

IEA-Advanced Motor Fuels ANNUAL REPORT 2025

JAPAN



Japan

Drivers and Policies

Since the previous revision of the Strategic Energy Plan in October 2021, the energy situation in Japan has changed dramatically. In light of these changes, the Ministry of Economy, Trade and Industry (METI) revised the Strategic Energy Plan consistent with the new target of reducing greenhouse gas (GHG) emissions 73% by fiscal year (FY) 2040 (compared with FY2013 levels). The Seventh Strategic Energy Plan was approved by the Cabinet on February 18, 2025, following the Public Comment Procedure and other processes.¹

In June 2021, METI, in collaboration with other ministries and agencies, formulated the “Green Growth Strategy through Achieving Carbon Neutrality in 2050.”² The strategy specifies 14 promising fields that are expected to grow and provides an action plan for each field from the viewpoints of both industrial and energy policies. Japan upholds ambitious goals while demonstrating realistic pathways to achieve them wherever possible. A 2-trillion-yen Green Innovation Fund has been established to encourage companies to take on ambitious challenges.³ In December 2023, to simultaneously achieve the three goals of decarbonization, economic growth, and a stable energy supply through GX (green transformation), the Government of Japan compiled “Sector-specific Investment Strategies” covering a 10-year horizon in prioritized fields in an effort to improve companies’ predictability and strongly encourage companies to invest in GX.⁴

Together with the GX2040 Vision and the Plan for Global Warming Countermeasures, both approved by the Cabinet on February 18, 2025, the government will strive to achieve stable energy supply, economic growth, and decarbonization simultaneously. In the road transport sector, the GX2040 vision is based on the pursuit of a “variety of options” (e.g., synthetic fuels and hydrogen). The vision newly stipulates that “with regard to fuel cell vehicles, emphasis will be placed on commercial vehicles,” “additional support will be provided to priority regions,” and the plan “aims for carbon neutrality through the decarbonization of internal combustion engine (ICE) fuels and utilization of biofuels and synthetic fuels.”⁵

To decarbonize the transportation sector, Japan will promote the reduction of CO₂ emissions across the life cycle of automobiles (including production, use, and disposal); the improvement of energy efficiency in the logistics sector; and the decarbonization of fuel itself.^{6, 7}

For passenger cars, comprehensive measures — such as expanding the deployment of electrified vehicles and infrastructures and reinforcing technologies related to electrified vehicles (e.g., batteries, supply chain, and value chain) — will be taken to achieve 100% electrified vehicle sales by 2035.

For commercial vehicles, the following electrification targets were set:⁸

- Electrified vehicles will account for 20–30% of new light vehicle sales by 2030, with electrified vehicles and decarbonized fuel vehicles to account for 100% by 2040.
- Early deployment of 5,000 heavy-duty vehicles will occur in the 2020s, with a 2030 interim target established toward the 2040 electrification goal.

¹ The Ministry of Economy, Trade and Industry (METI), “Cabinet Decision on the Seventh Strategic Energy Plan,” https://www.meti.go.jp/english/press/2025/0218_001.html.

² METI, June 12, 2022, “Green Growth Strategy through Achieving Carbon Neutrality in 2050,” https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html.

³ METI, “Green Innovation Fund,” https://www.meti.go.jp/english/policy/energy_environment/global_warming/gifund/index.html.

⁴ METI, December 22, 2023, “Sector-specific Investment Strategies: Compiled as Effort for Specifying Investment Promotion Measures for the Realization of GX,” https://www.meti.go.jp/english/press/2023/1222_002.html.

⁵ METI, February 18, 2025, “The ‘GX2040 Vision: Strategy for Promoting the Transition to a Decarbonized Growth-Type Economic Structure (Revised)’ has been approved by the Cabinet,” <https://www.meti.go.jp/press/2024/02/20250218004/20250218004.html>.

⁶ Agency for Natural Resources and Energy, October 2021, “Outline of Strategic Energy Plan,” https://www.enecho.meti.go.jp/en/category/others/basic_plan/pdf/6th_outline.pdf.

⁷ Agency for Natural Resources and Energy, October 2021, “Strategic Energy Plan,” https://www.enecho.meti.go.jp/category/others/basic_plan/pdf/20211022_01.pdf.

⁸ METI, “Automobile/battery industries,” https://www.meti.go.jp/policy/energy_environment/global_warming/ggs/05_jidosha.html (in Japanese)

For decarbonized fuel, Japan set the following targets: for gasoline alternative fuels, E10 (a blend containing 10% bioethanol) will be introduced by fiscal year 2030; for diesel alternatives, studies will be conducted on blending ratios and taxation issues.⁹

The Japanese government enacted legislation to abolish the provisional gasoline tax rate (¥25.1 per liter), a surcharge that had remained in place for approximately 51 years since its introduction in 1974. The abolition took effect on December 31, 2025, with the provisional diesel tax rate (¥17.1 per liter) scheduled to follow on April 1, 2026.¹⁰

Advanced Motor Fuels Statistics

Figure 1 shows the energy sources used in the transportation sector in Japan.¹¹ Oil-derived energy accounts for 97.9% of total consumption. The market for alternative fuels remains small in Japan, as does the number of alternative fuel vehicles owned (Table 1). Methanol vehicles compressed natural gas (CNG) vehicles, hybrid and plug-in hybrid vehicles (HEVs and PHVs), electric vehicles (EVs), and fuel cell vehicles (FCVs) currently constitute the environmentally friendly vehicle options available in Japan.

The number of hybrid vehicles is relatively large, owing to the prevalence of passenger hybrid vehicles. CNG and hybrid vehicles currently account for the largest share of vehicles in the low-emission truck category.

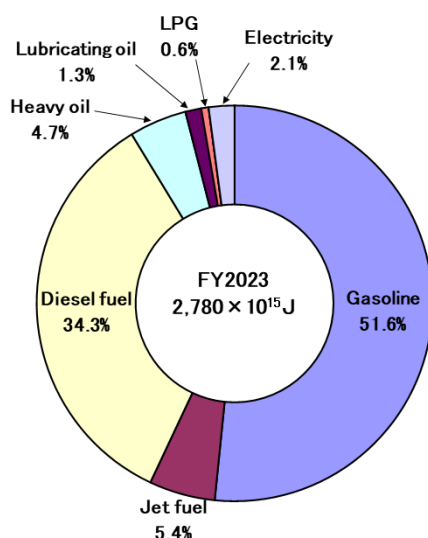


Figure 1. Energy Sources Used in the Transportation Sector in Japan, 2023

⁹ Agency for Natural Resources and Energy, October 2025, “Seventh Strategic Energy Plan,” https://www.enecho.meti.go.jp/en/category/others/basic_plan/.

¹⁰ Cabinet Office of Japan, Comprehensive Economic Measures for Realizing a 'Strong Economy', https://www5.cao.go.jp/keizai1/keizaitaisaku/1121_taisaku.pdf (in Japanese).

¹¹ Agency for Natural Resources and Energy, June 13, 2023, “Cabinet Decision Made on the FY2024 Annual Report on Energy (Japan’s Energy White Paper 2025),” https://www.meti.go.jp/english/press/2025/0613_002.html.

Table 1. Penetration of Environmentally Friendly Vehicles Owned in Japan, March 2024

Vehicle Type	Methanol ^{12,13}	CNG ^{11,12}	Hybrid ¹¹	PHV ¹¹	EV ^{11,12}	FCV ¹¹	Vehicle Registration ¹⁴
Passenger vehicles	3	8	13,498,256	287,352	214,514	8,289	38,680,275
Light, mid, and heavy-duty trucks	1	2,807	140,795	4	5,961	137	5,939,886
Buses	0	65	1,563	1	919	184	208,774
Special vehicles	1	725	16,683	445	456	62	1,674,873
Small vehicles	1	773	NA	NA	136,696	NA	31,912,878
Total	6	4,378	13,657,297	287,802	358,546	8,672	78,416,686

Research and Demonstration Focus

Hydrogen

In 2017, Japan formulated the world's first national hydrogen strategy, the Basic Hydrogen Strategy. Under this strategy, Japan achieved several accomplishments: commercialization of the world's first FCVs, increased utilization of fuel cells by households, and a world-class number of related patents. In this context, Japan's efforts to transition into a hydrogen-based society are moving from the technology development phase to the commercial phase.

In June 2023, the Basic Hydrogen Strategy was revised¹⁵ to include two new basic pillars: the "Hydrogen Industry Strategy" — a policy for strengthening the industrial competitiveness of hydrogen — and the "Hydrogen Safety Strategy" — a policy for the safe use of hydrogen. This revised strategy will be reviewed within a 5-year period.

With regard to the use of hydrogen in mobility, Japan is providing support for the spread of FCVs and the development of hydrogen stations. Commercial vehicles such as trucks are one of the areas where hydrogen utilization is expected in the transportation field; trucks need to transport goods daily over long distances, which is difficult for EVs given their range limitations. In the future, the spread of FCVs and the systematic development of hydrogen refueling stations will be accelerated. In particular, the cumulative number of fuel cell trucks on the road is expected to reach 15 million by 2050, at a value of approximately USD 2.7 trillion. In terms of refueling infrastructure, approximately 1,000 hydrogen stations will be installed in optimal locations by 2030, in anticipation of the widespread use of FCVs including fuel cell buses and trucks. In contrast, the actual domestic trend shows that 13 hydrogen stations have closed in the past two years, with 148 stations in operation as of November 2025.¹⁶

The NEDO (New Energy and Industrial Technology Development Organization)-backed HySTRA (CO₂-free Hydrogen Energy Supply-chain Technology Research Association) liquefied hydrogen supply chain initiative, completed its pilot phase — including the Suiso Frontier's historic voyage from Victoria, Australia, to Kobe, Japan, in early 2022. The program has now advanced to a full-scale commercialization demonstration. In August 2025, Kawasaki Heavy Industries began fabrication of a 50,000-m³ liquefied hydrogen storage tank at its Harima Works for installation at the planned domestic terminal in Ohgishima, Kawasaki. A contract was also signed in January 2026 to build a new

¹² Automobile Inspection and Registration Information Association, as of March 2025 (in Japanese), https://www.airia.or.jp/publish/file/teikougaisya_2025.pdf

¹³ Japan Light Motor Vehicle and Motorcycle Association, as of March 2025 (in Japanese), https://www.keikenkyo.or.jp/Portals/0/files/information/statistics/etc/kankatubetu_nenryobetuR0703.pdf.

¹⁴ Automobile Inspection and Registration Information Association, as of March 2025 (in Japanese), <https://www.airia.or.jp/publish/file/01.pdf>.

¹⁵ The Ministerial Council on Renewable Energy, Hydrogen and Related Issues, June 6, 2023, "Basic Hydrogen Strategy," https://www.meti.go.jp/shingikai/enecho/shoene_shinene/suiso_seisaku/pdf/20230606_5.pdf.

¹⁶ Next Generation Vehicle Promotion Center (in Japanese), http://www.cev-pc.or.jp/suiso_station/index.html.

commercial-scale 40,000-m³ liquefied hydrogen carrier — roughly 32 times the cargo capacity of the Suiso Frontier.^{17,18}

Natural Gas

Approximately 80% of the natural gas vehicles (NGVs) in Japan are commercial vehicles, such as trucks, buses, or special vehicles (mainly garbage trucks). Of the trucks, the majority are light- to medium-duty vehicles designed for short- or medium-distance transportation. In this context, Isuzu Motors Limited released a CNG heavy-duty truck in December 2015¹⁹ and a heavy-duty LNG truck in October 2021.²⁰ Mitsubishi Corporation and Air Water Inc. have jointly developed Japan's first compact LNG filling facility for LNG-powered trucks. They launched trial operations of the facility and LNG trucks in Hokkaido under the Ministry of the Environment's Low Carbon Technology R&D Program on November 18, 2022.²¹ This project uses LNG mixed with liquified bio methane (LBM) refined from livestock manure-based biogas, which is expected to be a carbon-negative fuel. In October 2024, the cumulative number of LNG fillings into LNG-powered trucks reached 3,000, with a total filling volume of approximately 470 tons.

Biofuel

With respect to initiatives aiming to encourage the use of biofuels in Japan, officials plan to introduce and promote biofuels as the third notification period from FY 2023 to FY 2027 under the Act on Sophisticated Methods of Energy Supply Structures, with an introduction target of 500,000 kiloliters (kL) in crude oil equivalent.

It should be noted that this target has been achieved every year since 2017 through the introduction of ethyl tertiary-butyl ether (ETBE).²²

E-fuel

In order to achieve a cost lower than the price of gasoline for synthetic fuels in 2050, Japan will work on the commercialization of synthetic fuels. In addition to improving the efficiency of existing technologies (reverse shift reaction plus Fischer Tropsch [FT] synthesis process) and designing and developing production facilities, innovative technologies and processes (e.g., co-electrolysis, direct-FT) will be developed as part of an integrated production process for synthetic fuels. The Green Growth Strategy aims to establish high-efficiency and large-scale production technology by 2030, expand the introduction and reduce costs during the 2030s, and achieve independent commercialization by 2040 by intensively developing and demonstrating technologies for such synthetic fuels over the next 10 years.²³

METI launched the “Public-private sector council to promote the introduction of synthetic fuels (e-fuel)” on September 16, 2022, and the “Public-private sector council for methanation promotion” on June 28, 2021, to address issues such as technology and price to enable commercialization of synthetic fuels through public-private partnership.²⁴

On March 2, 2022, 16 companies — including airlines and plant construction companies — announced the launch of “Act for Sky,” an organization that will transcend industry boundaries with the aim of domestically producing sustainable aviation fuel (SAF), an alternative fuel for aircraft. The organization will research stable procurement of used cooking oil and other raw materials and methods to produce it at reduced cost.²⁵

¹⁷ Kawasaki Heavy Industries, August 7, 2025, “Fabrication of Large Liquefied Hydrogen Storage Tank Launched — Toward the Establishment of Liquefied Hydrogen Supply Chain,” https://global.kawasaki.com/en/corp/newsroom/news/detail/?f=20250807_3407.

¹⁸ Kawasaki Heavy Industries, https://www.khi.co.jp/pressrelease/news_260106-1.pdf (in Japanese).

¹⁹ Isuzu Motors Limited (in Japanese), <https://www.isuzu.co.jp/product/cng/giga.html>.

²⁰ Isuzu Motors Limited (in Japanese), https://www.isuzu.co.jp/newsroom/details/20211028_01.html.

²¹ Mitsubishi Corporation, “Introduction of Trial Operations of Compact LNG Filling Facilities for LNG Trucks in Hokkaido,” <https://www.mitsubishicorp.com/jp/ja/about/business-group/lng-filling-facilities/>.

²² Japan Biofuels Supply LLP, “Target,” <https://www.jbsl.jp/english/objective/>.

²³ The Ministry of Economy, Trade and Industry, “Green Growth Strategy Through Achieving Carbon Neutrality in 2050,” Formulated June 2021, https://www.meti.go.jp/english/press/2021/0618_002.html.

²⁴ METI, “Public-private sector council to promote the introduction of synthetic fuels (e-fuel),” https://www.meti.go.jp/shingikai/energy_environment/e_fuel/001.html.

²⁵ Act for Sky, “All Japan Towards a carbon-neutral sky,” <https://actforsky.jp/>.

Alternative fuels research project promoted by the government

With the aim of early social implementation for the above alternative fuel use, the Next-Generation Environmentally Friendly Vehicles Development and Commercialization Project is promoted by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT). The project started in 2002 and is currently in its sixth phase. Each stage is five years in length and has several research aspects. In the current phase, the research aspects relating to alternative fuels use are hydrogen ICEs, and compression-ignition engines with synthetic carbon fuels originating from bio or direct air capture.²⁶

Outlook

In a “Green Growth Strategy towards 2050 Carbon Neutrality,” Japan will promote the electrification of automobiles and take comprehensive measures to achieve 100% electrified vehicles (EVs, FCVs, HEVs, and PHVs) in new passenger car sales by the mid-2030s at the latest. Furthermore, through efforts to neutralize energy such as e-fuel, Japan aims to achieve net zero emissions through the production, use, and disposal of automobiles in 2050.

Additional Information Sources

- METI, “[Overview of Japan’s Green Growth Strategy Through Achieving Carbon Neutrality in 2050](#),” January 2021.

Benefits of Participation in the AMF TCP

Participation in the AMF TCP makes it possible to obtain the latest information on advanced motor fuels for stakeholders, policy makers, and industries. AMF TCP activities facilitate an international network on advanced motor fuels.

²⁶ https://www.ntscl.go.jp/Portals/0/resources/forum/2024files/NTSELForum2024_LecPoster01.pdf (in Japanese).