METI
Ministry of Economy, Trade and Industry

(Provisional translation)

Energy White Paper 2024 (Summary)

(FY2023 Annual Report on Energy)

June 2024

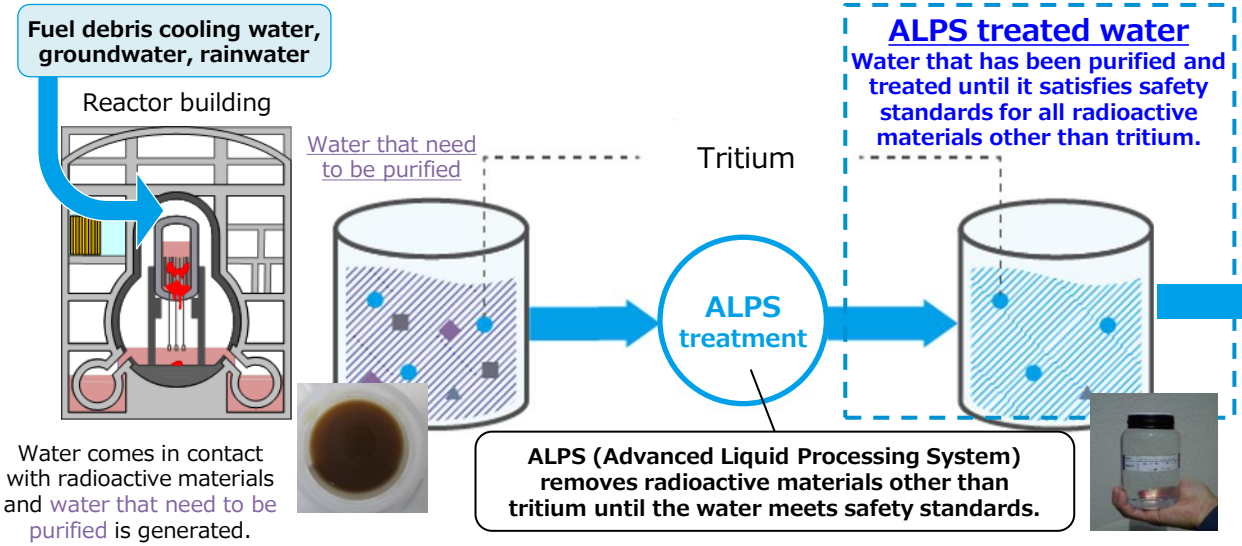
Agency for Natural Resources and Energy

Progress in Reconstruction of Fukushima

Discharge of ALPS Treated Water into the Sea

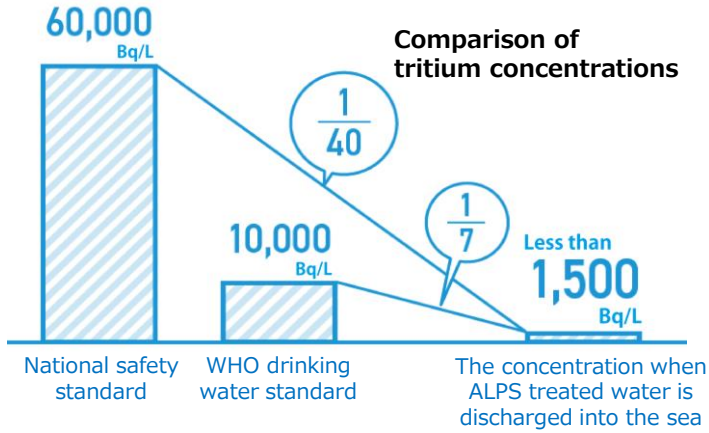
- On August 24, 2023, Japan **began discharging ALPS treated water into the sea**, an essential task for the reconstruction of Fukushima.
- **ALPS treated water has been purified and treated until it satisfies safety standards for all radioactive materials other than tritium**.
- For tritium, the water is significantly diluted with seawater before discharge so that it fully satisfies safety standards. **There is no concern about effects on human health or the environment**.

What is ALPS treated water?



What is the tritium concentration in ALPS treated water to be discharged to the sea?

Diluted with seawater until well below safety standards and then discharged into the sea.



Why do we need to discharge ALPS treated water?

Discharge of ALPS treated water is necessary for decommissioning and reconstruction

- ALPS treated water is stored in giant tanks in the area of the Fukushima Daiichi Nuclear Power Station. (Fig. 1)
- However, the number of tanks exceeds 1,000, leading to concerns about the site's storage capacity. (Fig. 2)
- Decommissioning the Fukushima Daiichi Nuclear Power Station requires the space to construct new facilities.
- Therefore, it is **essential to discharge ALPS treated water and reduce the number of tanks**.


(Fig. 1)
Giant tanks to store ALPS treated water


(Fig. 2)
The number of tanks exceeds 1,000, leading to concerns about the site's storage capacity

Efforts for Discharging ALPS Treated Water into the Sea

- Before and after the discharge of ALPS treated water into the sea, Japan conducted **monitoring of seawater and fish** and **confirmed that the treated water has been discharged safely as planned**.
- **IAEA has also concluded in its review** that the efforts for ALPS treated water are **consistent with international safety standards**.
- An increasing number of countries including **the U.S. and European countries are showing their understanding of the discharge.** **The public and private sectors** have been expanding their nation-wide **efforts to increase the consumption of marine products**.

Confirming the safety of ALPS treated water discharge into the sea

- Japan has been discharging ALPS treated water into the sea after confirming that radioactive materials are below the safety standards. Accordingly, **there is no concern about effects on human health or the environment**.
- Based on this, before and after the discharge of ALPS treated water into the sea, TEPCO, Fukushima Prefecture, the Ministry of the Environment, the Nuclear Regulation Authority, and the Fisheries Agency conducted the **monitoring of seawater and fish**.

  →**They confirmed that the treated water has been discharged safely as planned.**
- The results of the monitoring have been **announced** domestically and internationally on their websites **in a transparent and easy-to-understand manner**.

TEPCO website: Overarching Radiation-monitoring Data Browsing System around Japan (ORBS)

Examples of reactions of overseas countries to the discharge

The U.S.	➢ **Satisfied with the processes** taken by Japan that are **safe and highly-transparent and based on scientific evidence**. **Welcomed the fact that Japan has been working** not only with the IAEA but also **with regional stakeholders**. (Aug. 25; U.S. Department of State)
Europe	➢ **The EU, Iceland, Norway, Switzerland, and Liechtenstein lifted their import restrictions on Japanese products involving radioactive materials**. (Aug. 3 and 15). ➢ **The U.K.: Fully supported the Government of Japan**. (Aug. 25; Foreign, Commonwealth and Development Office) ➢ **The EU: Commended** the Japanese authorities for **regularly providing the latest information in a timely and transparent manner** on the current situation of Fukushima Daiichi NPS and the discharge of ALPS treated water. (Sep. 1; Delegation of the EU to Japan)
Pacific island countries	➢ **Have trusted Japan's commitment to ensuring that Japan will not allow any discharge that endangers the lives of the people of Japan and the Pacific island countries.** (Aug 24; Secretary General Puna, Pacific Islands Forum (PIF))

IAEA safety reviews (from 2021)

From 2021, the **IAEA** conducted reviews on the safety of ALPS treated water.

Comprehensive report before the discharge (released in July 2023)	■ The IAEA concluded that the efforts involving ALPS treated water are **consistent with international safety standards**. ■ It found that **the impact of radiation by the discharge on people and the environment is negligible**.
Review report after the discharge (review conducted in Oct. 2023)	■ **It did not identify anything that is inconsistent with the requirements in the relevant international safety standards.**

In July 2023, IAEA Director General Grossi submitted a comprehensive report to Prime Minister Kishida.

Examples of efforts for expanding the consumption of Japanese marine products

Efforts for expanding the consumption of tasty marine products called **"Sanriku-Joban Mono"** have been made across Japan.

Sanriku Joban Weeks
Prime Minister Kishida and Minister Saito enjoyed regional foods and encouraged the region.

"Gohiiki" (favorites) Sanriku Joban Campaign
Event for selling pizza in collaboration between Maruto supermarket and Mr. Ostubo, chef of a pizza restaurant. (attended by State Minister Iwata)

School lunch using scallops
(Source: Website run by Mori Town, Hokkaido Prefecture)

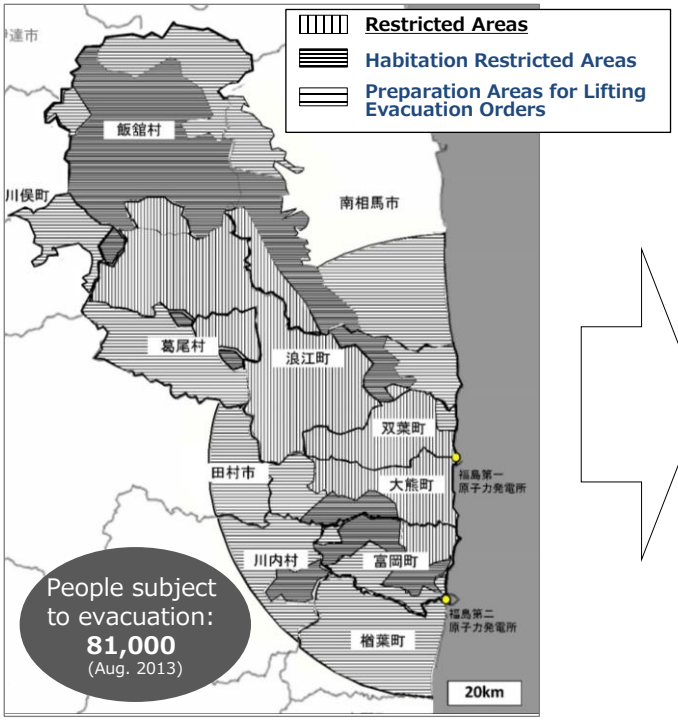
Progress in Reconstruction of Fukushima

Efforts for Lifting the Evacuation Orders Imposed on the Restricted Areas*

*Areas that Japan has designated as areas where residence will be restricted in the future

- **Over the time up to 2023, Japan lifted all evacuation orders imposed on the Specified Reconstruction and Revitalization Base Areas** in which Japan aims to return residents by lifting evacuation orders.
- Regarding the remaining Restricted Areas, in June 2023, Japan established a new system called the **"Specified Living Areas for Returners" in which Japan will promote efforts for lifting evacuation orders over the 2020s so that all residents who wish to return can do so**. Going forward, it will carry out **decontamination and infrastructure development**.

«Evacuation Ordered Areas: Aug. 2013»

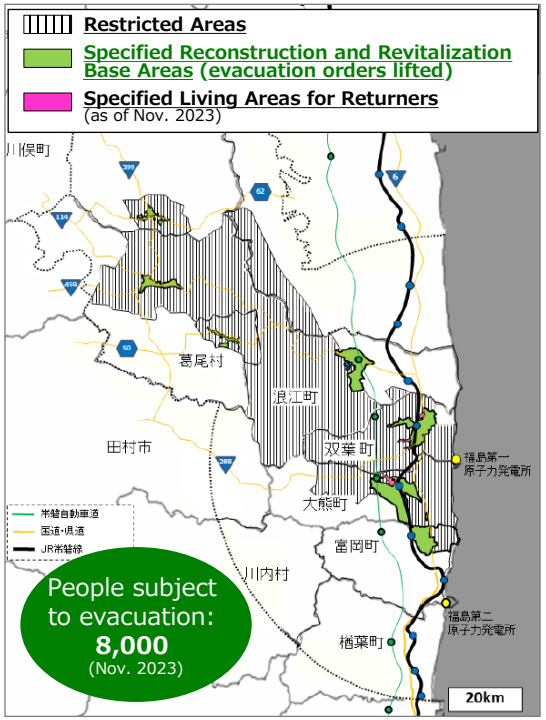


«Aug. 2013»
Completion of the revision of the Evacuation Ordered Areas (see the figure above)

Start of lifting the evacuation orders from Apr. 2014

«Mar. 2020»
Lifting of the evacuation orders from all the areas except the Restricted Areas

«Nov. 2023»

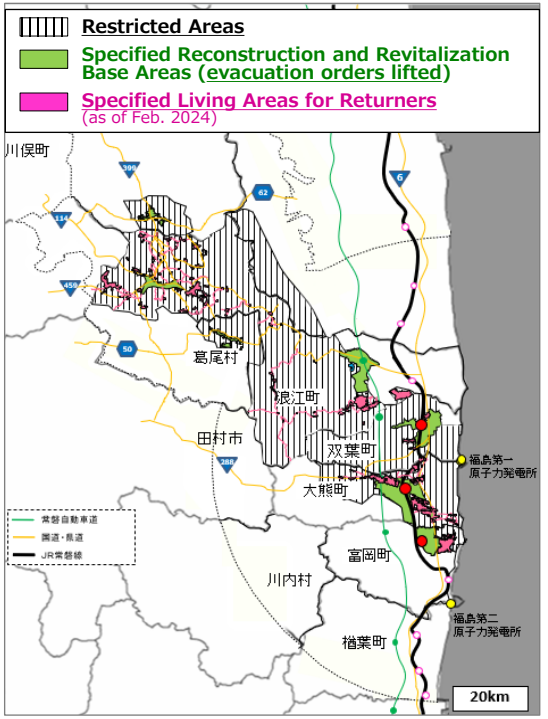


«May 2017»
Establishment of the **Specified Reconstruction and Revitalization Base Areas** from amongst the Restricted Areas, in which Japan aims to lift evacuation orders in about 5 years and to return residents

Start of lifting the evacuation orders from Mar. 2020

«Nov. 2023»
Lifting of the evacuation orders from all the Specified Reconstruction and Revitalization Base Areas (see the figure above)

«Feb. 2024»



«Jun. 2023»
Establishment of a system called the **Specified Living Areas for Returners** in line with the revised Act on Special Measures for the Reconstruction and Revitalization of Fukushima

«Feb. 2024»
Approval of the Plans on Revitalizing the Specified Living Areas for Returners submitted by four towns: Okuma Town, Futaba Town, Namie Town, and Tomioka Town

Going forward, Japan will carry out decontamination and infrastructure development and advance the lifting of evacuation orders.

Ensuring Energy Security Compatible with Net-Zero GHG Emissions

Uncertainty over the Global Energy Situation Continues to Increase

- Events affecting energy have occurred globally, such as Russia's aggression against Ukraine and the armed conflict between Israel and Palestine.
- Furthermore, **conflicts and disasters have occurred at key points of maritime transportation**, such as the Red Sea and the Panama Canal, raising concerns about the stable supply of energy. **Ensuring energy security has become an increasingly important issue** from the perspective of the entire supply chain.

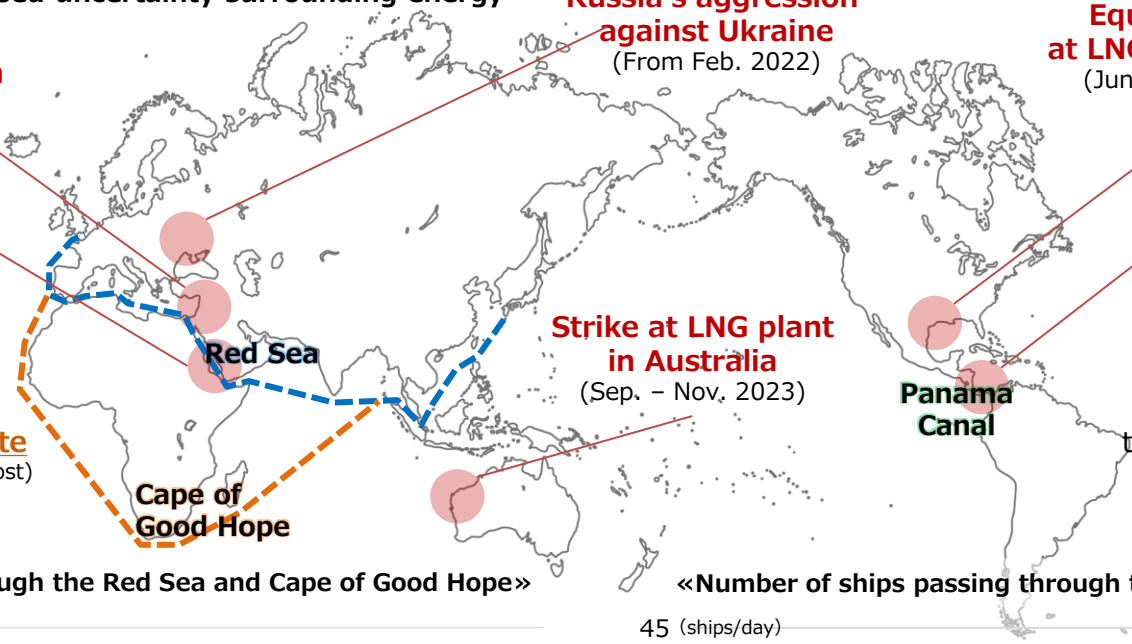
Key events related to increased uncertainty surrounding energy

Armed Conflict between Israel and Palestine
(From Oct. 2023)

Houthi attacks on ships in the Red Sea
(From around Oct. 2023)

⇩

Increased **rerouting** from the Red Sea route to the Cape of Good Hope route
(Increase in transportation distance and cost)



Drought and low water levels limit passage through the Panama Canal
(From around Nov. 2023)

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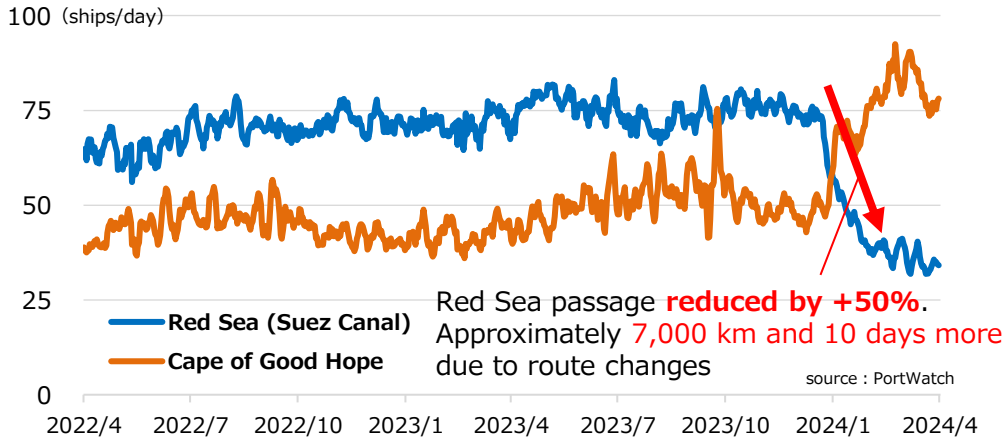
In addition to **waiting time**, some ships **reroute** to the Cape of Good Hope route, etc.
(Increase in transportation distance and cost)

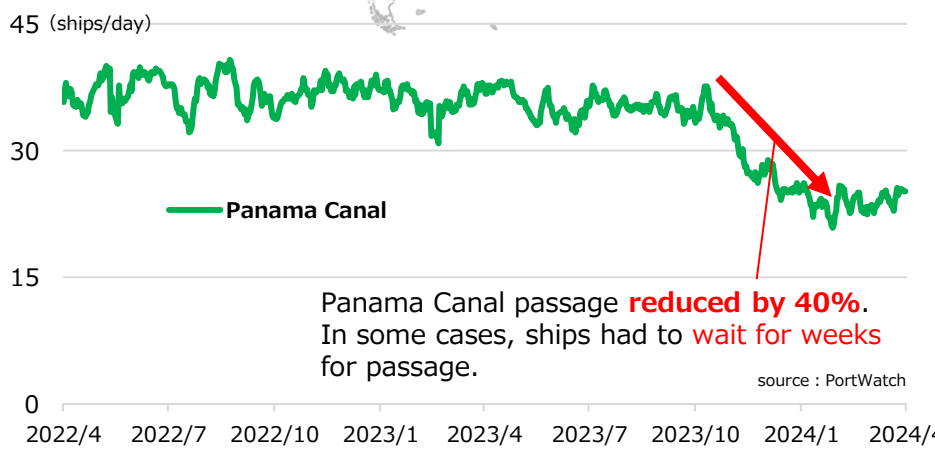
«Number of ships passing through the Red Sea and Cape of Good Hope»



Red Sea passage **reduced by +50%**.
Approximately 7,000 km and 10 days more due to route changes

source : PortWatch

«Number of ships passing through the Panama Canal»



Panama Canal passage **reduced by 40%**.
In some cases, ships had to wait for weeks for passage.

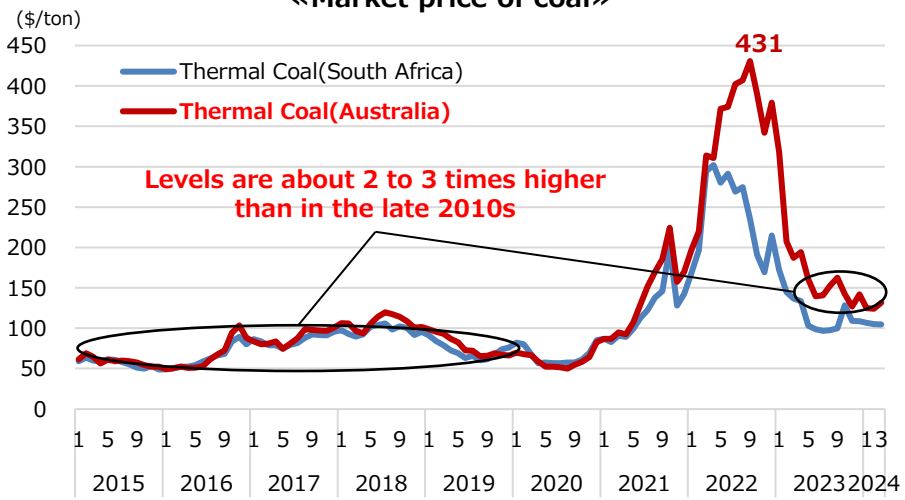
source : PortWatch

Ensuring Energy Security Compatible with Net-Zero GHG Emissions

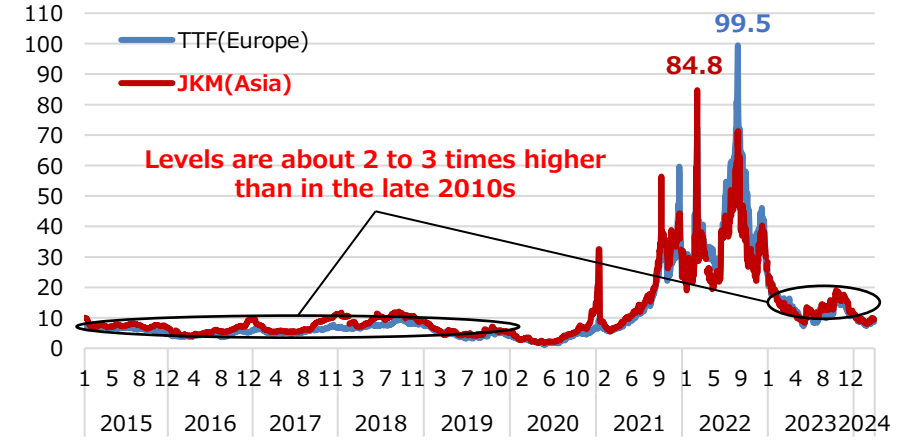
More Variables that Could Affect Energy in Japan

- **Fuel prices**, which soared in 2022, are falling, but **still remain high compared to the levels of the late 2010s**.
- **The future outlook for fuel prices remains uncertain**, partly due to increased coal imports by China, which produces and consumes more than half of the world's coal.
- In addition to issues such as **the decline in upstream investment in LNG and other resources** as global decarbonization progresses, **the possibility of increased demand for electricity in Japan due to the progress of GX and DX** has also been pointed out.

«Market price of coal»

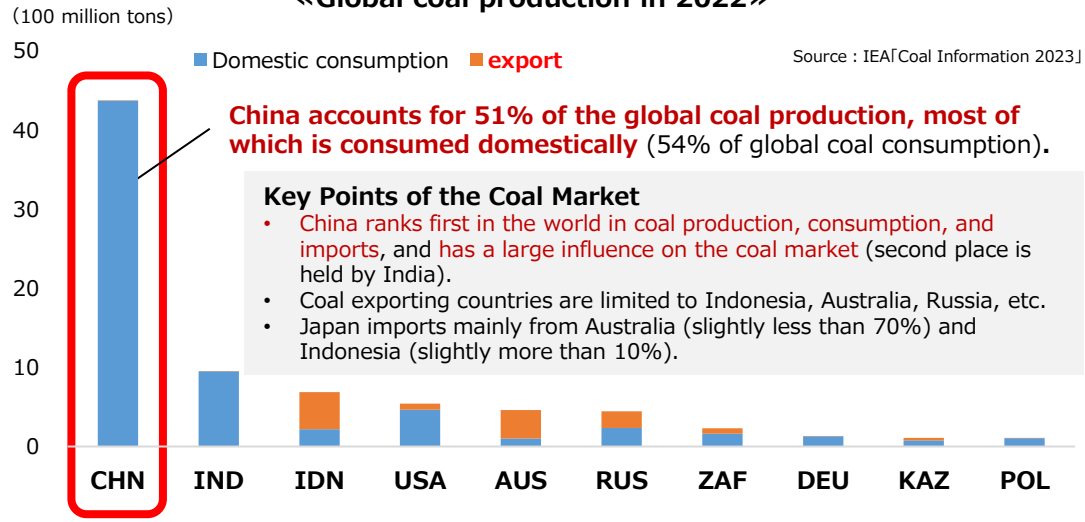


«Market price of natural gas（LNG）»



Source : Coal⇒The World Bank「Commodity Markets」、Natural Gas⇒S&P Global Platts, etc.

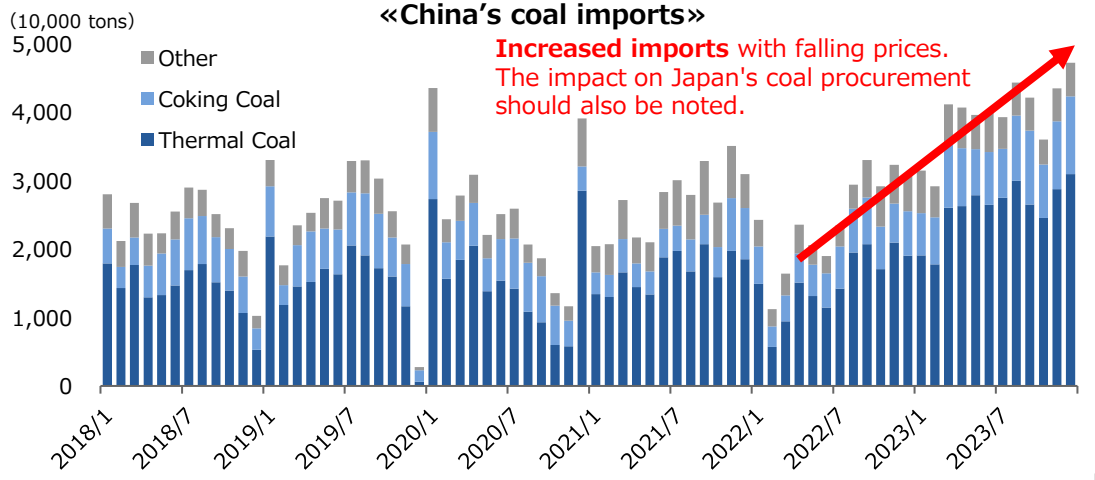
«Global coal production in 2022»



Key Points of the Coal Market

- China ranks first in the world in coal production, consumption, and imports, and has a large influence on the coal market (second place is held by India).
- Coal exporting countries are limited to Indonesia, Australia, Russia, etc.
- Japan imports mainly from Australia (slightly less than 70%) and Indonesia (slightly more than 10%).

«China's coal imports»

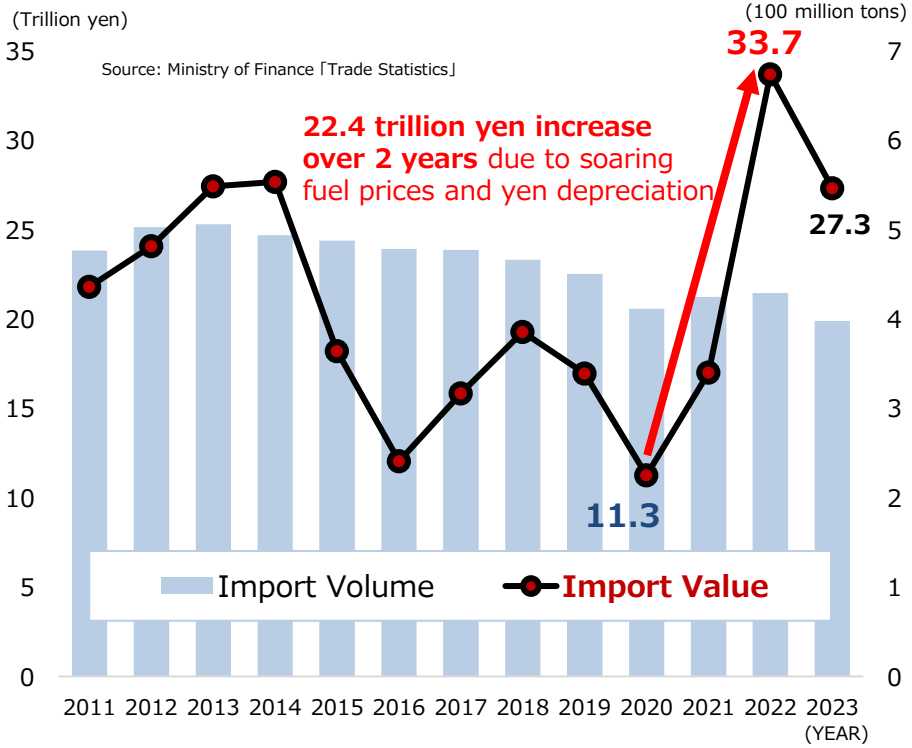


Source : Prepared by Energy Economics and Society Research Institute based on data from General Administration of Customs of PRC

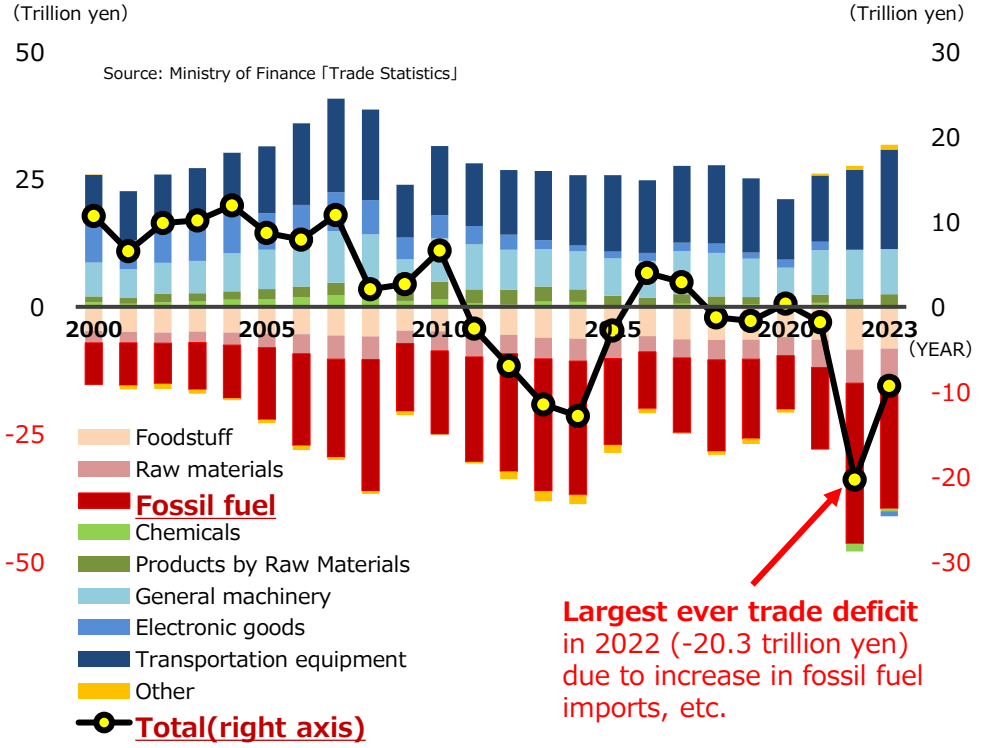
Structural Challenges Facing Japan's Energy

- Soaring fuel prices and a weak yen have increased **the value of Japan's fossil fuel imports by 22.4 trillion yen over the past two years**, leading to **an outflow of national wealth and a trade deficit**.
- In order to fundamentally resolve the risk of price hikes and other issues to which Japan is exposed, it is **necessary to shift to an energy supply-demand structure that is resilient to energy crises**.

«Trends in the value of Japan's fossil fuel imports»



«Japan's balance of trade»



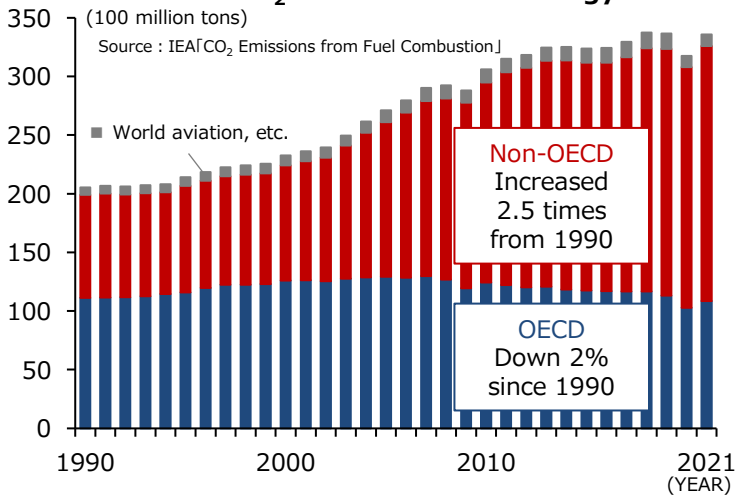
As long as Japan continues to rely on overseas supply sources for the majority of its energy needs,
it will continue to be exposed to price hikes and other risks.

Amid increasing uncertainty surrounding energy,
it is extremely important to promote a shift to a supply-demand structure that is resilient to energy crises,
through measures such as thorough energy efficiency improvement and promotion of investment in decarbonized energy.

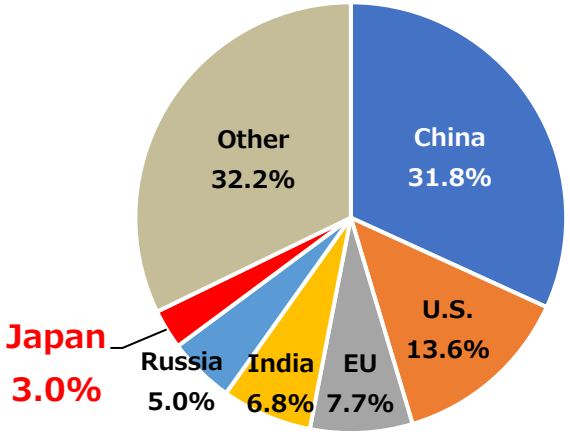
Progress in Reducing Greenhouse Gas Emissions

- The increase in emissions in developing countries has led to an **increase in global emissions** (**Japan's emissions are 3% of the global total**).
- **In order to achieve net-zero GHG emissions, it is important to aim for a common goal under various and realistic pathways according to each country's circumstances.**
- **Japan is making steady progress** in reducing emissions against its FY2030 reduction target (**on-track**).

«Global CO_2 emissions from energy»



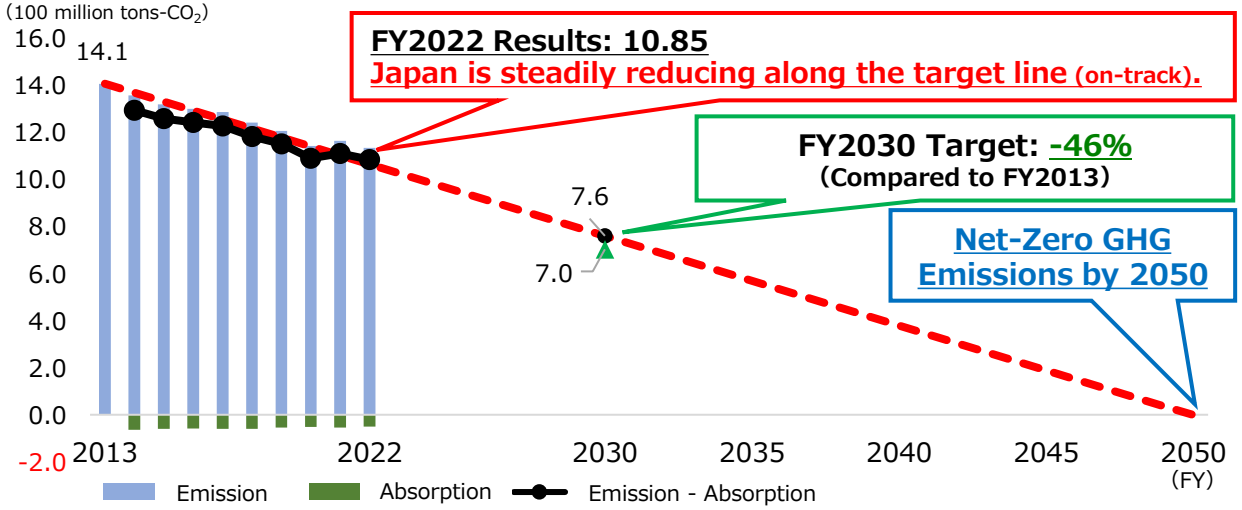
«Ratio of global CO_2 emissions from energy(2021)»



Source : IEA「CO_2 Emissions from Fuel Combustion」

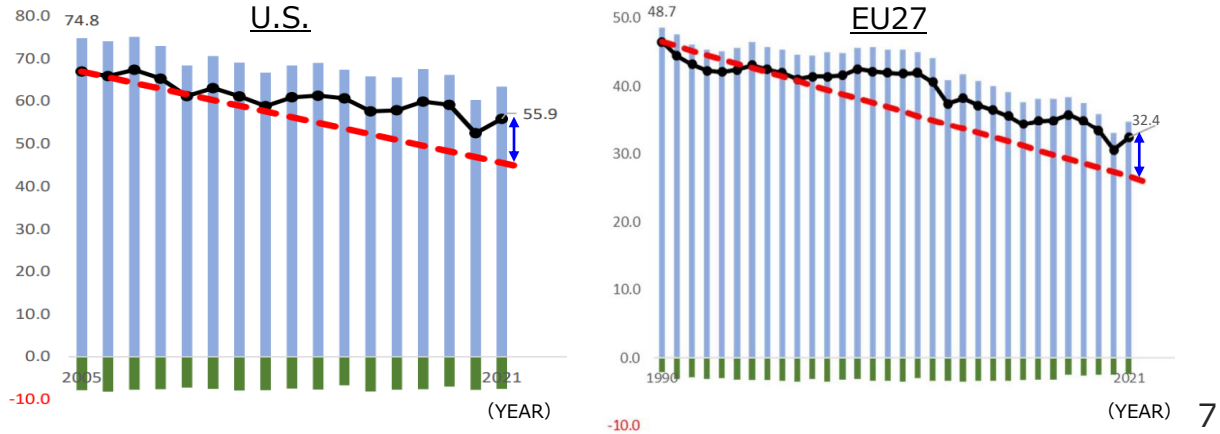
«Greenhouse gas emissions and absorption in Japan»

Source : Ministry of the Environment



«Greenhouse gas emissions and absorption in the U.S. and the EU»

Source: Compiled by Ministry of the Environment based on UNFCCC「Greenhouse Gas Inventory Data」



Japan's Efforts Toward GX Enter the Implementation Phase

- Efforts to realize GX are accelerating around the world. **Japan has entered the implementation phase of its public-private GX investment promotion measures** by compiling Sector-specific Investment Strategies for each priority sector, with the aim of simultaneously achieving a stable energy supply, economic growth, and decarbonization.
- In order to promote **GX in sectors where decarbonization is difficult to achieve**, **legislation for the introduction of low-carbon hydrogen and CCS** has also been developed.

Examples of global efforts to balance energy security and GX

U.S.	**Inflation Reduction Act（IRA）** (Enacted in Aug. 2022) ➢ The government has committed 10 years of government support for renewable energy, nuclear power, CCS, hydrogen, and other clean energy sources. There are also domestic investment requirements, etc.
EU	**Net Zero Industry Bill** (Tentative agreement in Feb. 2024) ➢ The EU aims to increase investment in the EU region with the goal of achieving a 40% self-sufficiency rate in net-zero technologies such as renewable energy and storage batteries, etc. The CCS target is also stipulated.

Japan's efforts to achieve GX Progress in FY2023

2023 May	**GX Promotion Act passed** ➢ Statutory requirement to issue GX Economic Transition Bonds, introduce Growth-Oriented Carbon Pricing, etc. to realize over 150 trillion yen of public/private GX investment over the next 10 years. **The GX Decarbonized Power Supply Act passed** ➢ Revision of relevant laws to promote the use of decarbonized power sources and ensure a stable supply of electricity, with a view to maximizing the introduction of renewable energy in harmony with local communities and the utilization of nuclear power on the basis premise of ensuring safety.
2023 Jul.	**Cabinet approves the GX Promotion Strategy** ➢ Formulated in accordance with the GX Promotion Act to implement policies to realize GX.
2023 Dec.	**Compiled Sector-specific Investment Strategies** ➢ Concretize the direction of GX and investment promotion measures for each priority sector. **Japan's efforts to realize GX have moved from the consideration phase to the implementation phase.**
2024 Feb.	**Cabinet approves Hydrogen Society Promotion Bill and CCS Business Bill**

- **To achieve net-zero GHG emissions by 2050**, it is **essential to promote GX in sectors where decarbonization is difficult**, in addition to thorough energy efficiency improvement and promotion of the use of decarbonized power sources (renewable energy and nuclear power).
- In Japan, efforts to introduce **hydrogen** and **CCS**, which contribute to GX in these sectors, are progressing.

Hydrogen

Including ammonia, e-methane and e-fuel

Background

- Hydrogen is a decarbonized type of energy that is **expected to be utilized in industrial sectors where decarbonization is difficult**, such as iron and chemicals, as well as in the **mobility** and **power generation sectors**.
- **The market for hydrogen is expected to expand in the future**. Countries are accelerating efforts to expand the introduction of hydrogen and to develop their own hydrogen industries.

Efforts

In Japan, legislation has progressed to **establish an independent supply chain for hydrogen, ammonia, e-methane, and e-fuel**, with **support focused on the price difference from existing fuels** and **support for the development of hubs**, etc.

CCS

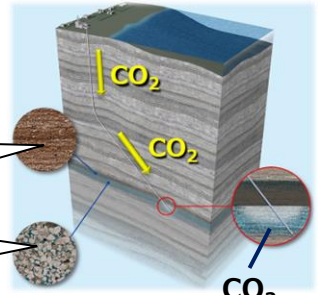
Background

- To achieve net-zero GHG emissions, **there are some sectors where CO_2 emissions are unavoidable (hard-to-abate sectors).** (e.g., steel and cement, where CO2 is generated in the manufacturing process)
- CCS is an option to decarbonize these sectors, and efforts for CCS are accelerating around the world.

Efforts

In Japan, support for advanced projects and **development of legislation** are progressing toward the **start of CCS projects by 2030**.

«Mechanism of CCS»



Source: JCCS

COP28 and AZEC to Advance Global Emission Reductions

- The **COP28** decision document stated that there is a gap between global progress and the 1.5°C target, and called on Parties to contribute to **"tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements"**, etc. Furthermore, **nuclear power** was specified for the first time as a climate change counter measure. In addition, Japan endorsed **the Declaration to Triple Nuclear Energy**.
- **Japan's efforts toward GX could also lead to GX in Asia**, which is dependent on fossil fuels and is expected to continue to increase its energy demand in the future.
- **The AZEC will serve as a bridge**. Through Japanese technology, finance, and other means, we will **contribute to GX in Asia and the world**.

COP28

- November-December 2023 in Dubai, the UAE.
- First-ever Global Stocktake conducted to review progress on climate action across the world.


Group photo of heads of states and governments at COP28

Global Stocktake Decision Document

- **Urgent action is needed** to achieve the 1.5°C target.
- Calls on Parties to contribute to the following efforts, taking into account their different national circumstances, approaches etc.
  - **Triple renewable energy capacity globally and double the global average annual rate of energy efficiency improvements.**
  - **Transition away from fossil fuels toward net-zero by 2050.**
  - **Accelerate zero- and low-emission technologies, including renewables, nuclear, CCUS, low-carbon hydrogen, etc.**

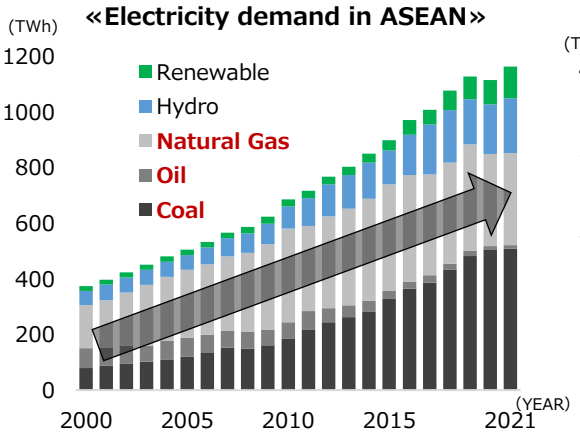
*According to the World Nuclear Association, **this is the first time that nuclear power is explicitly mentioned as a climate change measure in a COP decision document.**

Japan also participates in international initiatives (examples below)

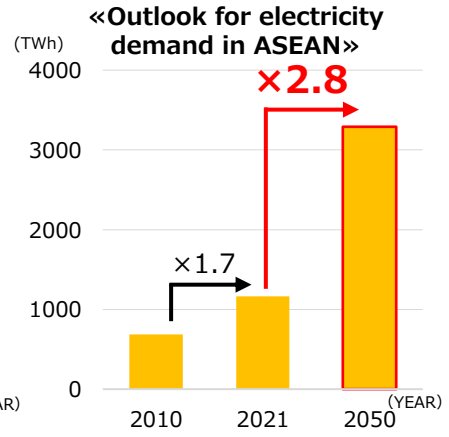
- **The declaration to triple renewable energy generation capacity and double annual energy efficiency improvement rate**
  Aim to triple global renewable energy generation capacity and double the annual rate of energy efficiency improvement by 2030
- **The Declaration to Triple Nuclear Energy**
  Aim to triple global nuclear power capacity by 2050

25 countries have endorsed the Declaration to Triple Nuclear Energy

AZEC



Source : IEA「World Energy Balances 2023」



Source : IEA「World Energy Outlook 2023」

With economic growth expected to continue in ASEAN, energy demand is expected to increase in the future. **Simultaneously achieving economic growth, stable energy supply, and carbon neutrality/net-zero emissions in Asia is a major challenge for the entire world.**

"AZEC" -Asia Zero Emission Community

11 countries are participating, including Indonesia, Thailand, and Malaysia

- **GX in Asia is essential to achieve global carbon neutrality/net-zero emissions.**
- Japan's GX technologies, such as hydrogen and CCUS, are effective for GX in Asia.
- AZEC is a bridge. **We will contribute to GX in Asia and the world including through Japan's GX technologies.**

First AZEC summit in December 2023.