



Availability, Affordability and Adequacy of Energy for Mining and Metals — Japan's Perspective —

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Japan Organization for Metals and Energy Security

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Why Energy Matters for Mining and Metals in Japan



- Mining, smelting and refining are highly energy-intensive activities.
- Energy affects not only costs, but also operational stability, investment decisions, and long-term competitiveness.
- Small changes in energy price or supply reliability can have a disproportionate impact.
- **Energy availability, affordability and adequacy must be addressed as a core part of mineral supply chains.**

Mining

Smelting

Refining

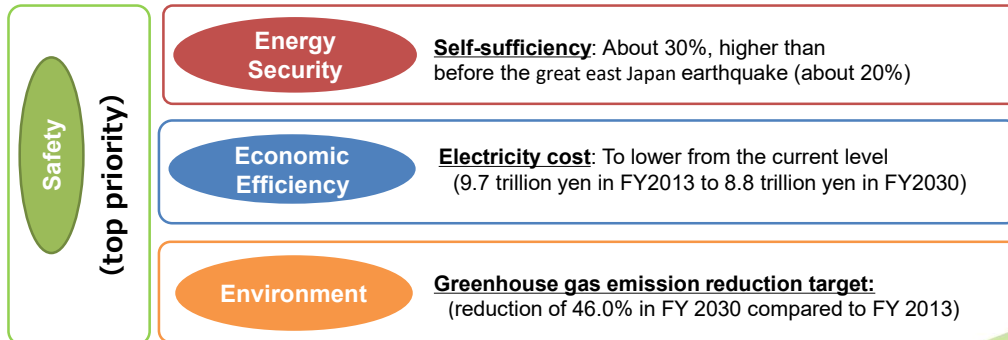
Energy

Japan's Structural Energy Constraints



- Based on the Strategic Energy Plan, Japan sets up the energy policy targets, **① Safety**, **② Energy security**, **③ Economic efficiency**, and **④ Environment** simultaneously. (S+3E)

<Policy target for S+3E>



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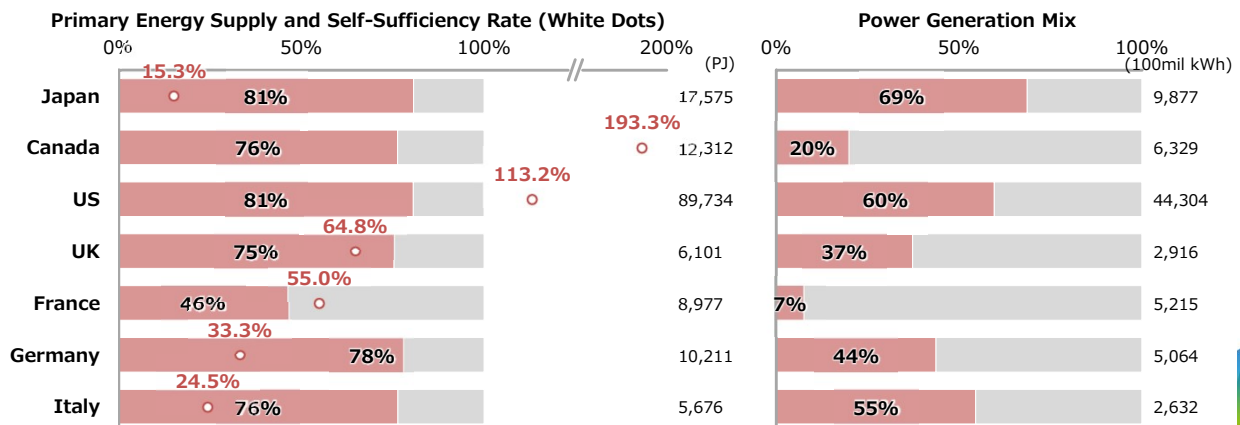
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Fossil Reliance & Low Energy Self-Sufficiency



- Energy self-sufficiency is only **15.3%**.
- Fossil fuels supply about **70%** of power generation — the highest among G7.
- This makes Japan highly vulnerable to geopolitical and price risks.

Share of Fossil Energy in Primary Energy Supply and Power Generation Mix in 2023



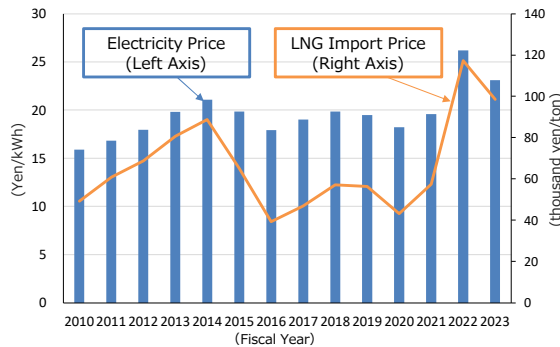
Source: IEA "World Energy Balances"; ANRE "General Energy Statistics"
 *Japan's data is based on the fiscal year, while data for other countries corresponds to the calendar year 2023

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Energy Dependence and Price Sensitivity

- Heavy reliance on fossil fuel-fired power generation links electricity costs closely to fuel prices.
- As observed after the Ukraine crisis in 2022, increases in LNG and fuel prices translated directly into higher electricity rates.
- This structural sensitivity raises cost volatility for energy-intensive industries.

Electricity and LNG Price Trends in Japan

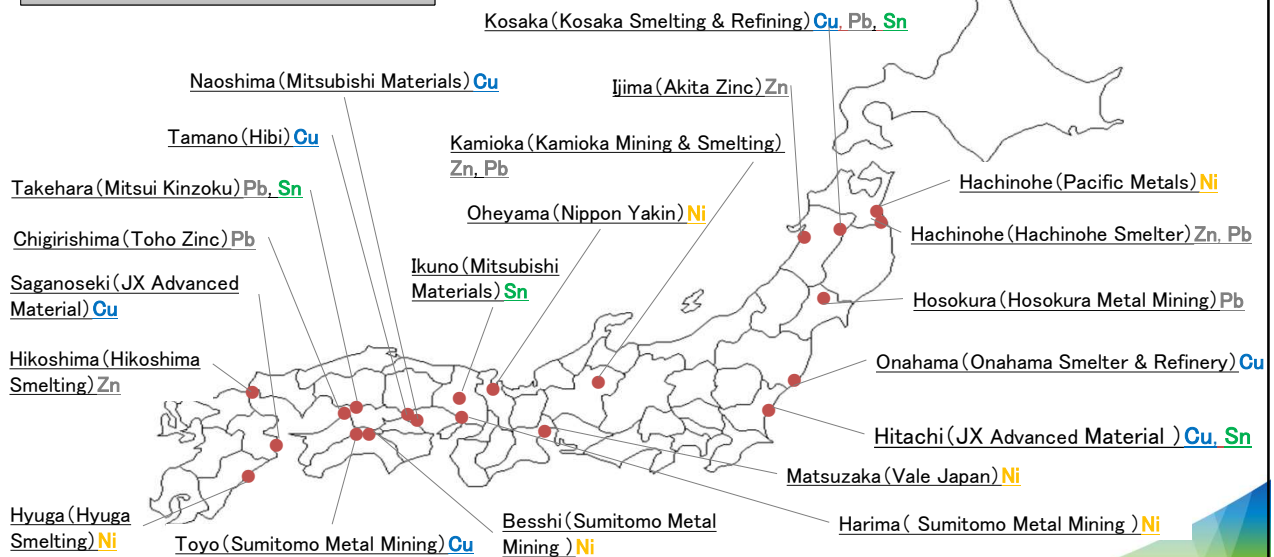


*Average electricity price for households and industries across Japan's 10 major electric power companies (excl. sales tax).
 *The figures for FY2022-2023 include the effects of the Electricity and Gas Price Mitigation Measures.

Source: MOF "Challenges and Prescriptions for the Japanese Economy from the Perspective of the Balance of Payments"; Trade Statistics; Customs Statistics

Energy-Intensive Smelting and Refining Capacity in Japan

Major non-ferrous smelters in Japan



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Ni Hachinohe, Oheyama, Hyuga: Ferro Nickel, Matsuzaka: Oxide Nickel, Harima: Nickel Sulfate (Source: Japan Mining Industry Association)

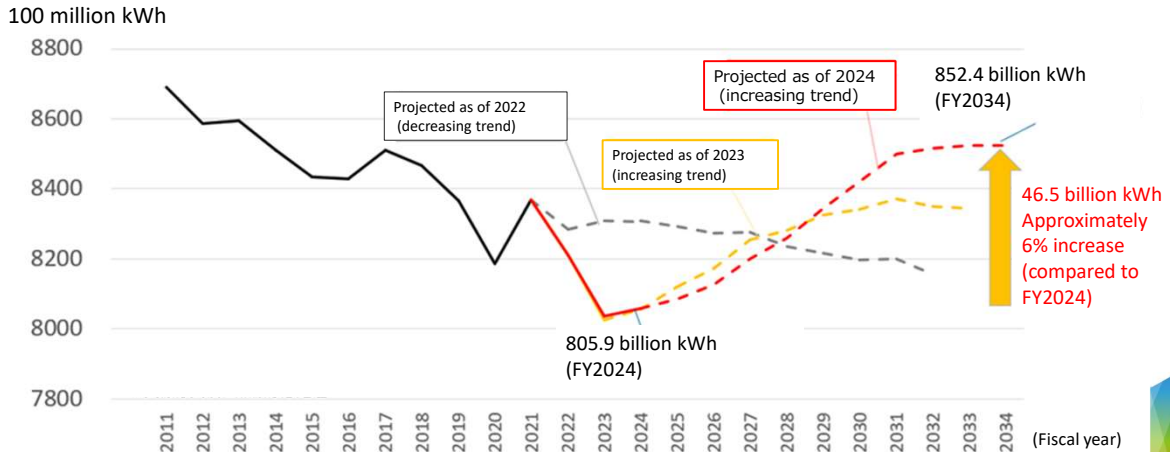
Future Challenge: Energy Adequacy

Rising Electricity Demand and Supply Constraints



- Overall **electricity demand is expected to increase**, driven by growth in industrial demand.

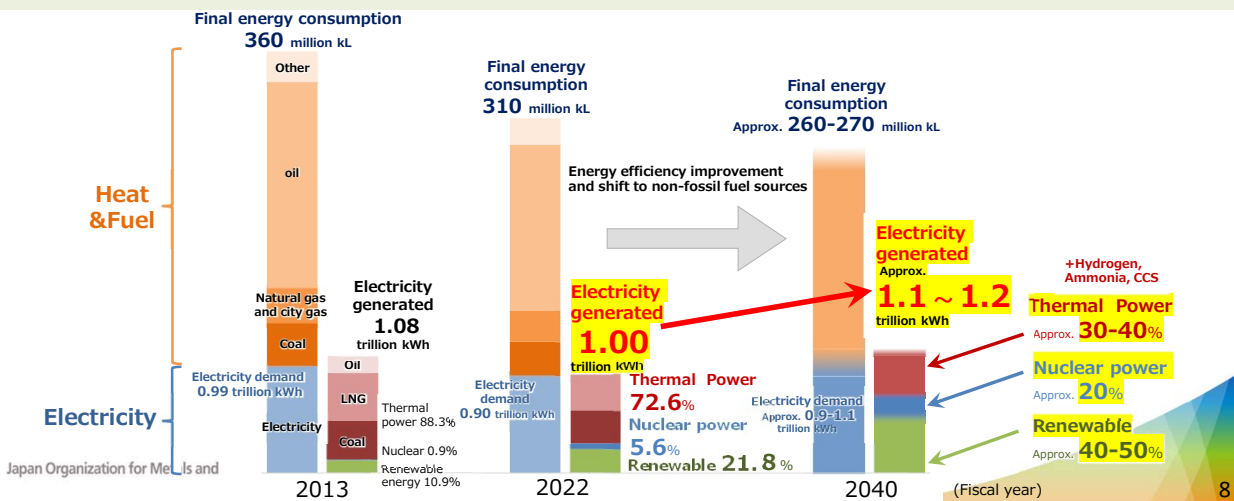
Outlook for Japan's Electricity Demand (kWh)



*Based on current concrete plans for data centers and semiconductor plants, growth is projected to slow after FY2031, though future trends in new development plans could change this.
Source: OCCTO "National and Regional Supply Area Projections"

Japan's Policy Direction - the 7th Strategic Energy Plan (Feb,2025)

- Maintain the principles of S+3E, with energy security as a top priority.
- Electricity demand is expected to increase over the medium to long-term.
- Japan pursues a balanced power generation mix, maximizing renewable energy and nuclear power as stable, decarbonized sources.
- Energy policy and industrial policy are integrated to support long-term economic growth.

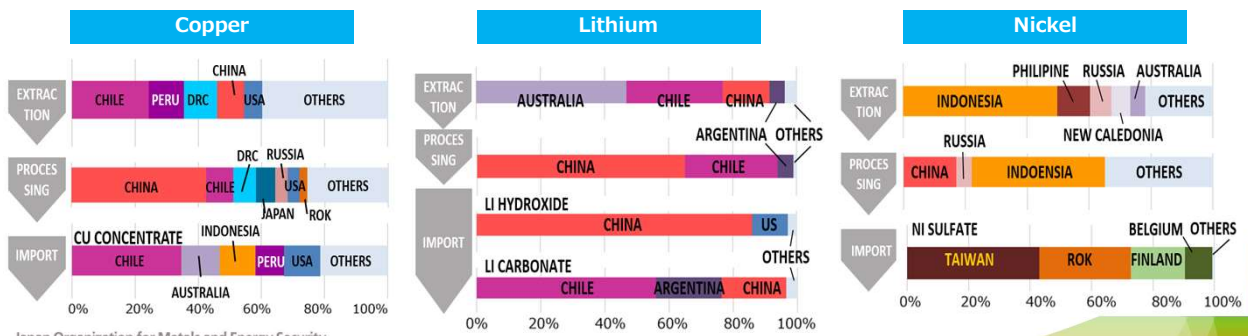


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Double Dependence: Energy and Minerals



- Japan relies heavily on imports for many mineral resources.
- Global supply of critical minerals is often concentrated in a few countries.
- This creates a structural double dependence on energy and minerals.

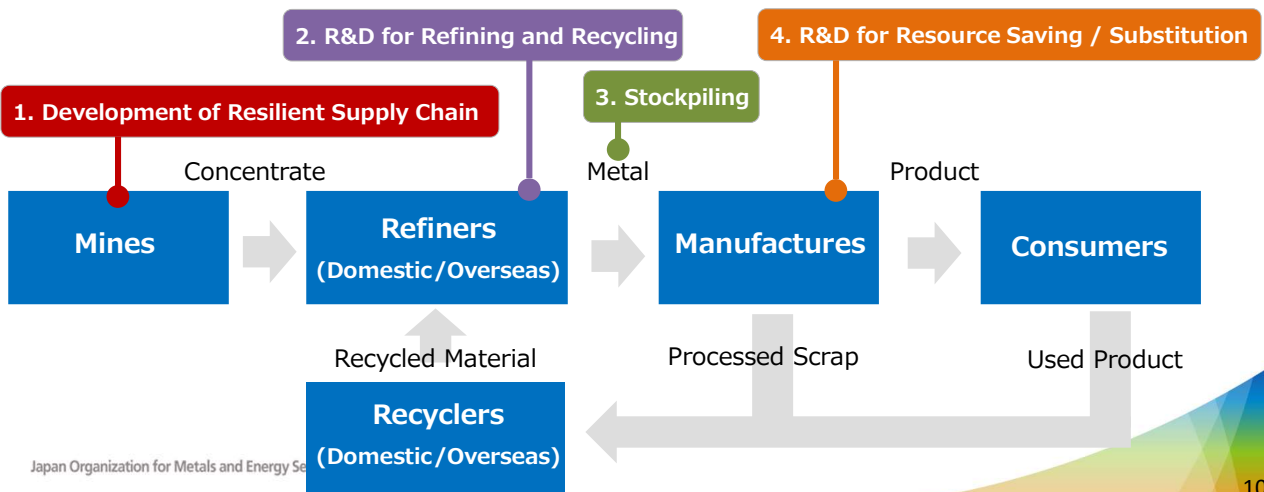


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Source : IEA, JOGMEC, Upstream interest data is sourced from "S&P Global Market Intelligence Metals & Mining"

Overview of Japan's Mineral Resources Policy



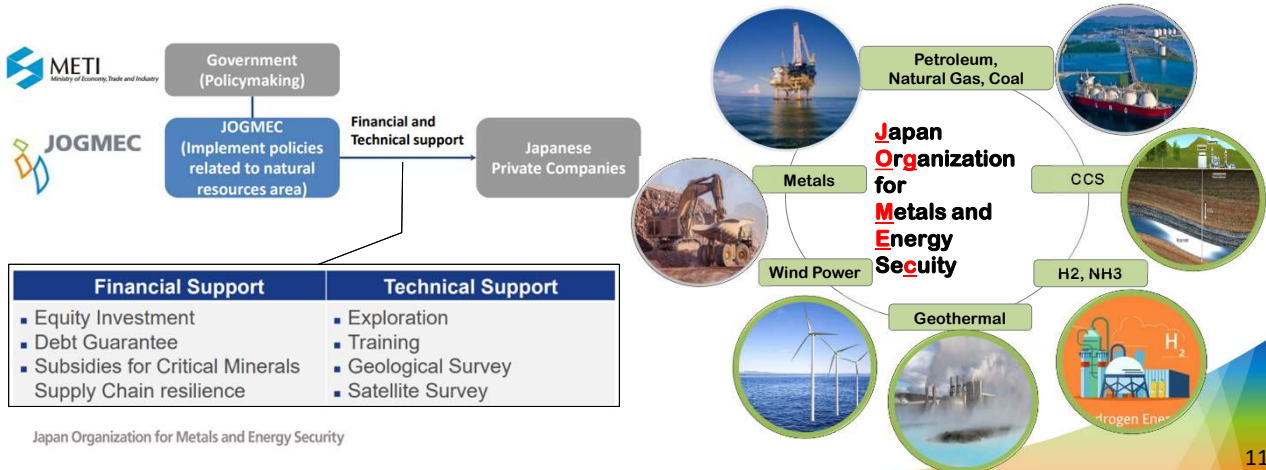
- To secure stable mineral supply chains, Japan promotes a comprehensive set of mineral resource security policies, combined with diplomatic engagement with resource-rich and like-minded countries.



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Why Government Involvement Matters: The Role of JOGMEC

- Mineral projects involve **high capital intensity**, **long lead times**, and **significant market volatility**, with **risks that often exceed the capacity of the private sector alone**.
- JOGMEC is Japan's government-owned agency responsible for supporting the **stable and affordable supply of natural resources**.
- JOGMEC provides financial and technical support to help Japanese companies mitigate project risks.



Three Main Measures for Metals by JOGMEC - How Policy Works in Practice

- To secure stable and resilient mineral supply chains, JOGMEC focuses on three main measures:
 1. Financial Assistance and Subsidies for Japanese companies (over 2 billion EUR)
 2. Joint Venture Exploration
 3. Resource Diplomacy, in coordination with METI
- These measures support projects across the supply chains, from exploration through processing and R&D.



Partnership in Practice: Selected Examples



Lynas Rare Earths Project
(Australia: Rare earths)

Company Name: Sojitz Corporation
Support Scheme: Equity support
Objective: To diversify the REE supply sources, especially HRE



Caremag Project
(France: Rare earths recycling and refining plant)

Company Name: Iwatani Corporation
Support Scheme: Equity support
Objective: To diversify the REE supply sources, especially HRE



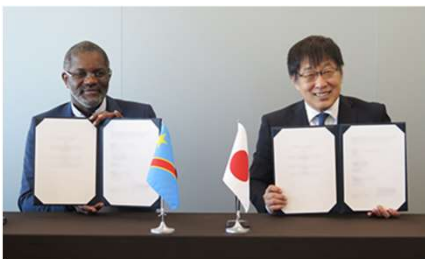
Waterberg Project
(South Africa: PGM, Nickel, Copper)

Company Name: Hanwa Co., Ltd.
Support Scheme: Equity support
Achievement: To import high-quality PGM into Japan stably

Sustained Engagement as the Basis for Long-Term Partnership



- Sustained engagement and dialogue form the foundation of long-term partnerships.



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Examples shown include partner countries in Africa, the Middle East, Central Asia and Latin America.

From Sustained Engagement to Institutionalized Partnership

- Japan is deepening cooperation on critical minerals with key partners such as the United States and France.
- These partnerships go beyond individual projects and aim to institutionalize cooperation across mining, processing, and supply chain resilience.

Japan-U.S. Cooperation

Deepening bilateral cooperation on critical minerals and supply chain resilience.



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Japan-France Cooperation

Advancing strategic cooperation on diversification of critical mineral supply chains.



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Addressing Systemic Challenges through Public-Private Dialogue

- Some supply chain challenges cannot be addressed through projects alone.
- Japan has initiated international public-private dialogue to address structural challenges in the copper value chain, including treatment and refining charges (TC/RC).



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- In some cases, long-term supply stability depends not only on projects, but also on shared understanding of market conditions.
- Public-private dialogue provides a platform to address such structural challenges

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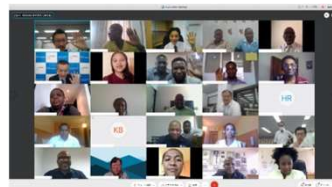
What Long-Term Partnership Means

- Long-term commitment beyond short-term market cycles
- Risk sharing across the project lifecycle
- Stable and predictable operating environment
- Capacity building and human resource development to support sustainable operations
- Mutual benefits for resource-rich and consuming countries

For example, JOGMEC supports long-term capacity building through geological training and human resource development programs in resource-rich regions.

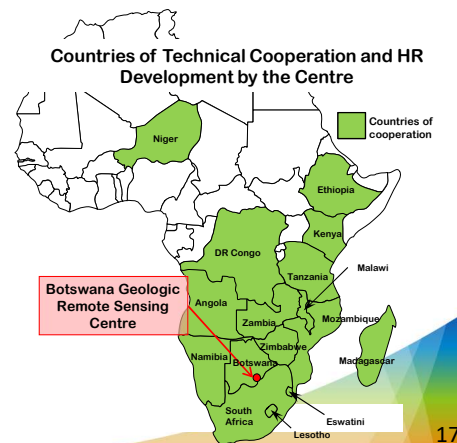


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Why Energy and Minerals Must Be Discussed Together

Japan's Expectations in Practice

- Japan respects and supports value addition efforts, including processing and refining.
 - At the same time, such activities require reliable, affordable, and stable energy supply, as processing and refining are highly energy-intensive.
 - Long-term, stable off-take arrangements are crucial to support investment, particularly in capital- and energy-intensive sectors.
 - Safe and secure operating environments also matter for stable operations.
- Energy is a prerequisite for mineral supply chains.
 - Resilient supply requires integrated policies and long-term partnerships.

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Closing



Ultimately, Japan seeks long-term partnerships based on mutual trust, combining stable energy supply, secure operating environments, and predictable policy frameworks.

Thank you