



September 2023

Japan Energy Newsletter

**Japan Electric Power
Information Center, U.S.A.**

1 The Japanese Government Announces Investment of 2 Trillion Yen in GX—Including Storage Batteries, Semiconductors, and Hydrogen-Related Equipment

At the 7th GX Executive Committee held on August 23, 2023, the Japanese government presented a proposal requesting more than 2 trillion yen for the Green Transformation (GX) field, based on the government's budget request for fiscal year 2024. According to documents submitted by the Minister of Economy, Trade and Industry, the official in charge of GX implementation, the proposed budget will provide adequate support for the domestic production of key technologies essential to GX, such as battery storage, semiconductors, and hydrogen-related equipment. The government will also encourage private investment through a multi-year budget mechanism.

Of the over 2 trillion yen, more than 1.2 trillion yen will be allocated to the fiscal year (FY) 2024 budget. Since long-term efforts by the public and private sectors will be essential for achieving decarbonization, the remaining budget will be executed over a period of 3 to 5 years through the "National Treasury Debt Burdening Act," which guarantees measures from the next fiscal year onwards.

Main Contents of the Budget

- 1) 1.2 trillion yen over five years to support projects that develop domestic supply chains for innovative products that promote decarbonization
 - For example, this funding will encourage the domestic production of water electrolysis equipment for hydrogen production, battery storage, perovskite solar cells that are thin enough to be installed on building walls, offshore wind power generation equipment, and power semiconductors. Power semiconductors will also be utilized in electric vehicles (EVs) and renewable energy-related equipment.
- 2) 152.1 billion yen over three years to support R&D of high temperature gas-cooled reactors (HTGR) and fast reactors (FR) for next-generation nuclear power plants.
- 3) 203.4 billion yen over five years to provide development support for startups working on decarbonization ("deep tech"¹ startups).
- 4) 141.7 billion yen to support the introduction of Electric Vehicles (EVs), Plug-in Hybrid Vehicles (PHVs), and Fuel Cell Vehicles (FCVs) that are expected to be used in next-generation cars, trucks, buses, and taxis, and to maintain charging equipment.
- 5) 192.5 billion yen over five years to support advanced energy-saving investments that involve the conversion of fossil fuels to non-fossil energy and the adoption of demand-response measures, mainly targeting small and medium-sized enterprises.
- 6) 148.4 billion yen to support the retrofits of highly insulated windows and high-efficiency water heaters (e.g., heat pumps) into existing houses.

¹ Deep technology is a type of organization, often a startup company, that aims to provide technology solutions based on substantial scientific or engineering challenges.

Furthermore, the following three points were presented without specific budget amount allocations in the proposal:²

- 1) Converting manufacturing processes in hard-to-abate industries where they are difficult to reduce emissions and investing in resource circulation to build up the circular economy
- 2) Providing “price difference support” to fill the gaps between the hydrogen/ammonia production cost/price and the conventional fossil fuel retail price to build up a supply chain for hydrogen and ammonia
- 3) Providing support for the development of manufacturing equipment for sustainable aviation fuel (SAF) and the raw materials supply chain

The GX Promotion Law was enacted in May 2023. In conjunction with the issuance of 20 trillion yen of GX Economic Transition Bonds, the government aims to achieve public and private investments of over 150 trillion yen toward decarbonization over the next ten years. The GX Executive Committee plans to refine and finalize the specific “sector-specific investment strategies” for the next ten years by the end of this year. It will also form an “advance five-year action plan” to achieve carbon neutrality by 2050.

Regarding the “sector-specific investment strategies” aimed at achieving industrial GX, the government highlighted the advanced materials to be utilized domestically and internationally to achieve decarbonization. Regarding the steel and chemical sectors, the government will provide upfront investment assistance to businesses that are actively working on GX, such as introducing green steel produced by electric furnaces and green chemicals produced by chemical recycling and fuel conversion. The investment is expected to be over 6 trillion yen over the next ten years. For the paper and pulp industries, the government will also promote emissions reductions for paper and paperboard domestic production and will provide the industries with upfront investment assistance in growth fields such as Cellulose Nano Fiber (CNF), Bioethanol, and Sustainable Aviation Fuel (SAF) from biomass. The government expects to invest more than 1 trillion yen in these fields over the next ten years.

² https://www.cas.go.jp/jp/seisaku/gx_jikkou_kaiqi/dai7/siryou1.pdf

2 MEXT's Council on Fusion Research to Promote Technological Innovation with Government Support

On August 4, 2023, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) held a "Council on Support for Challenging Nuclear Fusion Research" and released an interim report on the meeting. MEXT proposed the use of the government's "Moonshot Research and Development System (MS)" to encourage innovation to support young researchers across a wide range of science and technology fields. According to the interim report, the ministry plans to realize an energy system centered on nuclear fusion energy by 2060.

Council on Support for Challenging Nuclear Fusion Research

On April 14, 2023, a Japanese Government Cabinet Office's advisory committee positioned nuclear fusion energy as a key technology to solve both energy and global environmental issues simultaneously and released the "Fusion Energy Innovation Strategy."³ This strategy calls for stronger measures to support creative emerging technologies, including the advancement of conventional nuclear reactors and compact reactors, which are considered potential "game-changing" technologies for nuclear energy.

Afterward, the Council on Support for Challenging Nuclear Fusion Research was newly established to discuss a future society made possible by fusion energy and to consider research topics that should be addressed using the backcasting planning method.⁴ To expand the range of R&D in fusion technology, the government is calling for new approaches to research support. These new approaches would differ from the current model, which promotes step-by-step R&D starting from the experimental reactor, ITER (International Thermonuclear Experimental Reactor)⁵, which is currently under construction, to the prototype reactor, and then to the commercial reactor. The council's first meeting was held on June 28, 2023; the August meeting was the third time.

Draft Interim Summary

A wide range of research and development topics were collected from academia and industry for the interim report. The report emphasizes the need to design compact fusion reactors and extend their lifetime. It also recommends supporting young researchers and emerging companies' creative technological development through the government's "Moonshot Research and Development System (MS)," which aims to create technological innovations that can alter society.⁶

³ https://www8.cao.go.jp/cstp/fusion/fusion_senryaku.pdf

⁴ Backcasting is a planning method that starts with defining a desirable future and then working backward to identify policies and programs.

⁵ The ITER project aims to realize fusion energy, with participation from Japan, Europe, the United States, Russia, China, South Korea, and India. It also aims to establish the scientific and technological feasibility of nuclear fusion energy through the construction and operation of ITER based on international agreements. Fusion operations are scheduled to begin in December 2035.

https://www.mext.go.jp/content/20220112-mext_kaisen-000019860_1.pdf

⁶ https://www.mext.go.jp/content/20230824_mxt_kaisen_000031579_1.pdf

The Moonshot Research and Development System (MS) was established to enable disruptive innovation from Japan and support challenging R&D based on bold ideas. It aims to solve important social issues such as the declining birthrate, an aging population, and global warming.⁷

The research will be promoted by the following institutions: 1) Japan Science and Technology Agency (JST), 2) New Energy and Industrial Technology Development Organization (NEDO), 3) Bio-oriented technology Research Advancement Institution (BRAIN), and 4) Japan Agency for Medical Research and Development (AMED). The funding was initially 100 billion yen in the 2018 supplementary budget and 15 billion yen in the 2019 supplementary budget. An additional 80 billion yen was added to the 2021 supplementary budget, providing support for up to 10 years.⁸ Nine programs are being implemented, including Moonshot Goal 1: "Realization of a society in which human beings can be free from limitations of body, brain, space, and time by 2050."⁹

The interim report sets new moonshot goals for fusion energy, aiming to realize a dynamic society away from energy resource constraints and greenhouse gas emissions by 2060, utilizing abundant and stable fusion energy. To achieve this, the following points were listed as interim goals for 2035¹⁰:

- 1) Achieving the use of fusion energy as a diverse energy source
- 2) Accelerating the application of fusion energy through the use of particles generated by nuclear fusion reactions and elemental technologies
- 3) Developing a research support system that promotes new startups and encourages highly motivated researchers to take on challenges

⁷ <https://www.jst.go.jp/moonshot/jigyuu.html>

⁸ https://www8.cao.go.jp/cstp/gaiyo/yusikisha/20230119/siryo2-1_1.pdf

⁹ <https://www.jst.go.jp/moonshot/program/goal1/index.html>

¹⁰ https://www.mext.go.jp/content/20230824_mxt_kaisen_000031579_1.pdf

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