

# Japan's Supply Chain Policy and its Implications for South Korea

Gyu-Pan KIM Senior Research Fellow, Japan and East Asia Team, Center for East Asian and Advanced Economy Studies (keiokim@kiep.go.kr)

## I. Introduction

The Biden U.S. administration is rushing to restructure global supply chain as part of its strategy to decouple itself from the Chinese economy. In September 2022, the United States officially launched the IPEF (Indo-Pacific Economic Framework), which involves 14 countries in the Asia-Pacific region, and is leading negotiations on four pillars: trade, supply chain, clean economy, and fair economy. The United States also launched the Minerals Security Partnership (MSP) in June 2022 to check against China, which is leading the development of critical mineral resources globally. In addition, in August 2022, the Biden U.S. administration enacted the CHIPS and Science Act and the IRA (Inflation Reduction Act).

Japan began to rapidly pursue an economic security strategy in response to the intensifying competition for technological hegemony between the United States and China and

COVID-19. Japan's signature economic security policy is export control, and the countries subject to export control were expanded to Russia in February 2022 and China in July 2023. The supply chain policy being promoted by the Kishida Cabinet combines the distinctive features of economic security and industrial policy, and was embodied in the reshoring policy launched in 2020 and the Economic Security Promotion Act enacted in May 2022. In particular, the Economic Security Promotion Act aims to strengthen industrial competitiveness by promoting domestic investment by Japanese companies in semiconductors, electric vehicle batteries, and critical minerals, which are the main targets of the US decoupling policy with the China.

This WEB paper analyzed Japan's supply chain policy in line with the implementation of Japan's Economic Security Promotion Act in May 2022, and presented policy implications

such as supply chain cooperation between Korea and Japan. First, this paper analyzed the US-led reorganization of the global supply chain and the Japanese government's response to it. In particular, the Japanese government's economic security policy was evaluated from the perspective of how Japan approaches the US-led the global supply chain reorganization. Second, the Japanese government's supply chain policy was analyzed, focusing on the supply chain support policy for some critical materials under the Economic Security Promotion Act. After the enactment of the Economic Security Promotion Act in May 2022, the Japanese government designated 11 critical materials through the Basic Guidelines for Strengthening Supply Chains in September 2022 and the corresponding ministry's enforcement decrees in December 2022. However, due to space constraints, this paper analyzed the Japanese government's supply chain support project, which was limited to three of the 11 critical materials, including semiconductors, EV batteries, and critical minerals. Finally, this paper proposed ways for Korea and Japan to cooperate in reshaping the global supply chain led by the United States.

## II. US-led Global Supply Chain Reorganization and Japan's Response

### 1. US-led Global Supply Chain Reorganization

The IPEF and the MSP are representative multilateral consultative bodies related to

global supply chain reorganization currently led by the United States. In May 2023, the IPEF Ministerial Meeting concluded working-level negotiations in the supply chain pillar among the four negotiation areas and agreed on an agreement to strengthen the supply chain of critical materials. The agreement aims to reduce the 14-nation IPEF's dependence on China in the supply chain of critical materials, and aims to reorganize each country's supply chain to be "more resilient and competitive" by forming IPEF three working committees, including the Supply Chain Council, the Supply Chain Response Network, and the Labor Rights Advisory Board. Based on this agreement, IPEF participating countries plan to prepare the text and legal system required for domestic ratification in order to stabilize the supply chain in the Indo-Pacific region. However, IPEF negotiations are reportedly facing difficulties in the trade-digital trade pillar.

The Japanese government appears to be more interested in securing critical minerals than in core materials such as semiconductors or EV batteries in the IPEF supply chain pillar. In relation to the implementation of the U.S. IRA, Japan secured FTA status by signing the US-Japan Critical Minerals Supply Chain Agreement with the US in March 2023. Japan plans to use the IPEF Supply Chain Committee to stabilize the critical minerals supply chain by cooperating with the ASEAN countries such as Indonesia, the Philippines, and Vietnam. In IPEF's third pillar, the Clean Economy, Japan is interested in cooperative projects such as industrial

waste recycling with ASEAN countries.

The MSP, established pursuant to an agreement at the US-Japan Summit held in May 2022, is a ministerial-level meeting between 13 participating countries and the European Commission. It is based on sharing information on critical mineral resources among member countries and aims to strengthen the supply chain of critical minerals through strategic mine development, refining, processing, investment, and activation of recycling and reuse of mineral resources. A characteristic of MSP is that member countries pursue mine development, refining, and processing projects with resource-rich non-member countries. Although MSP does not profess the principle of excluding China, it maintains high ESG (Environmental, Social, and Governance) standards that contribute to the transition to clean energy and the achievement of carbon neutrality. However, it does not disclose the status of specific projects.

Japan is participating in four MSP working groups, including information sharing, strategic mine development & refining and processing, building an investment network, and promoting recycling and reuse of mineral resources. However, the issue of coordinating interests among member countries remains, and in particular, it is questionable how much member countries will agree on the strategic issue of excluding China and Russia, so the Japanese government is seeking out bilateral resource diplomacy in parallel with MSP cooperation. A representative example is the signing of a cooperation agreement on the

mining of EV battery minerals with three African countries, Zambia, the Democratic Republic of Congo, and Namibia in August 2023.

## 2. Bilateral Supply Chain Cooperation between the US and Japan

### 1) US-Japan Semiconductor Cooperation

The basic principles of US-Japan semiconductor cooperation signed in May 2022 show that the Japanese government is placing emphasis on cooperation with the United States. The leaders of the United States and Japan signed the CoRe (Competitiveness and Resilience) partnership as part of economic security cooperation in April 2021, and based on this, Japan's METI and the U.S. Department of Commerce established a ministerial-level conference organization called JUCIP (Japan-U.S. Commercial and Industrial Partnership) in November 2021. At the time of its establishment, JUCIP have four areas of cooperation, including semiconductors, export control, digital economy, and trade and investment, however at the 2nd JUCIP meeting in May 2023, the areas of cooperation were expanded to include bio and quantum sectors and cooperation with Pacific Island countries.

Japan's METI held the 'US-Japan Economic 2+2 Conference' in July 2022 with the additional participation of the US Department of State and Japan's MOFA, and agreed to establish a 'Next-Generation Semiconductor Manufacturing Technology Development Center (tentative name)' in Japan by the end of 2022,

ultimately to mass produce cutting-edge logic semiconductors with a circuit width of 2 nm in Japan by 2025. In November 2022, METI announced measures to establish a design and manufacturing base for next-generation semiconductors as a follow-up measure based on the basic principles of US-Japan semiconductor cooperation. At the same time, the Japanese government named the 'Next-Generation Semiconductor Manufacturing Technology Development Center' as the LSTC (Leading-edge Semiconductor Technology Center) and declared a policy of establishing Rapidus Co., Ltd. as a semiconductor mass production manufacturing base in Japan.

The concept of the next-generation semiconductor project, which focuses on establishing cutting-edge logic semiconductors, is a key element of the second phase of the semiconductor strategy announced by METI in June 2023.

Japan failed to mass produce FIN-type semiconductors more than 20 years ago, so the most advanced logic semiconductor manufacturing line currently in operation is 40nm products at Renesas Naka Plant. The TSMC semiconductor plant, which was located in Kumamoto Prefecture in 2022, also plans to mass produce 12~28nm FIN-FET type semiconductor products starting around the end of 2024. For the Japanese government, in order to foster a cutting-edge logic semiconductor industry based on next-generation process technology so called GAA beyond 2nm, technical cooperation with IBM of the United States and LSTC's global open innovation are

essential elements rather than Rapidus' own efforts. At this point, the METI took full advantage of the bilateral semiconductor cooperation with the U.S. Department of Commerce.

According to the LSTC's R&D roadmap announced by METI in April 2023, Rapidus will establish the pilot line and Albany advanced logic GAA beyond 2nm technology within LSTC by early 2025, and then establish a mass production system to enter the semiconductor manufacturing consignment business as a foundry around 2030. Rapidus is focusing on joint R&D and deployment of engineers with IMEC in Belgium, IBM and NSTC in the United States, and ASML in the Netherlands. The METI allocated approximately 350 billion yen for the LSTC in the 2022 supplementary budget, and Rapidus was selected as the R&D operator for the advanced semiconductor manufacturing consignment project of the post-5G fund publicly contested by NEDO in November 2022. In December 2022, Rapidus signed a joint partnership agreement with IBM to acquire a GAA test chip license, a 2nm generation semiconductor technology and signed an MOU with IMEC to deploy Rapidus engineers and establish IMEC's Japanese research center in Hokkaido area. Rapidus began construction of its semiconductor factory in Chidose City, Hokkaido in September 2023.

## 2) US-Japan Science and Technology Cooperation

The Japanese government is strengthening science and technology cooperation with the United States independently of its own national

strategic technology development. At the 15th Joint High-Level Committee (JHLC) Meeting on US-Japan Science and Technology Cooperation held in May 2023, the science and technology policies of the US and Japan and strategic areas of science and technology and innovation cooperation were discussed. At the meeting, data science & quantum technology and AI, climate change response, biotechnology & advanced medical care and bio-manufacturing were adopted as the three major areas of cooperation. Based on the discussions at the JHLC Meeting, the Department of State of the U.S.A. and MEXT of Japan signed a Memorandum of Cooperation in Education. The key cooperation issue is that American companies such as IBM and Google are investing 29 billion yen in Japanese and American universities in the semiconductor and quantum fields.

A representative example of industry-university cooperation between Japan and the United States is the signing of an MOU in May 2023 between RIKEN of Japan and Intel of the United States on joint research in the field of next-generation computing (AI, High Performance Computing, quantum computers, etc.). The cooperation includes the development of supercomputer and AI-related computing technology, the development of quantum computer technology and quantum simulation technology using silicon semiconductors, and the joint pilot production of advanced semiconductors with Intel's semiconductor manufacturing subsidiary Intel Foundry Services (IFS).

### III. Japan's Supply Chain Policy

In addition to economic statecraft such as export controls, technology export controls, foreign capital regulations, tightening regulations on land transactions by foreigners, and government procurement bans, Japan is also promoting measures to strengthen the domestic supply chain, such as reshoring & near-shoring support, semiconductor and digital industry strategies, storage battery industry strategies, and the Economic Security Promotion Act.

In May 2022, the Japanese Cabinet Office enacted the Economic Security Promotion Act, and in September 2022, provided the following criteria for selecting critical materials through Basic Guidelines on Securing the Supply Chain of Critical Materials: importance, external dependency, probability of supply chain disruption due to external acts, and necessity. In December 2022, the Cabinet Office designated 11 specific critical materials in the Enforcement Decree of the Economic Security Promotion Act including semiconductors, EV batteries, cloud services, permanent magnets, machine tools and industrial robots, aircraft parts and materials, critical minerals, liquefied natural gas, ship parts, antibiotics, fertilizer raw materials.

The Japanese government's supply chain support project is carried out as follows: the minister in charge publishes a "stable supply policy" for the relevant critical materials, and then the private enterprise prepares a plan to secure

stable supply and submits it to the minister in charge. When the relevant enterprise prepares a stable supply plan, it should include specific items of critical materials, goals and contents of supply security measures, amount and method of funds required for supply security measures, etc. The following support measures are provided to private enterprises who have received approval from the minister in charge of critical materials. The private enterprise can receive government subsidy, which will be distributed through Specific Support Corporations such as NEDO, JOG-MEC, and NIBIOHN. The private enterprise can also apply a special loan program provided by Japan Finance Corporation. The supply chain support measures will be applied to SMEs, such as the special application of the Small and Medium-sized Enterprise Investment Business Corporation Act and the Small and Medium-sized Enterprise Credit Insurance Act.

The Japanese government allocated a total of 1.0358 trillion yen for supply chain support projects in the 2022 supplementary budget, and 60 billion yen as fiscal loan funds under the Fiscal Investment and Loan Program for 2023. In terms of budget size, among the 11 specific critical materials, the budget share of the three critical materials, semiconductors (368.6 billion yen, 35.6%), EV batteries (331.6 billion yen, 32.0%), and critical minerals (105.8 billion yen, 10.2%) is overwhelming, reaching 77.8% of the total.

### 1) Semiconductors

The reason why Japan's METI designated semiconductors as a critical material is due to the country's semiconductor industry's high dependency on foreign countries. In 2018, Japan's external dependency rate for semiconductors reached approximately 79%, raising concerns that if the external supply chain was to be disrupted, the impact on the industry as a whole would ripple throughout the national economy. Based on these concerns, the METI justifies government fiscal support for the semiconductor sector. The METI included not only memory semiconductors, power semiconductors, MCUs, and analog semiconductors for which Japanese companies have secured international competitiveness, but also semiconductor manufacturing equipment and semiconductor materials for which Japanese companies have secured high international competitiveness as critical materials subject to government subsidies. Table 1 shows the list of approved semiconductor supply security plans as of June 2023.

In addition, the Japanese government created a special semiconductor fund of 617 billion yen at NEDO through the supplementary budget for 2021, and added 450 billion yen to the supplementary budget for 2022. This fund was created as a result of METI's revision of the 5G Promotion Act in June 2021 to allow semiconductor manufacturers to receive government subsidies like communications equipment companies. Under the previous law, there was no basis for providing government subsidies to the semiconductor sector. METI

decided to provide subsidies to Taiwan's TSMC Kumamoto plant (up to 476 billion yen), Kioxia Yokkaichi memory semiconductor

plant (up to 92.93 billion yen), and Micron Hiroshima DRAM plant (up to 46.47 billion yen) in June 2022.

**Table 1. Government Subsidy Program approval status: Semiconductors (June 2023)**

	Company	Critical Materials for Semiconductor Manufacturing
1	Renesas Electronics	MCU (Micro Controller Unit)
2	IBIDEN	Package Board (FC-BGA Board)
3	Canon/Canon Semiconductor Equipment	i-line & KrF Lithography Equipments
4	RESONAC/RESONAC HD. Yamanashi	SiC Wafer (Board & Epitaxial Wafer)
5	Sumitomo Electric	SiC Wafer (Board & Epitaxial Wafer)
6	Shinko Electric	Package Board (FC-BGA Board)
7	Kioxia/Kioxia Iwate	Rare Gas (NEON)
8	Sony Semiconductor Manufacturing	Rare Gas (NEON)
9	Koatsu Gas Kogyo	Rare Gas (HELIUM)
10	Sumitomo Corporation	Yellow Phosphorus

Source: METI Website, [https://www.meti.go.jp/policy/economy/economic\\_security/semicon/index.html](https://www.meti.go.jp/policy/economy/economic_security/semicon/index.html) (accessed June 23, 2023)

The Japanese government has implemented the “Semiconductor Production Facility Decarbonization and Renovation Subsidy” project twice through the 2021 supplementary budget of 47 billion yen. As a result, of the 81 legacy semiconductor factories in Japan, including power semiconductors, MCUs, and analog semiconductors, 27 factories (approximately 33%) were found to have received government subsidies for facility investment.

Lastly, the Japanese government is focusing R&D support in the semiconductor sector on the development of cutting-edge logic semiconductor-related manufacturing technology and green transition (GX)-related technology. Among these, the METI is utilizing the post-5G fund raised in 2020 to develop cutting-

edge logic semiconductor manufacturing technology that does not exist in Japan, such as pre-process, post-process-packaging, next-generation photoresist for EUV exposure equipment, and advanced logic semiconductor manufacturing technology related to Rapidus.

## 2) EV Battery

The METI diagnoses the risk of global supply chain disruption by dividing the value chain of the domestic EV battery industry into battery materials, such as anode materials, cathode materials, electrolytes, separators, and battery cells. According to the METI, the market share of Japanese companies in the global EV battery market will decline from 43% (Panasonic, AESC, and LEJ) in 2016 to 9.1% (Pana-

sonic) in 2022. The METI believes that although excessive dependence on a specific country has not yet occurred, there is a risk of excessive dependence on a specific country as electric vehicle production increases in the future unless the necessary supply capacity is secured domestically. In particular, METI is concerned that its domestic companies have secured a certain market share due to the high quality, safety and technological superiority of EV battery materials, but as Chinese companies catch up not only in terms of cost but also in terms of quality, and its domestic battery manufacturers are also likely to use Chinese materials.

In 2019, Japan's domestic EV battery production capacity was 20GWh per year, lower than

South Korea's 29GWh per year. The Japanese government expects that private investment of approximately 350 billion yen as a priming effect from the 2021 supplementary budget (100 billion yen), which is expected to add 20 GWh/year to domestic battery production capacity. The Japanese government expects that the investment of 100 billion yen from the 2021 supplementary budget into the EV battery sector will attract private investment of about 350 billion yen, which is equivalent to 20GWh per year of EV battery production capacity. In addition, the Japanese government plans to use the supply chain support project every year from 2023 to achieve the domestic production capacity target of 150GWh per year in 2030.

**Table 2. Government Subsidy Program approval status: EV Battery (June 2023)**

	Company	Critical Materials for EV Battery
1	Honda/GS YUASA/Blue Energy /Honda-GS Yuasa EV Battery R&D	LIB for automotive and stationary use
2	Panasonic Energy	Cylindrical EV LIB
3	UBE MAXELL	Separator
4	NICHIA	cathode active material
5	Asahi Kasei	Separator
6	KUREHA	Binder
7	Mexichem Japan	Binder materials (R152a)
8	RESONAC	Conductive assistance
9	Toyota Motor/ Prime Planet & Energy Solutions /Primearth EV Energy / Toyota Industries Corporation	EV Battery/New Structure EV Battery /Next Generation EV Battery
10	TOKAI CARBON	Anode active material
11	Kanto Denka Kogyo	Electrolyte additive
12	UBE MAXELL KYOTO	Coated separator
13	NISSIN Kogyo	Positive and negative electrode current collector /exterior materials
14	DENKA	Conductive assistance
15	Aisan Industry	Cell case/Cell cover

Source: METI Website, [https://www.meti.go.jp/policy/economy/economic\\_security/battery/index.html](https://www.meti.go.jp/policy/economy/economic_security/battery/index.html) (accessed June 23, 2023)



Table 2 shows a list of companies that have been approved for EV battery supply chain security plans as of June 2023. The METI subsidizes 1/3 of the investment amount for facility investment and 1/2 of the R&D investment amount for technology development.

In addition, METI has implemented a fiscal support project for the development of advanced production technology to strengthen the domestic production base of batteries from 2022 through the 2021 supplementary budget of 30 billion yen. It is significant in that it will strengthen the social application of battery technology and facility investment support measures in the future. This project supports facility investment in large-scale manufacturing bases using cutting-edge battery and material manufacturing and recycling technologies. The Japanese government subsidize R&D and investment costs for companies that locate factories or introduce facilities. The R&D subsidy rate is within 1/2 and the facility investment subsidy rate is within 1/3.

### 3) Critical Minerals

The METI estimates that in order to achieve the 2030 domestic battery manufacturing base target of 150GWh/year, 100,000 tons of lithium, 90,000 tons of nickel, 20,000 tons of cobalt, 20,000 tons of manganese, and 150,000 tons of graphite will be needed annually. Japan has domestic mines for some metals, such as gold, silver, and silica stone, but relies on imports from overseas for most critical minerals, including rare metals.

METI identifies the challenges facing Japan in the global supply chain of critical minerals at each stage of the value chain as follows. At the exploration stage, while resource nationalism is intensifying and competition for resource acquisition is fierce among major countries, it is becoming increasingly difficult for Japanese companies to secure an interest and resources overseas. The METI points out the need to create a “level playing field” for resource development. While the mineral processing and refining stage tends to be concentrated in some countries with low manufacturing costs, the METI points out that the Japanese government needs to strengthen cooperation with ‘like-mined’ countries and take measures to strengthen its domestic position. Lastly, at the processing stage, the METI points out that utility costs such as electricity are high in Japan, and domestic location conditions for middle-stream processes are also unfavorable.

METI’s projects to strengthen the domestic supply chain of critical minerals consist of supporting exploration and feasibility studies for companies to discover new promising mines, mine development to produce mineral resources, construction of processing and refining facilities, and technological development to increase efficiency and reduce production costs. However, as of September 2023, there are no approved private sector plans to ensure the supply of critical minerals.

## IV. Policy Implications for South Korea

First, with regard to the US-led global supply chain reorganization, the S. Korean government seems to need to further strengthen cooperation with Japan and derive specific and effective policies regarding policy issues discussed or agreed upon at the IPEF in May 2023, the Korea-US-Japan summit at the David Camp in August 2023, and the MSP.

In the ongoing IPEF consultations, there is a need to first review the ‘Korea-U.S.-Japan trilateral discussions’ on supply chain management, including the establishment of an early warning system. Furthermore, the S. Korea and Japan need to discuss in detail the extent to which IPEF participating countries can share information on critical materials and the extent to which supply chain assistance can be provided to countries facing the risk of supply chain disruption for certain critical materials. It is recommended that the S. Korean government, which is in a similar position to Japan with regard to the development of critical mineral resources, is recommended to pursue an active policy of joint resource diplomacy that takes into account not only multilateral cooperation such as MSP, but also overseas mineral resource development in the form of joint projects in third countries with Japan.

Second, the implication of Japan's economic security strategy in terms of 'checking' against China is that the Japanese government has enacted the Economic Security Promotion Act of May 2022, which implements policies to strengthen the domestic supply chains. Looking at the 11 ‘specific critical materials’ designated by the Japanese government, they mainly consist of ‘defensive’ measures to prepare for supply chain disruptions resulting from overwhelming dependence on China and government support to strengthen the country's industrial competitiveness. It is desirable for S. Korea government to develop the economic security strategy in a way that focuses on mitigating the risk of supply chain disruption and strengthening industrial competitiveness through legislation.

Finally, from the perspective of Japan's industrial policy, the semiconductor strategy is significant in that it marked a major change in direction from full-set, closed industrial development to open innovation and international cooperation. Recently, the Japanese government is expanding the foreign investment incentive system that foreign companies can use, and is also opening the door to R&D projects in the semiconductor-related supply chain support plan. It is expected that direct investment by Korean companies into Japan will be active in the digital sector, including semiconductors. **KIEP**