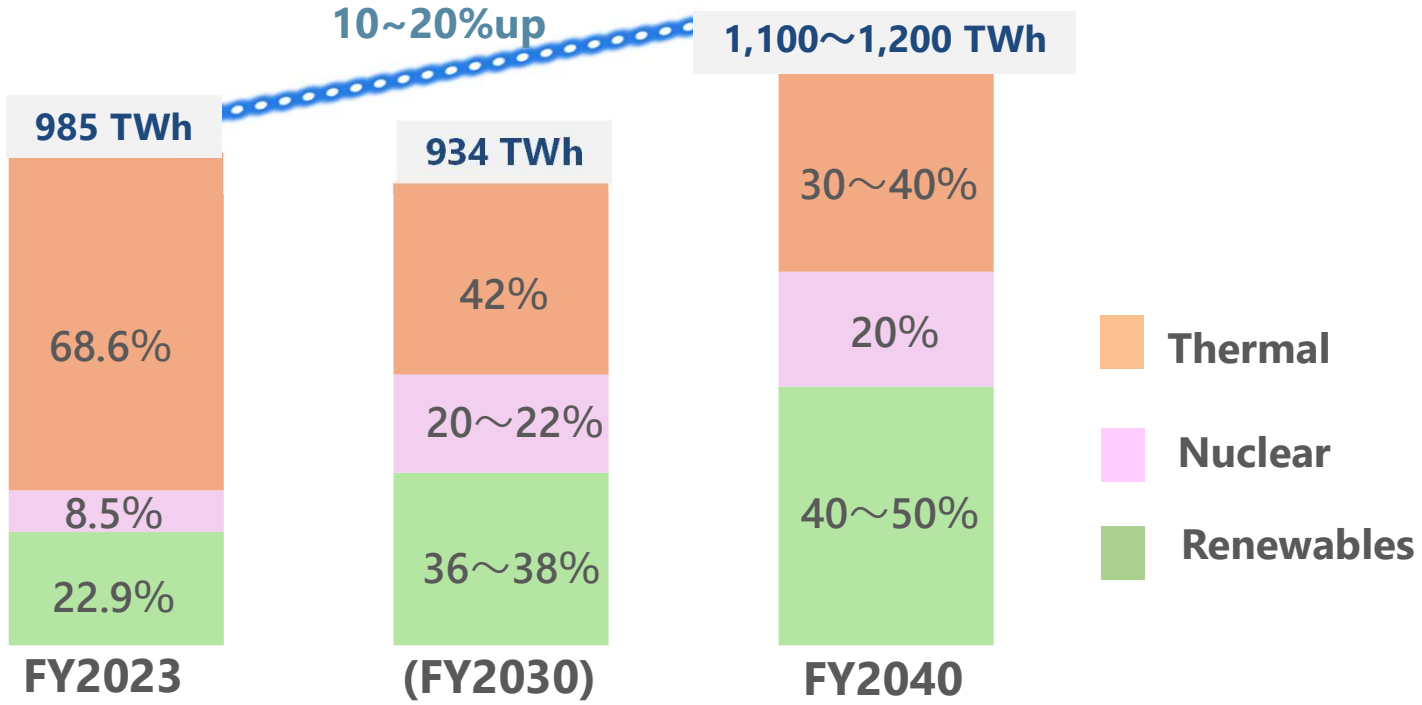


FY = fiscal year (April-March), p.a. = per annum
Source: METI (2024), Outlook of energy supply-demand balance in the fiscal year 2040

Reducing the carbon intensity of electricity

- Increase non-fossil power generation to 60-70% by FY2040.

Outlook of power generation mix



Source: FY2023 : Actual results (preliminary) as of Dec.2024
(FY2030) : The 6th Strategic Energy(October 2021) “Outlook for energy supply and demand in FY2030“
FY2040 : The 7th Strategic Energy Plan Draft “Outlook for energy supply and demand in FY2040 “

AI and Energy Efficiency

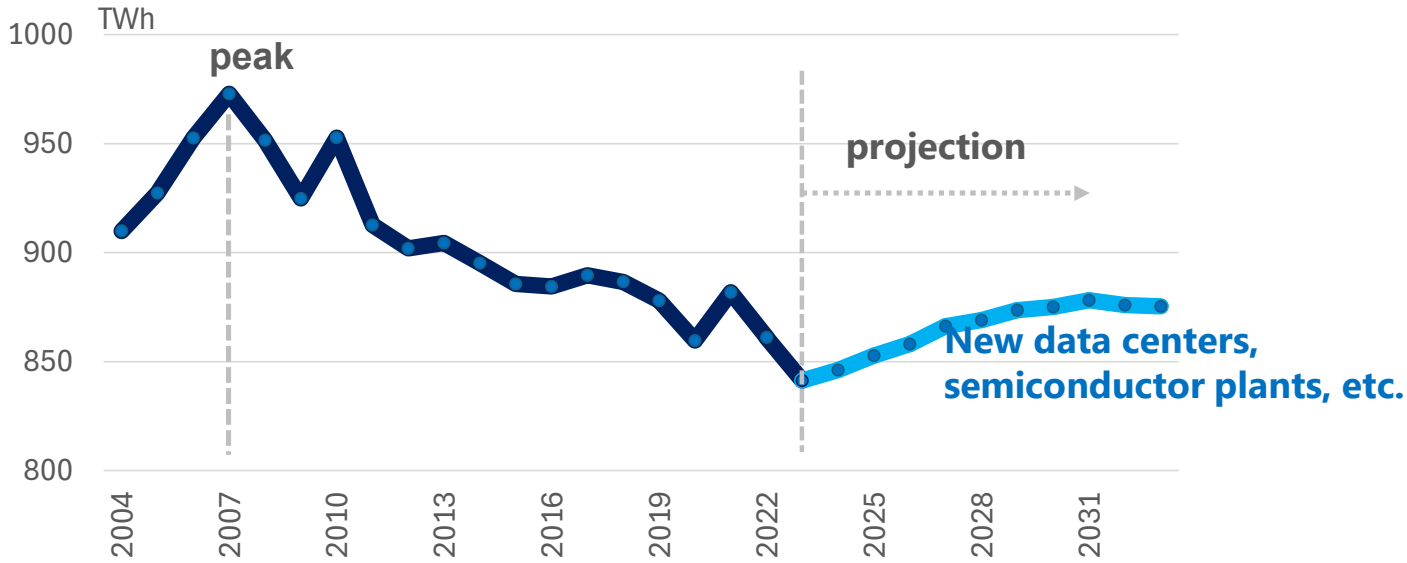
- AI is expected various benefits to the energy sector.

Examples	
Detection	▪ Automatic **detection of malfunctions** and other issues, detection of methane leaks ▪ Remote sensing
Prediction	▪ **Weather forecasting** and renewable energy use ▪ **Industrial production forecasting** and building operation forecasting ▪ **Transportation demand forecasting** and vehicle route optimization
Optimization	▪ Optimizing **industrial production processes** ▪ Optimizing energy usage in **buildings and equipment** ▪ Improving fuel efficiency through **autonomous driving** ▪ **Demand response** through energy supply and demand optimization
Simulation	▪ Simulations related to **identifying new materials** and **manufacturing new products** ▪ Simulations of the effects of energy conservation and clean energy adoption

Electricity demand is expected to rise

- Electricity demand has been **revised upward** due to electrification of demand and demand for data centers.
- While aiming to maximize introduction of REs, challenges remain.
  - Available **land area**, increasing **integration costs**, coexistence with **local communities**

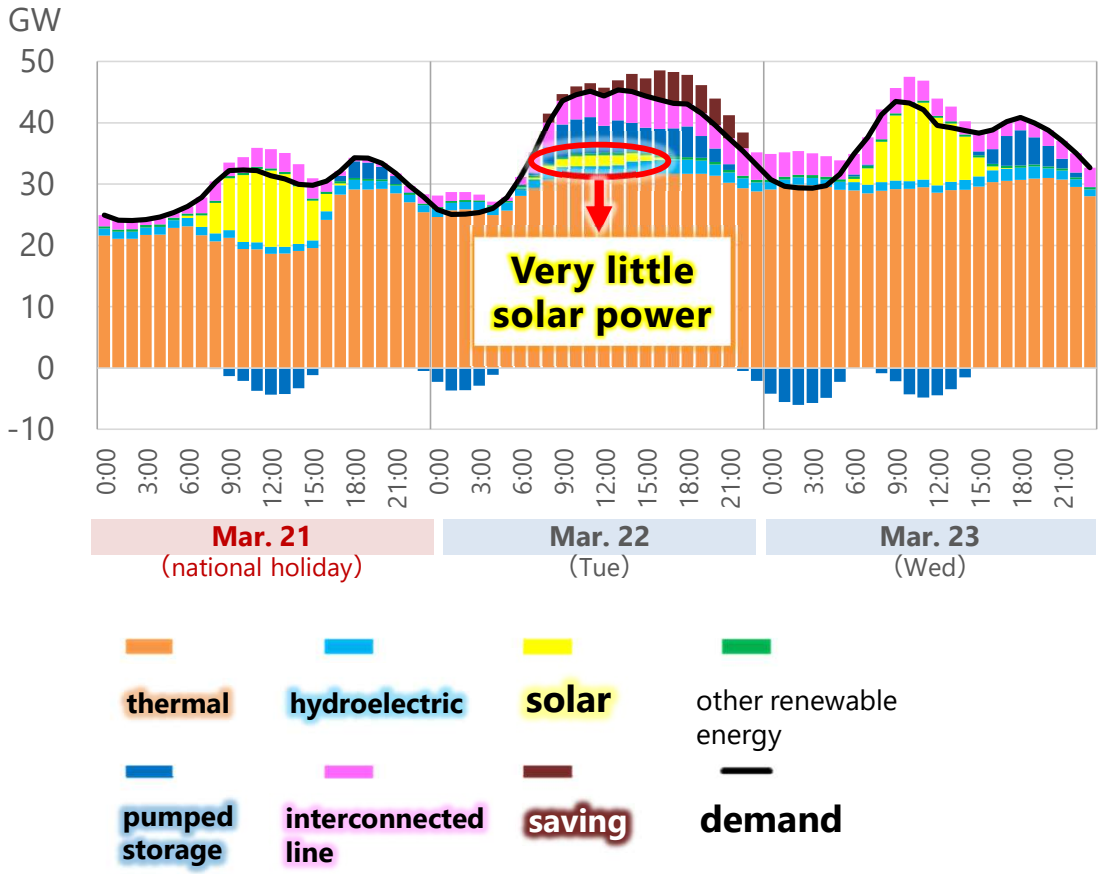
Electricity Demand Projection (national total)



Source: OCCTO

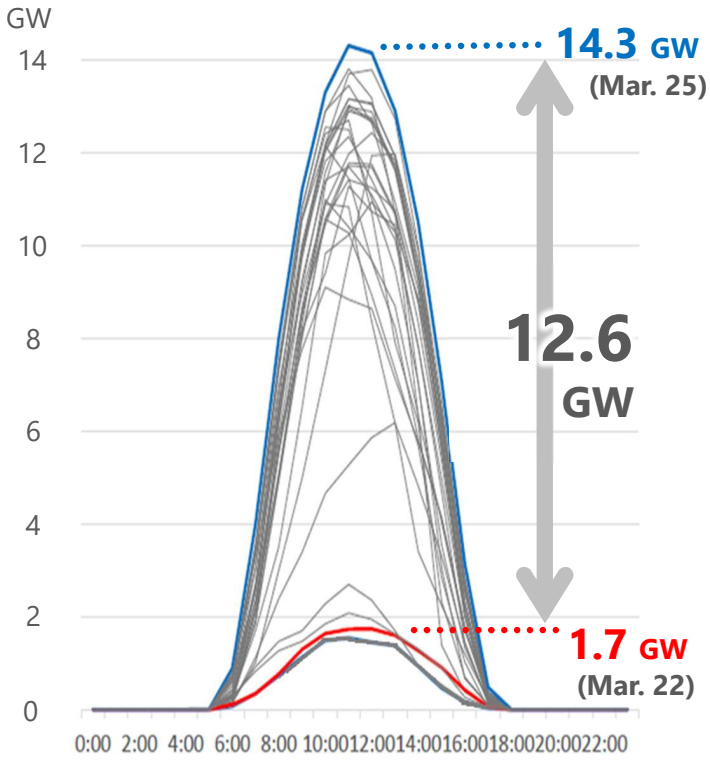
Responding to intermittency (March 22, 2022 : Tokyo Area)

Electricity Supply and Demand (Tokyo Area)



Source: Tepco Powe Grid ,METI and Cabinet Office

Solar output on each day of March 2022

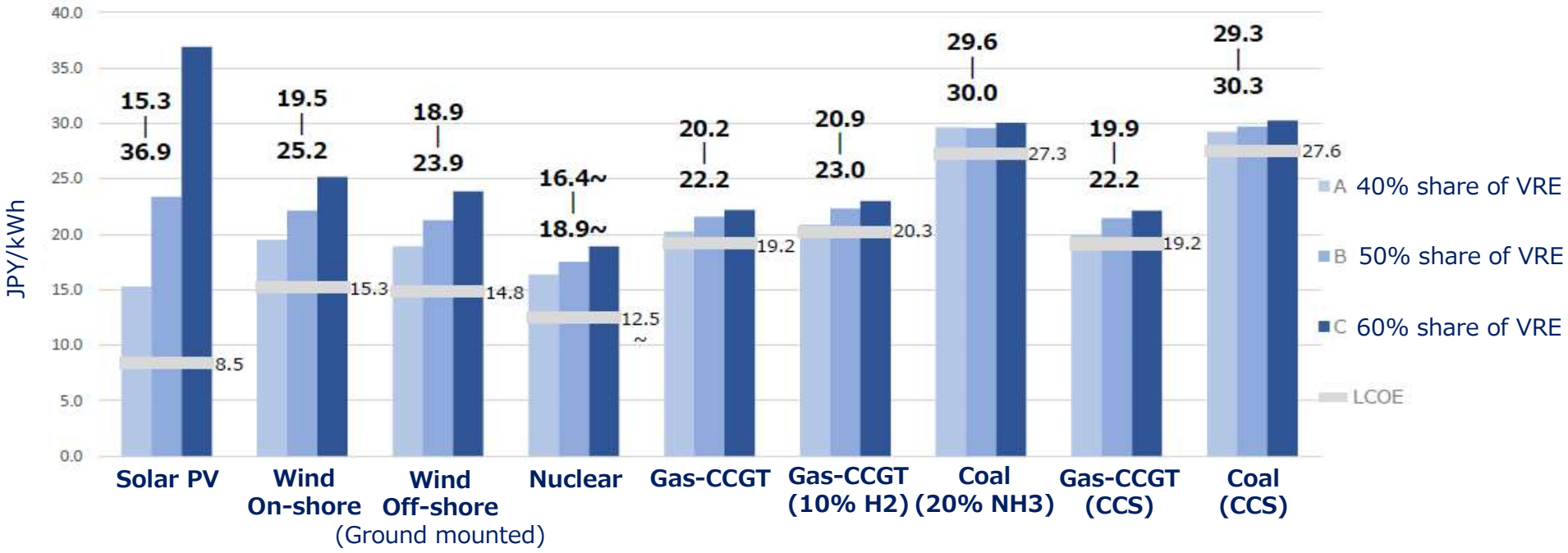


Source: Agency for Natural Resources and Energy, METI

Integration cost of VREs need to be carefully assessed

- Integration cost would have significant impact on electricity costs.

Cost of generating electricity (LCOE and system cost depending on the share of VRE)



CCGT = combined cycle gas turbine, LCOE = levelized cost of electricity, VRE = variable renewable energy, e.g. solar PV and wind power
Source: METI (2024), Outlook of energy supply-demand balance in the fiscal year 2040

DX in Renewable Energy

- **Renewable Energy in 2040 is targeted Approx. 30-40%.**
  - Solar : Approx. 23-29% (Intermittency : variable renewable energy)
  - Wind : Approx. 4-8% (Intermittency : variable renewable energy)
  - Hydraulic. : Approx. 8-10%
  - Geothermal : Approx. 1-2%
  - Biomass : Approx. 5-6%

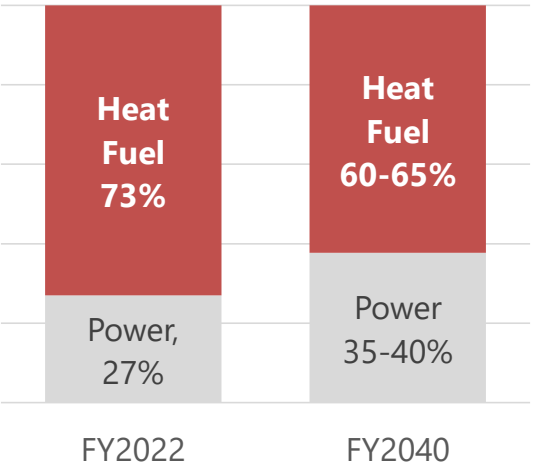
- **Large scale of integration variable renewable requires technical challenges of power grid control**.

- **DX(Digital Transformation: AI, IoT) and GX(Green Transformation) promoted in Energy industry. Main fields of DX application related Renewable Energy considered as follows**
  - Power generation forecasting and output fluctuation response.
  - Supply and demand balance optimization.
  - Distributed energy resources (DERs) control.

Fuel for the hard-to-abate demand

- Heat account for 70% of final consumption, thus need to be addressed.
- Hydrogen and its derivatives
  (including ammonia, e-methane, e-fuels)
  - Contract for Difference (CfD) support for early-stage use cases. ($20 billion)
  - Support for infrastructure development, , rationalization of safety regulations
- CO_2 Capture and Storage (CCS)/Carbon Dioxide Removal (CDR)
  - Development of business support scheme, R&D to reduce costs, and work on storage site development.
  - Establish markets and institutional arrangements for transferring car credits.
- Biofuels
  - E10 gasoline by 2030 and E20 by 2040.
  - Biofuels for SAF (sustainable aviation fuel) and automotive diesel.

Final energy consumption



Source: METI (2024), Outlook of energy supply-demand balance in the fiscal year 2040

Thank you for your attention!