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Report Highlights:

In 2024 and 2025, Japan has met the government's mandated annual target of 824 million liters of bioethanol, with oil refineries continuing to supply bioethanol in the form of ETBE (ethyl tert-butyl ether). In 2025, Japan's average ethanol blend rate has remained at 1.9 percent. Japan is planning to introduce nationwide E10 direct blending by fiscal year (FY) 2030, while continuing with existing ETBE initiatives. Japanese oil refineries are preparing to conduct E10 regional test-runs in Okinawa Prefecture starting in FY 2028. In April 2025 and located in Sakai, Osaka, Japan’s first sustainable aviation fuel (SAF) plant began production with used cooking oil as the feedstock. However, other planned SAF projects are experiencing delays. Relatedly, Prime Minister Sanae Takaichi’s intention to abolish the 25.1 yen per liter provisional gasoline tax by the end of 2025 could slow the adoption of ethanol direct blending in the short term.

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Section I. Executive Summary

Since 2017, Japan's biofuel standards under the Sophisticated Act have mandated an annual biofuel target of 500 million liters of crude oil equivalent, or approximately 824 million liters of bioethanol. Japanese oil refineries have consistently met this target, primarily through imported bio-ETBE (ethyl tert-butyl ether) derived from U.S. corn-based and Brazilian sugarcane-based bioethanol, supplemented by domestically produced bio-ETBE derived from imported ethanol. In 2025, Japan's ethanol blend rate in gasoline remains at 1.9 percent, with on-road ethanol consumption expected to stay flat at 824 million liters annually until Japan's fiscal year (FY, April to March) 2028. The Ministry of Economy, Trade and Industry (METI) has maintained this target while proposing revisions to its biofuel standards, including updated greenhouse gas (GHG) reduction targets and the inclusion of new ethanol sources, such as Brazilian corn-based ethanol and Thai sugarcane- and cassava-based ethanol, in future regulations.

In February 2025, METI released the 7th Strategic Energy Plan, outlining Japan's near-term energy policy direction. The plan includes a roadmap for introducing E10 gasoline nationwide by FY 2030 and E20 by FY 2040. Test runs for E10 are expected to begin in Okinawa by FY 2028; however, nationwide adoption will require addressing infrastructure compatibility, vehicle eligibility, fuel quality control, and consumer acceptance. On-road ethanol consumption is projected to remain steady until FY 2028, with gradual increases anticipated as a voluntary E10 blending option is introduced alongside existing ETBE-based gasoline.

Japan's petroleum consumption continues to decline; however, newly elected Prime Minister Sanae Takaichi's decision to abolish the provisional gasoline tax of 25.1 yen per liter by the end of 2025 may stabilize gasoline demand. This policy change will reduce the price advantage of bioethanol compared to gasoline, potentially discouraging the voluntary adoption of higher ethanol blends unless additional incentives are introduced.

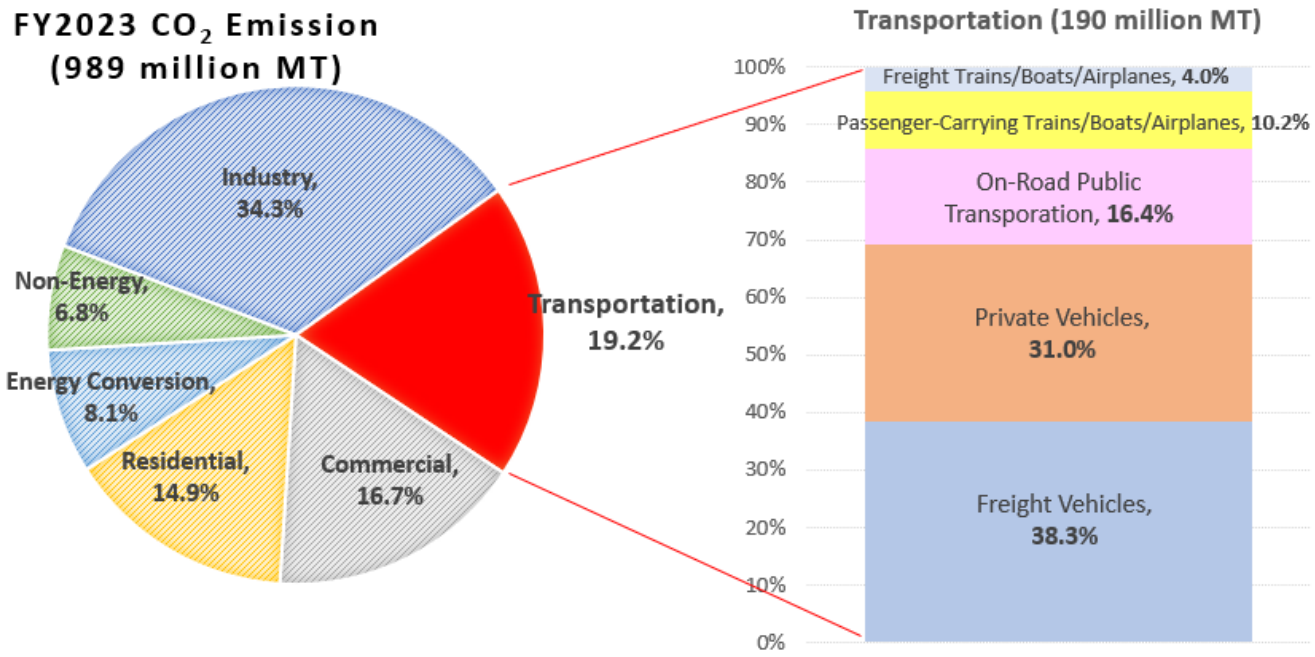
Japan has not been a major producer, consumer, or importer of biodiesel. Market development has been limited by feedstock constraints and taxation policies, despite the 7th Strategic Energy Plan's call for increased biodiesel use in the future. Meanwhile, Japan's first sustainable aviation fuel (SAF) plant, completed by Cosmo Oil in December 2024, began producing 30 million liters of SAF annually in April 2025 using the HEFA (hydro-processed esters and fatty acids) pathway with used cooking oil. However, other SAF projects face significant delays due to rising construction costs and feedstock challenges. Japan remains committed to producing 1.2 billion liters of SAF by 2030, though significant progress is needed to meet this ambitious goal.

Section II. Policy and Programs

Japanese Energy Policy and Greenhouse Gas Emissions

Japan has made significant commitments to reducing greenhouse gas (GHG) emissions over the past two decades. Following the adoption of the Kyoto Protocol at the 3rd Conference of Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC) in 1997, Japan pledged to reduce its GHG emissions by 6 percent by FY 2020 compared to FY 1990 levels. Under the 2015 Paris Agreement, the Government of Japan (GOJ) Intended Nationally Determined Contribution (INDC) set a target to reduce emissions by 26 percent by Japan's FY 2030 compared to FY 2013 levels. In October 2020, Japan announced its ambition to achieve carbon neutrality by 2050, as outlined in the 6th Strategic Energy Plan. In April 2021, the then-Suga Administration raised its FY 2030 reduction target to 46 percent from FY 2013 levels, surpassing the earlier commitment. Japan's latest Nationally Determined Contribution (NDC), published in February 2025, sets ambitious targets to reduce GHG emissions by 60 percent by FY 2035 and 73 percent by FY 2040, compared with FY 2013 levels.

Figure 1. Japan's CO_2 Emissions by Sector in FY 2023



Note: The figure does not include other GHG emissions: CH_4 (29.4 million MT CO_2eq), N_2O (15.8 million MT CO_2eq), and CFC substitutes (37.0 million MT CO_2eq). Separately, carbon sinks mainly through land use, land-use change and forestry (LULUCF) were 53.7 million MT CO_2eq. Source: Ministry of the Environment

The Ministry of the Environment reports that Japan's GHG emissions and removals (net GHG emissions) fell to a record low in FY 2023, putting the country on track to meet its targets. Net GHG emissions decreased by 4 percent from FY 2022 and by 27.1 percent from FY 2013, totaling 1.017 billion metric tons (MT) CO_2-equivalent (CO_2eq). Of this total, CO_2 emissions accounted for 989 million MT. Transportation sector emissions declined slightly by 0.7 percent to 190 million MT, representing 19.2 percent of Japan's total CO_2 emissions (Figure 1). However, as Japan recovered from the COVID-19 pandemic and travel resumed, CO_2 emissions from private vehicles increased by 1.7 percent, and emissions from passenger trains, boats, and airplanes rose by 1.2 percent. Freight vehicle

emissions remained unchanged at 73 million MT, while passenger-carrying vehicles and freight trains, boats, and airplanes saw reductions of 5.6 percent and 8.6 percent, respectively.

To achieve its GHG reduction goals, the then-Kishida Administration approved the Basic Policy for the Green Transformation (GX) Realization ("GX Basic Policy") in February 2023. This policy prioritizes innovation-driven solutions, such as increased adoption of electric vehicles (EVs) for road transportation and the development of electrofuels (synthetic fuels or e-fuels). It also emphasizes the production and use of sustainable aviation fuel (SAF) in the aviation industry. The original GX Basic Policy at that time placed limited emphasis on readily available technologies, such as biofuels.

The Suga Administration (2020–2021) and the Kishida Administration (2021–2024) implemented ambitious green policies aimed at addressing climate change and promoting sustainable development, positioning green innovation as a key growth strategy for matured Japan. Following Prime Minister Kishida stepped down, Shigeru Ishiba was elected Prime Minister on October 1, 2024. While Prime Minister Ishiba did not introduce significant new green policies, he maintained the environmental agenda established by his predecessors, ensuring continuity in Japan's approach to GX.

On February 18, 2025, the then-Ishiba Cabinet approved the "GX 2040 Vision," revising the previous GX promotion strategy to outline Japan's long-term plan for transitioning to a decarbonized, growth-oriented economy by 2040. Simultaneously, the Ministry of Economy, Trade and Industry (METI) published the 7th Strategic Energy Plan, which prominently featured biofuels for the first time. Japan aims to introduce E10 gasoline by FY 2030 and E20 gasoline by FY 2040, alongside efforts to promote biodiesel adoption. The GOJ plans to collaborate with private companies to accelerate SAF production and support decarbonization in the marine sector, aligning with international efforts such as those led by the International Maritime Organization (IMO).

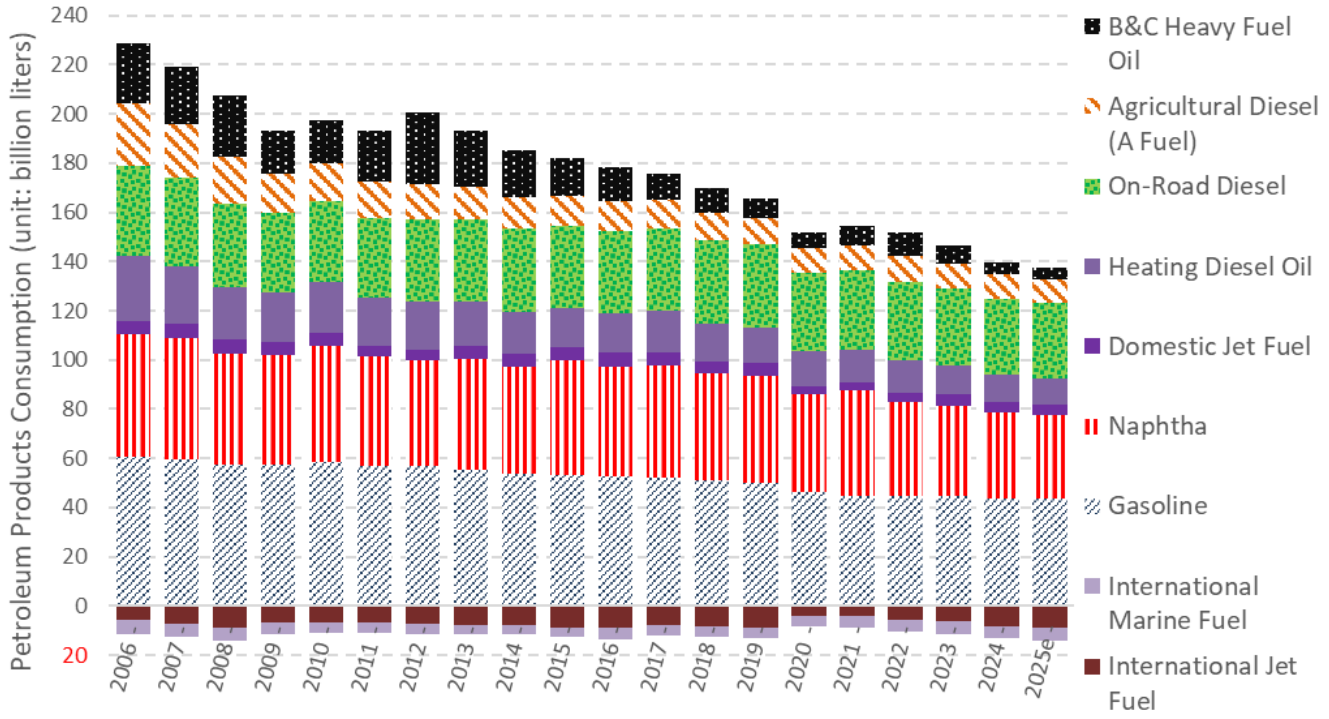
Shigeru Ishiba resigned as Prime Minister following pressure from his Liberal Democratic Party (LDP) after two major election defeats. On October 21, 2025, Sanae Takaichi was elected as Japan's first female Prime Minister. A prominent and often described "conservative" member of the LDP, Takaichi's leadership has drawn significant attention, particularly regarding her approach to Japan's green policy framework. She has been outspoken in opposing foreign-made solar panels and advocating for reductions in renewable energy subsidies. Observers are closely monitoring whether Prime Minister Takaichi will uphold the biofuel and GX commitments established by previous administrations. On November 11, 2025, the Takaichi Administration convened its first "Council for Japan's Growth Strategy," designating "resource and energy security and GX" as one of 17 priority investment targets.

Petroleum Products Market and Pool Size

Decline in Petroleum Products Consumption

According to METI's Petroleum Statistics, Japan has experienced a steady decline in petroleum product consumption over the past three decades. In 2024, total consumption fell by 4.7 percent compared to the previous year, driven by high gas prices (Figure 2). A further decline of 1.7 percent is estimated for 2025. The demand for B & C heavy oil dropped sharply due to reduced use by power plants, while naphtha and heating oil (kerosene) also experienced significant declines. However, transportation fuel demand has remained steady, supported by the recovery from the COVID-19 pandemic. The GOJ's gasoline and diesel subsidy program has stabilized retail prices, helping to maintain consumer demand.

Figure 2. Japan's Consumption of Petroleum-Derived Products



Note: "2025e" represents year-to-date estimate for 2025 (till October 2025 monthly data).
International jet and marine fuel are estimated based on export data. Source: METI

Impact of Tourism and Imports

The weak Japanese yen has boosted inbound tourism, with 37 million foreign nationals visiting Japan in 2024—a record high[1]. By October 2025, 35.5 million visitors already arrived[2] this year, on-track for another annual record. This surge in tourism has increased demand for transportation fuels. In 2024, Japan imported 4.8 million liters of gasoline—a 49 percent increase from the prior year—and 1.9 million liters of on-road diesel—a 58 percent increase—to meet domestic demand. This upward trend is expected to continue in 2025. Jet fuel consumption for domestic flights remained steady at 4.3 million liters, while consumption for international flights surged to 8 million liters. Jet fuel imports reached 0.1 million liters in 2024, a 63 percent increase from the prior year, and are projected to rise further in 2025 to support robust demand.

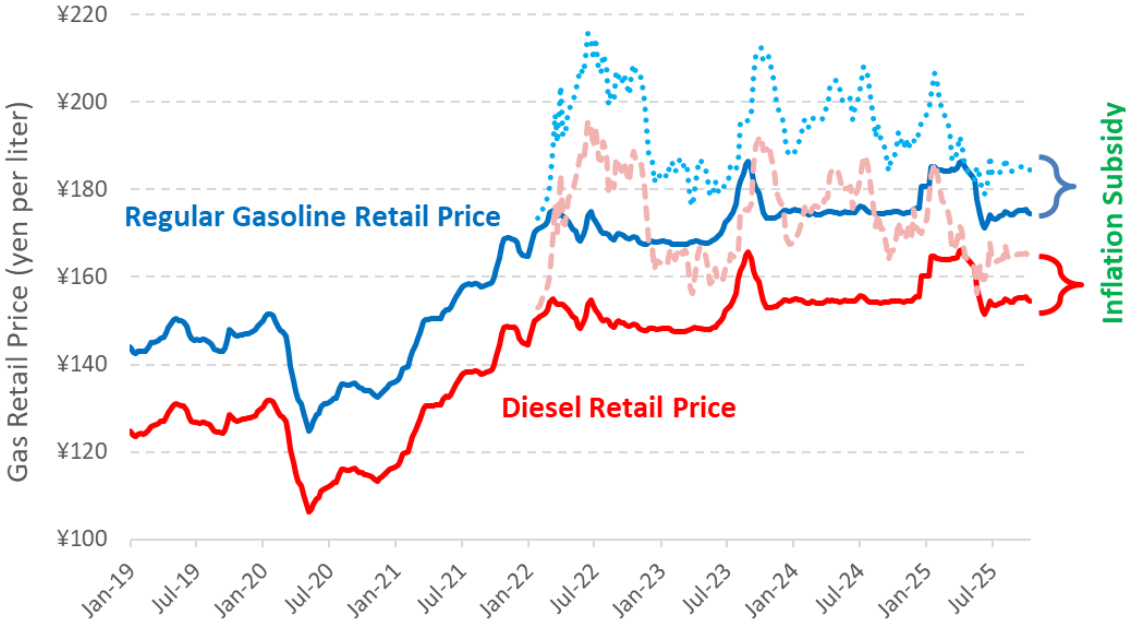
Fuel Subsidy Program

Since mid-2020, rising gasoline and diesel prices—driven by a weakening yen and higher global crude oil prices—prompted the GOJ to implement the Fuel Oil Price Volatility Mitigation Subsidy Program on January 27, 2022. Initially covering gasoline, on-road diesel, heating oil, and fuel oil, the program was expanded to include jet fuel in May 2025. Although intended as a temporary measure, the program has been extended multiple times due to persistent price increases.

[1] https://www.mlit.go.jp/kankocho/tokei_hakusyo/shutsunyukokushasu.html (Japanese only)
[2] https://www.jnto.go.jp/statistics/data/_files/20251118_1615-1.pdf (Japanese only)

In November 2024, then-Prime Minister Shigeru Ishiba announced plans to phase out the subsidy program by December 2024 through a two-step reduction in subsidy rates (Figure 3). However, declining public support for the Ishiba Cabinet—exacerbated by rising rice prices (see JA2025-0009) and dissatisfaction among motor vehicle-dependent voters especially in suburb/rural towns—led to the introduction of a new fixed-price subsidy program. Under this program, the GOJ provides subsidies of 10 yen per liter for gasoline and on-road diesel, 5 yen per liter for kerosene and heavy oil, and 4 yen per liter for jet fuel. As a result, retail prices have stabilized at approximately 175 yen per liter for gasoline and 155 yen per liter for on-road diesel from mid-2025 till the beginning of November 2025.

Figure 3. Gasoline and On-Road Diesel Retail Price and Subsidy Program



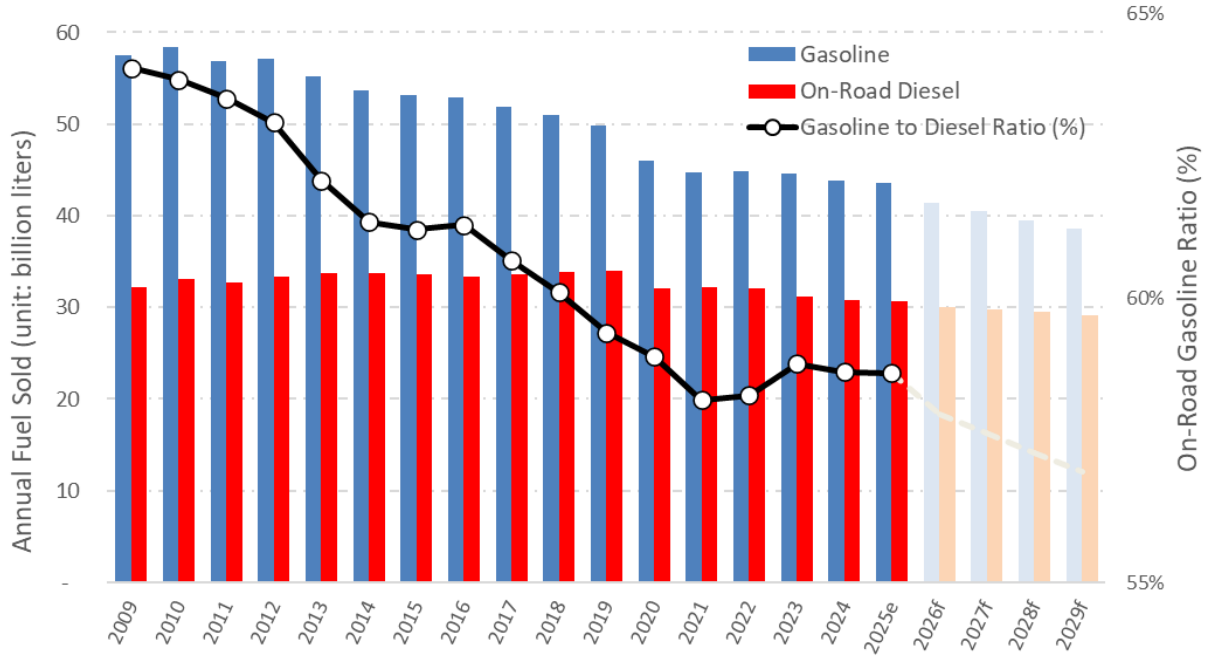
Note: Dotted lines represent the expected retail price by METI without the gas subsidy program based on the Dubai Fateh Crude Oil Price. Source: METI

Fuel Consumption Trends

In 2024, gasoline sales in Japan totaled 43.8 billion liters, a 1.8 percent decline from 2023, while on-road diesel sales fell by 1.3 percent to 30.8 billion liters. The gasoline-to-diesel ratio has remained steady at around 58.7–58.9 percent over the past three years (Figure 4). Thanks to the subsidy program, year-to-date declines in gasoline and diesel sales for 2025 are marginal, at 0.5 percent and 0.4 percent, respectively.

METI forecasts annual gasoline consumption to decline by 2.1–2.5 percent through 2029, driven by improved fuel efficiency in new vehicles (e.g., hybrids). On the other hand, on-road diesel consumption is expected to decline at a slower rate of 0.7–1.2 percent annually. If these trends persist, Japanese oil refineries may increasingly consider biodiesel as a viable alternative.

Figure 4. Japan's Past and Expected Consumption of Gasoline and On-Road Diesel



Note: The graph contains year-to-date estimate for 2025e consumption and forecasts for 2026f-2029f consumption by METI.

Fuel Tax Policy

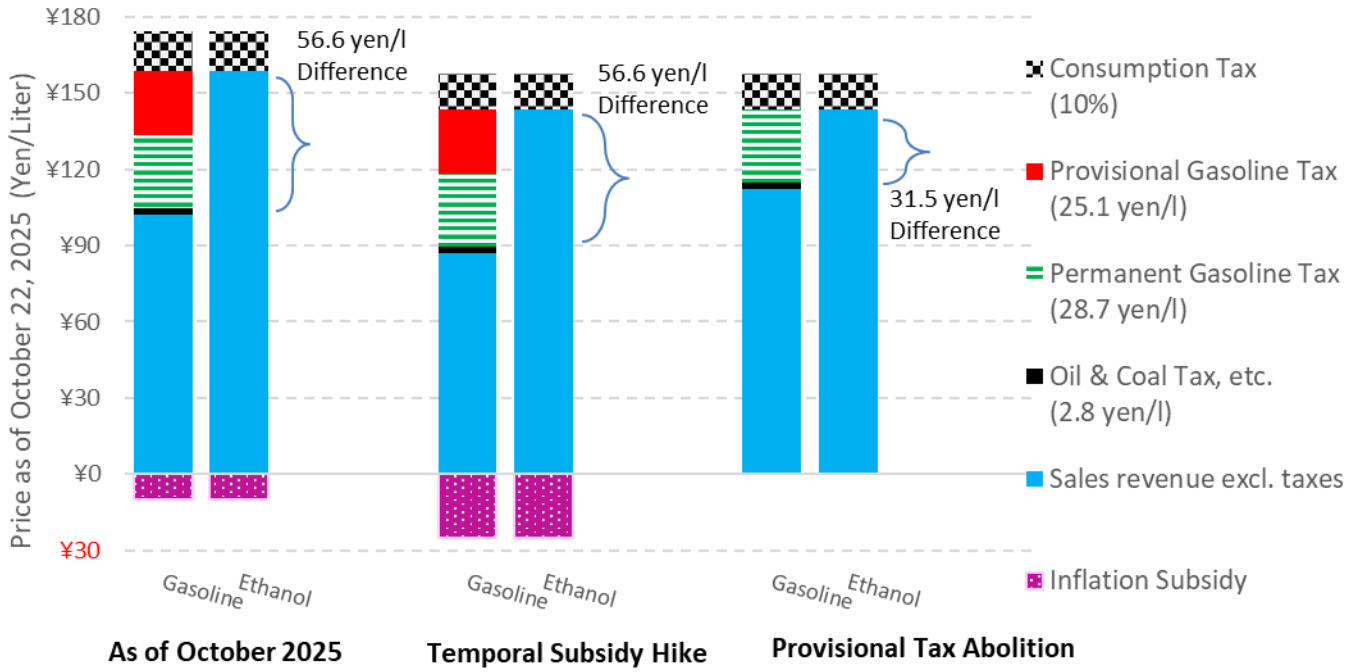
As of October 22, 2025, the average retail price of gasoline in Japan was 174.5 yen per liter[3] (≈ $4.36 per gallon[4]), which includes a 10 percent consumption tax (15.86 yen per liter). The price also incorporates other taxes: standard gasoline tax (28.7 yen per liter), provisional gasoline tax (25.1 yen per liter), oil and coal tax (2.04 yen per liter), and global warming measure tax (0.76 yen per liter). Gas stations retained approximately 102 yen per liter, while oil refineries received an additional 10 yen per liter as a government subsidy. See Figure 5.

Since 2008, the GOJ has exempted bioethanol fuel from the total gasoline tax (53.8 yen per liter) and the oil and coal and global warming tax (2.8 yen per liter) under the Quality Control Act, making bioethanol more price-competitive with gasoline. This exemption results in a price advantage of 56.6 yen/liter for bioethanol compared to gasoline.

Japan exempts biodiesel from the oil and coal tax (2.8 yen per liter). However, when biodiesel is blended with on-road diesel (e.g., B3, B5) [5], it becomes subject to the on-road diesel local tax (32.1 yen per liter), which includes a provisional diesel tax of 17.1 yen per liter.

[3] https://www.enecho.meti.go.jp/statistics/petroleum_and_lpgas/pl007/results.html (Japanese only)
[4] $1 USD = 151.66 yen (as of October 22, 2025 by BOJ)
[5] The Quality Control Act, which limits biodiesel content to 5 percent (B5) in on-road diesel, only sets out requirements for fossil fuels and does not extend to B100 or 100 percent biodiesel.

Figure 5. Japan's Current and Proposed Tax and Subsidy Structures for Gasoline and Ethanol



Source: METI

Provisional Gasoline Tax Debate

The provisional gasoline tax, introduced in 1974 as an intended temporary measure to fund road development, has remained in place for decades, drawing criticism from voters concerned about inflation and rising living costs. Following the LDP failure to secure majorities in both houses, newly elected Prime Minister Sanae Takaichi has prioritized addressing gas prices.

The National Democratic Party has proposed eliminating the 25.1 yen per liter (≈ $0.61 per gallon[6]) provisional gasoline tax. Takaichi Administration decided to accept this plan by the end of 2025. On November 28, 2025, Japan passed bill to end provisional gasoline tax and the provisional diesel tax by December 31, 2025. To keep consumers from holding back on purchases, until Japan completely abolishes the provisional gasoline tax, the GOJ has decided to raise the inflation subsidy gradually to 25.1 yen/liter. This can maintain the current price advantage of 56.6 yen per liter for bioethanol without altering the tax structure.

This means that the price advantage of bioethanol over gasoline will drop to 31.5 yen per liter (≈ $0.76 per gallon[6]) from 56.6 yen per liter (≈ $1.37 per gallon[6]) from January 2026, potentially reducing the competitiveness of on-road ethanol against fossil fuel absent any additional new measures (Figure 5). This tax elimination would likely cause a headwind for the voluntary, future introduction of on-road ethanol.

[6] $1 USD = 156.25 yen (as of November 28, 2025 by BOJ)

Biofuel Policy Framework

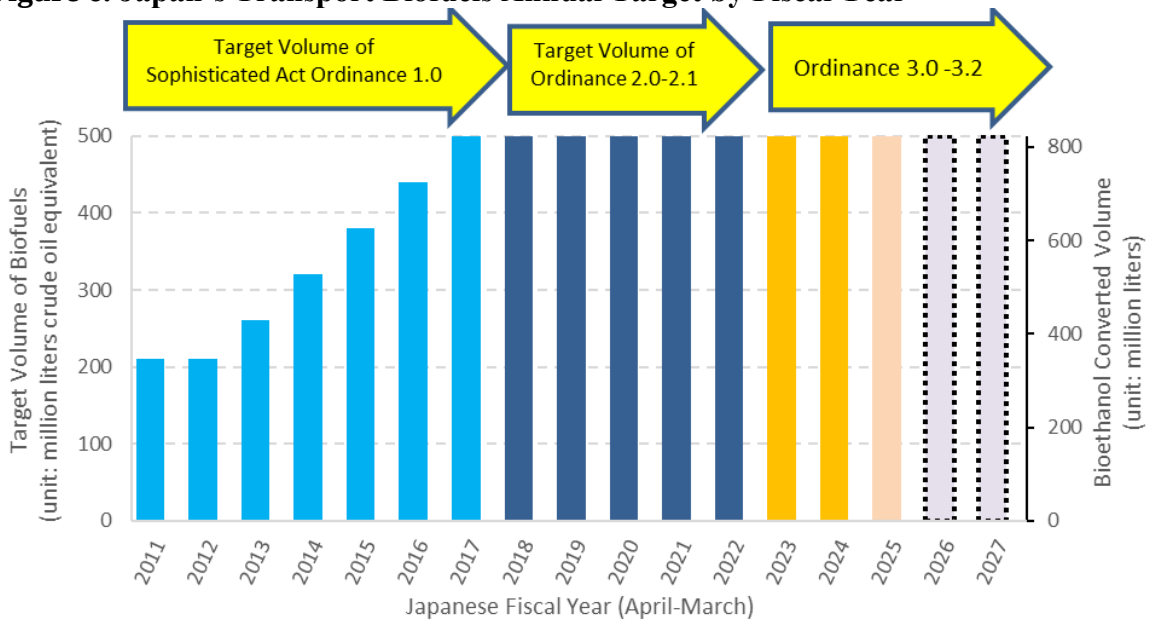
The Sophisticated Act: Biofuel Standards

In 2009, METI's Agency for Natural Resources and Energy (ANRE) enacted the Act on Promotion of Use of Non-Fossil Energy Sources and Effective Use of Fossil Energy Raw Materials by Energy Suppliers, commonly referred to as the Sophisticated Methods of Energy Supply Structure Act (hereafter, "the Sophisticated Act"). This legislation aimed to encourage the replacement of fossil fuels with renewable energy sources. It directed METI to develop basic policies and guidelines (i.e., METI ordinances) tailored to specific energy sectors, including oil refineries, gas suppliers, and power companies.

Evolution of Biofuel Standards (Sophisticated Act Ordinances)

The scope of the series of Ordinances is limited to fuel produced by the Petroleum Association of Japan (PAJ) member companies. Although oil refineries with PAJ membership are the primary suppliers of on-road fuel distributed in Japan, there are some gas stations not affiliated with PAJ. As such the fuel distributed by these companies is not subjected to the Sophisticated Act and their biofuel use does not count toward Japan's biofuel target.

Figure 6. Japan's Transport Biofuels Annual Target by Fiscal Year



1. Ordinance 1.0 (FY 2011–FY 2017)

METI published its first biofuel standards in 2010, laying the foundation for Japan's bioethanol-focused approach to fulfilling its biofuel commitments for on-road transportation. Japan's preference for bioethanol over biodiesel stems from strong gasoline demand, variable biodiesel quality, and higher production costs for biodiesel.

- Annual Target: Ordinance 1.0 introduced a de facto mandate of 210 million liters of crude oil equivalent (LOE), approximately 346 million liters of bioethanol. By FY 2017, the annual target increased to 500 million LOE (approximately 824 million liters of bioethanol[7]). See Figure 6.

2. Ordinance 2.0-2.1 (FY 2018–FY 2022)

In 2018, METI revised the biofuel standards under Ordinance 2.0, primarily updating default ethanol greenhouse gas (GHG) emission values while retaining the annual target of 500 million LOE. In September 2020, METI further updated the gasoline GHG emission value under Ordinance 2.1 (see JA2020-0162).

3. Ordinance 3.0 (FY 2023–FY 2028)

On March 31, 2023, METI introduced Ordinance 3.0, which maintained the annual target volume of 500 million LOE (Figure 6) while updating ethanol's default GHG emission values. Key provisions included:

- GHG Emission Value for Gasoline: Temporarily maintained at 88.74 g-CO_2eq/MJ.
- GHG Reduction Target for Transport Bioethanol: Temporarily maintained at 55 percent.
- Default GHG Emission Values: Improved for U.S. corn-derived ethanol (36.86 g-CO_2eq/MJ) and Brazilian sugarcane-derived ethanol (28.59 g-CO_2eq/MJ).
- Next-Generation Biofuels: Consumption of advanced biofuels, such as cellulosic bioethanol and SAF, counts twice toward the annual target volume. However, Japan had not adopted next-generation biofuels as of November 2023.
- Proposed Updates: Ordinance 3.1 and 3.2

Table 1. Comparison of Current and Future Planned Biofuel Standards

	Current Standard	Future Standard	
Version	Ordinance 3.0	Ordinance 3.1 (TBA)	Ordinance 3.2 (TBA)
Introduced	March 2023	Winter 2025 (?)	2026 (?)
Covered Period	April 2023-March 2028	Till March 2028	
Annual Target Volume of Ethanol	823.7 million Liters	823.7 million Liters (i.e., 500 million LOE)	
Gasoline CI Value	88.74 g-CO_2eq/MJ	90.17 g-CO_2eq/MJ	
Reduction Target	55%	60%	
Brazilian Sugarcane Ethanol	28.59 g-CO_2eq/MJ		Unchanged?
U.S. Corn Ethanol	36.86 g-CO_2eq/MJ		Unchanged?
Brazilian Corn, Thai Sugarcane & Cassava	N/A		Newly added
Next Gen. Biofuels including SAF	Count Twice		

On July 30, 2025, METI proposed Ordinance 3.1, which includes the following updates:

- GHG Emission Value for Gasoline: Increased to 90.17 g-CO_2eq/MJ due to higher emissions from desulfurization operations in gasoline production.
- GHG Reduction Target: Raised to 60 percent (JA2025-0039).

[7] The conversion factor for ethanol into crude oil equivalent is 0.607. Reference: METI's "Provisions related to the Sophisticated Methods of Energy Supply Structure Act" (Japanese only).

Additionally, METI plans to calculate life-cycle assessment (LCA) GHG emission values for new ethanol sources, including Brazilian corn-based ethanol, Thai sugarcane-based ethanol, and Thai cassava-based ethanol (JA2025-0035). These values will complement existing ones for Brazilian sugarcane-based ethanol and U.S. corn-based ethanol. METI aims to release Ordinance 3.2 in 2026, incorporating these new default values. Please see Table 1.

SAF Integration

Under Ordinance 3.0, certain types of SAF are classified as next-generation biofuels and count twice toward the annual target volume for transport biofuels. However, during expert committee meetings, some stakeholders recommended establishing a separate SAF target distinct from the on-road ethanol target.

On May 26, 2023, METI's ANRE presented a draft interim report on SAF introduction in Japan. The report proposed setting a new, separate target volume for SAF beyond the current 500 million LOE for the transportation sector under the Sophisticated Act (JA2023-0050). However, as of November 2025, a stand-alone SAF standard has not been set.

Gasoline Standards and Practices in Japan

Current Standards Under the Quality Control Act

The Act on the Quality Control of Gasoline and Other Fuels (hereafter referred to as the "Quality Control Act") empowers METI to set gasoline standards. Since 2003, the regular gasoline standard has allowed for the direct blending of ethanol up to 3 percent by volume. Additionally, the oxygen content in regular gasoline is limited to less than 1.3 percent by weight, equivalent to 8.3 percent of ethyl tert-butyl ether (ETBE).

Since 2011, the PAJ, representing Japanese oil refineries, has fulfilled the biofuel mandate by blending bioethanol-derived ETBE rather than directly blending bioethanol with gasoline. The Japan Biofuels Supply LLP (JBSL), which represents major Japanese oil companies[8], blends approximately 1,940 million liters of ETBE annually, containing about 823.7 million liters of bioethanol, to meet Japan's biofuel targets. While most gasoline in Japan uses ETBE, small independent gas stations not affiliated with PAJ distribute limited quantities of directly blended E3 gasoline.

E10 Gasoline Standards

The Quality Control Act also established an E10 gasoline standard for vehicles certified by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) as compatible with E10/ETBE22. E10 gasoline contains 3 to 10 percent directly blended ethanol, while ETBE22 gasoline allows for a maximum blend level of 22 percent ETBE. In summer 2023, Nakagawa Bussan, a company based in Nagoya, commercially introduced Japan's first E10-grade gasoline[9]. The current E10 standard was developed based on empirical studies conducted in Okinawa. METI plans to review this standard before launching a nationwide E10 program.

[8] As of November 2025, JBSL consists of five refineries, ENEOS, Idemitsu Kosan, Cosmo Oil, Fuji Oil Company, and Taiyo Oil Company.

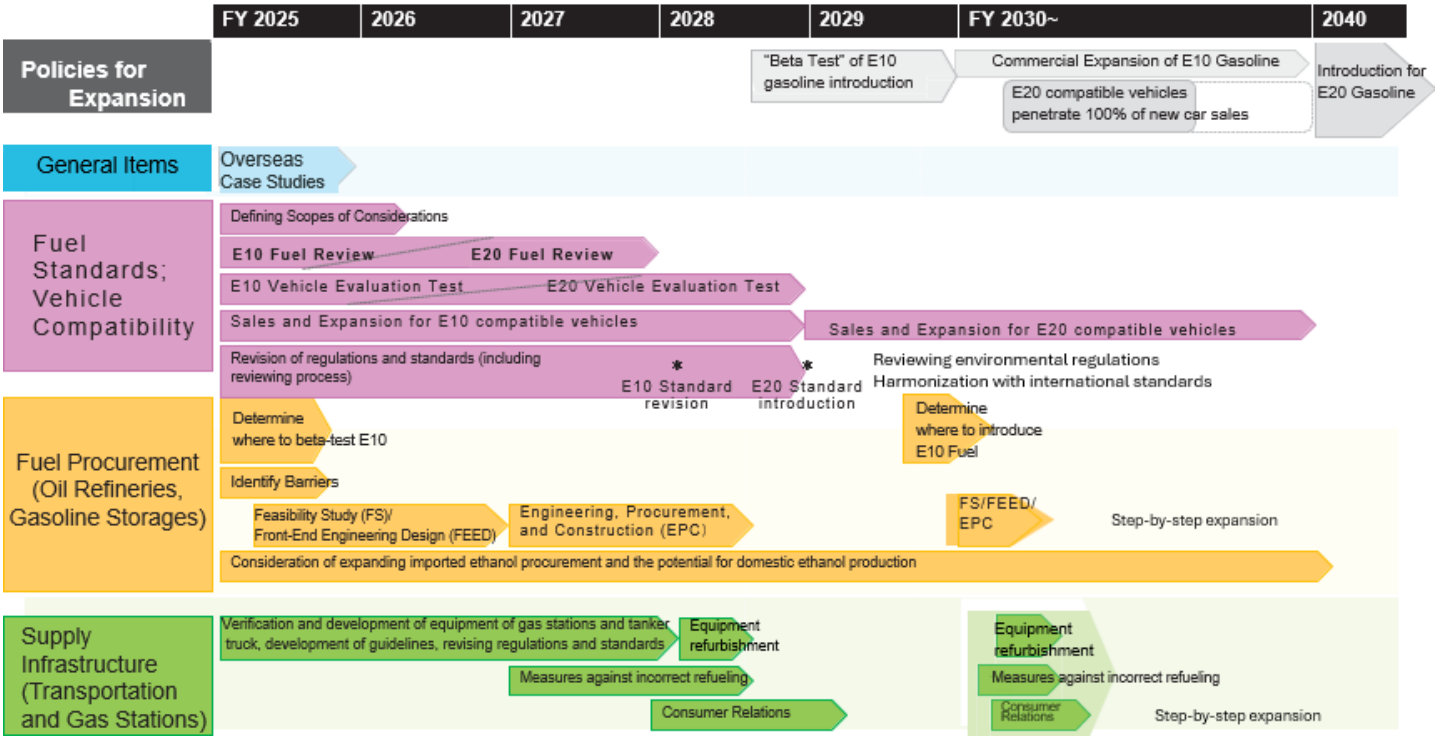
[9] Nakagawa Bussan provides gasoline containing 7 percent of bioethanol (i.e., E7).

The Quality Control Act currently does not allow any gasoline that contains more than 10 percent of ethanol. In the near future, Japan needs to revise the gasoline standards to accommodate higher biofuel blends, reflecting Japan's long-term commitment to reducing GHG emissions and increasing bioethanol consumption, especially because Japan aims to introduce E20 gasoline by FY 2040.

Introduction of E10 Direct Blend

On November 11, 2024, ANRE announced plans to increase bioethanol consumption for on-road vehicles, as outlined in the 7th Strategic Energy Plan published in February 2025. These plans include the nationwide introduction of E10 gasoline by FY 2030 and E20 gasoline by FY 2040 (JA2024-0035). Before implementing E10 nationwide, on November 25, 2025, ANRE proposed that oil refineries would conduct beta-test trials in Okinawa Prefecture starting in FY 2028. This localized approach aims to address potential barriers to adoption, such as infrastructure compatibility and consumer acceptance. To support this initiative, ANRE proposed an action plan to facilitate the introduction and expansion of bioethanol consumption. The plan outlines strategies to overcome legal, technical, and commercial challenges associated with E10 and E20 gasoline commercialization over the next five years. ANRE also emphasizes the importance of studying successful biofuel introduction cases from other countries to replicate effective practices.

Figure 7. ANRE's Action Plan for the Introduction and Expansion of Bioethanol to Gasoline



Source: ANRE (unofficial translation by FAS/Tokyo)

Major Japanese oil refineries have indicated that they will continue producing ETBE-based regular gasoline, concurrently with the introduction of voluntary E10 pump options at their stations. Consumption of on-road ethanol is expected to remain steady at approximately 824 million liters annually until FY 2028, with gradual increases anticipated following the introduction of voluntary E10

pumps. However, oil refineries have yet to fully determine how to introduce E10 gasoline. To support these plans, METI will need to substantially revise the upcoming Ordinance 4.0, which is expected to specify Japan's biofuel standards starting in FY 2028. This revision will be critical to ensuring the successful adoption of higher ethanol blends and to meet Japan's long-term biofuel targets.

SAF as an Emerging Biofuel Opportunity

Addressing Aviation Emissions Through SAF

To mitigate CO_2 emissions from international aviation, the International Civil Aviation Organization (ICAO) adopted the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) in 2016. SAF is a key component of this initiative. On April 22, 2022, MLIT and the METI jointly launched the Public-Private Council for Promoting the Introduction of SAF to develop an internationally competitive SAF supply chain (JA2022-0041). In the summer of 2022, METI initiated SAF production and supply working group meetings, while MLIT separately focused on SAF distribution.

Decarbonization Targets for Aviation

In 2022, MLIT published the Basic Policy for Promoting Decarbonization of Aviation (JA2022-0085), which outlined three key targets for airlines:

1. Stabilization of CO_2 emissions: Achieve carbon-neutral growth for international flights at FY 2020 levels;
2. Reduction in CO_2 emissions per unit transport: Reduce emissions from domestic flights by 16 percent by FY 2030 compared to FY 2013 levels;
3. Carbon neutrality: Achieve carbon neutrality for both international and domestic flights by FY 2050.

Japan aims to replace 10 percent of its conventional jet fuel usage with SAF by 2030. To meet CORSIA goals, MLIT estimates that Japanese airports will consume 2.5–5.6 billion liters of SAF annually by FY 2030, out of a total jet fuel consumption of 10.9–12.3 billion liters.

SAF as a Growth Opportunity for Japan's Biofuel Market

With domestic demand for gasoline and other on-road fuels expected to decline by approximately 2 percent annually, SAF presents a significant opportunity to expand Japan's liquid biofuel market. The GOJ has prioritized domestic hydro-processed esters and fatty acids (HEFA) and alcohol-to-jet (ATJ) SAF production over imports.

SAF Standards and Policy Development

On September 30, 2024, METI held the 16th Decarbonized Fuel Policy Working Group meeting under the Resource and Fuel Subcommittee. The ANRE outlined several key discussion points for developing stand-alone SAF standards (JA2024-0032):

- Supply Target Volume: Japan aims to achieve a 5 percent or greater reduction in aviation GHG emissions by FY 2030 compared to FY 2019 levels. This target is based on a SAF blend rate of 10 percent combined with a GHG reduction rate of 50 percent or higher;
- Definition of SAF: SAF must meet globally recognized fuel standards, including ASTM D7566 and D1655;
- Covered Period: The first SAF ordinance will cover FY 2030–FY 2034;

- Target Operators: Jet fuel producers and importers supplying more than 100 million liters annually will be required to comply with the rules. Allocation of target volumes will be based on average annual production volumes;
- Flexibility: ANRE plans to allow leeway for circumstances beyond the control of business operators during the introduction phase;
- GHG Reduction Goals: SAF must achieve a minimum 50 percent reduction in GHG emissions. Japan also intends to establish obligations to develop raw materials and production technologies for SAF.

Airlines utilizing CORSIA-eligible fuels for international flights may report associated emissions reductions in their annual CORSIA Emissions Reports. However, as a resource-constrained country, Japan relies on imports to secure feedstocks for SAF production. Experts have raised concerns about Japan's ability to procure feedstocks that meet the required 50 percent GHG reduction threshold. As of November 2025, Japan has not yet established a stand-alone SAF policy. The GOJ has established the SAF Introduction Acceleration Task Force and aims to publish an interim report at the upcoming Public-Private Council for Promoting the Introduction of SAF meeting, scheduled for December 2025.

Financial Support for SAF Commercialization

Green Innovation Fund

In 2020, METI introduced a 2.3 trillion yen ($21.5 billion[10]) Green Innovation Fund to support research, development, and commercialization of environmentally innovative projects through the New Energy and Industrial Technology Development Organization (NEDO). SAF and e-fuels are key targets of this initiative.

- e-fuels (including e-SAF or e-kerosene): GOJ aims to achieve a liquid fuel yield of 80 percent in pilot projects by 2030 and commercialization by 2040.
- ATJ SAF: NEDO plans to achieve commercial production by 2030, with a liquid fuel yield of at least 50 percent and production costs of 100 yen per liter.

On April 19, 2022, NEDO awarded 114.5 billion yen ($1.04 billion[11]) in grants for pilot projects to develop e-fuels, SAF, and other renewable fuels. In FY2023, METI separately allocated 5.18 billion yen ($36.9 million[12]) for bio-jet fuel technology research and development.

GX Economy Transition Bonds

The GOJ has developed the Japan Climate Transition Bond Framework and plans to issue 20 trillion yen in GX Economy Transition Bonds over 10 years. In February 2025, METI selected four companies—Idemitsu Kosan, ENEOS, Taiyo Oil, and Cosmo Oil—for its FY2024 "Subsidy Program for Promoting the Transition to a Decarbonized Growth-Oriented Economic Structure." This program provides subsidies for investments in large-scale SAF production facilities, aiming to establish a stable and internationally competitive SAF supply system.

[10] $1 USD = 106.78 yen in 2020 (Federal Reserve Bank of St. Louis)
[11] $1 USD = 109.84 yen in 2022 (Federal Reserve Bank of St. Louis)
[12] $1 USD = 140.50 yen in 2023 (Federal Reserve Bank of St. Louis)

SAF Tax Incentives

The GOJ introduced the Tax System to Promote Domestic Production in Strategic Sectors as part of the FY 2024 Tax Reform. SAF production is one of five targeted areas.

- Tax Deduction Rate: SAF producers receive a deduction of 30 yen per liter, which decreases to 75 percent in year eight, 50 percent in year nine, and 25 percent in year ten.
- Corporate Tax Deduction: SAF producers can deduct up to 40 percent of corporate tax.

Tokyo Metropolitan Government Subsidy

The Tokyo Metropolitan Government provides a 100 yen per liter subsidy for domestically produced SAF at Tokyo Haneda Airport. This subsidy aims to bridge the price gap between imported and domestic SAF, covering up to 2.5 million liters of SAF. As of 2025, Cosmo Oil is the only company producing SAF in Japan.

Environmental Sustainability and Certification

To meet biofuel targets under the Sophisticated Act, METI requires proof of sustainability. The Japan Biofuels Supply LLP (JBSL) typically relies on the International Sustainability and Carbon Certification (ISCC) program.

Import Policy: Tariffs

Table 2 provides a detailed breakdown of tariff rates applicable to ethanol imports into Japan, categorized according to Harmonized System (HS) codes.

Table 2: Tariff Rates and Applications for Ethanol Imports to Japan under HS 2207

H.S. Codes	Description	Tariff rate		End Use		
		MFN	USJTA	Industrial	Fuel	Beverage
2207.10	**Undenatured Ethanol 80%+**					
Undenatured: Alcoholic Strength by Volume of 90%+						
2207.10-121	Intend for use in manufacturing industrial alcohol (through distillers)	Free		Y	N	N
2207.10-122	Intend for use in manufacturing ethyl acetate	Free		Y	N	N
2207.10-123	Intend for use in manufacturing ethylamine	Free		Y	N	N
2207.10-130	Intend for making alcoholic beverages	Free		N	N	Y
2207.10-191	intend for use in manufacturing ethyl-tertiary-butyl ether	Free		N	Y	N
2207.10-199	Other ethanol (not through distillers or not decided the end-use)	10%	2.7% (FY2025)	Y	Y	Y
Undenatured: Alcoholic Strength by Volume of 80-90%						
2207.10-220	Intend for making alcoholic beverages	Free		Minimal Imports as of 2025		
2207.10-290	Other (not through distillers)	38.1 yen/l				
2207.20	**Denatured Ethanol**					
2207.20-100	Alcoholic strength by volume of 90%+	27.2%		Minimal Imports as of 2025		
2207.20-200	Alcoholic strength by volume of 80-90%	38.1 yen/l				

Source: Japan Customs

Sales and imports of industrial alcohol are strictly regulated under METI's Ordinance for the Enforcement of the Ethanol Business. There is no tariff on ethanol for ethyl acetate and ethylamine production, or on industrial 'crude' ethanol destined for Japanese distilleries. However, other undenatured ethanol (HS code: 2207.10-199), including refined industrial ethanol intended for direct use, remains subject to a tariff. Under the 2020 U.S.-Japan Trade Agreement (USJTA), Japan is gradually phasing out the 10 percent tariff on undenatured ethanol imports for other uses, including undenatured ethanol for direct blending. In FY 2025, the tariff rate for these imports was reduced to 2.7 percent (see Table 3). Ethanol imports from the European Union (EU) and the United Kingdom (UK) receive comparable tariff treatment.

Table 3. Tariff Reduction Staging Table under the USJTA (HS: 2207.10-199)

2207.10-199	FY2020	…	FY2024	FY2025	FY2026	FY2027	FY2028
USJTA	7.2%	…	3.6%	2.7%	1.8%	0.9%	0%
WTO MFN	10%						

Source: Japan Customs

There is no tariff on imports of bio-ETBE (HS: 2909.19-010) and of bioethanol for bio-ETBE production (HS: 2207.10-191). Although denatured ethanol is commonly used as fuel in other countries, some Japanese companies import undenatured ethanol for direct blending, due to the substantial tariff burden on denatured ethanol. Denatured ethanol is ethanol to which substances have been added to render it unfit for human consumption, primarily to avoid liquor taxes (JA2025-0013). Japan imposes a very high World Trade Organization (WTO) most-favored-nation (MFN) tariff rate of 27.2 percent on denatured ethanol (90 percent or higher; HS: 2207.20 220). This has resulted in Japan historically importing only minimal quantities of denatured ethanol. For additional information on tariffs for ethanol imports, please refer to JA2021-0072.

For biodiesel (HS: 3826.00-000), Japan imposes a 3.9 percent WTO MFN tariff, which applies to imports from the United States. Tariffs are eliminated for countries with which Japan has concluded free trade agreements, including the EU, the UK, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), and the Association of Southeast Asian Nations (ASEAN). Japan currently does not import biodiesel for on-road use.

Section III. Ethanol

Overview of Bioethanol Production and Usage

Bioethanol is produced by fermenting the sugar components found in organic materials such as corn, sugarcane, and rice. In Japan, bioethanol is used for both fuel and industrial purposes, with distinct applications and consumption patterns.

Consumption

Fuel Use

Major Japanese oil refineries, represented by the PAJ, fulfill biofuel mandates by blending gasoline with bioethanol-derived ETBE rather than directly blending bioethanol. The JBSL blends approximately 1.95 billion liters of ETBE annually, containing 823.7 million liters of bioethanol, to meet Japan's biofuel targets under the Sophisticated Act.

While some independent gas stations voluntarily sell direct-blend E3 or E10 gasoline, their ethanol consumption remains under half a million liters annually.

In 2024, Japan's consumption of ethanol components in ETBE aligned with government mandates, with approximately 95 percent of ETBE derived from imported U.S. and Brazilian ethanol and 5 percent from domestically produced ETBE using Brazilian ethanol. The average ethanol blend rate in 2024 was 1.9 percent. FAS/Tokyo forecasts that on-road ethanol consumption will remain steady at the target volume in 2025, with an average blend rate of approximately 1.9 percent of total gasoline consumption.

Industrial (Non-Fuel and Non-Beverage) Use

In Japan, ethanol used for purposes other than beverages or transportation is classified as industrial ethanol for taxation purposes.

During the COVID-19 pandemic, demand for industrial bioethanol surged to 547 million liters in 2020, primarily for sanitization purposes. However, consumption declined as the pandemic subsided. In 2024, price inflation and reduced consumer spending led to a decline in industrial bioethanol consumption to approximately 429 million liters. FAS/Tokyo forecasts a marginal recovery to 437 million liters in 2025 as ethanol prices decline.

The food sector accounts for roughly half of industrial ethanol consumption. Food manufacturing includes food preservation, vinegar production, condiment (e.g., soy sauce and miso, see JA2021-0040) production, food additives, flavoring agents, and processed foods. Rising demand for ready-to-eat and processed foods has increased industrial ethanol usage in the food sector. Consequently, Japanese industrial ethanol distributors voluntarily adhere to food safety regulations. For more details on Japan's distribution structure for non-fuel ethanol, refer to JA2021-0072.

Japan also uses approximately 250 million liters of imported bioethanol annually for alcoholic beverage production, though this is outside the scope of this report. While some ethanol used for beverages shares the same distribution channels with industrial ethanol, the GOJ tracks these separately for taxation purposes.

Table 4. Fuel and Industrial Ethanol Production, Supply and Distribution (2016-2025)

Ethanol Used as Fuel and Other Industrial Chemicals (Million Liters)										
Calendar Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025f**
Beginning Stocks	82	89	84	60	78	62	64	92	87	78
Fuel Begin Stocks	44	46	44	22	23	16	18	55	35	25
Production	1	0	0	0	0	0	0	0	0	0
Fuel Production	1	0	0	0	0	0	0	0	0	0
Imports	1,143	1,194	1,198	1,173	1,381	1,297	1,363	1,275	1,252	1,277
Industrial Imports	385	412	373	388	538	465	489	464	430	440
Fuel Imports	758	782	825	785	843	832	874	811	822	837
>of which to make ETBE	70	55	87	60	54	66	71	50	45	33
>imported as ETBE	688	727	738	725	789	766	803	761	777	804
Exports	0	0	0	0	0	0	0	0	0	0
Consumption	1,137	1,199	1,222	1,155	1,397	1,295	1,335	1,280	1,261	1,274
Industrial Consumption	380	415	375	371	547	465	498	449	429	437
>for food industry	190	186	202	209	246	222	228	210	200	205
Fuel Consumption	757	784	847	784	850	830	837	831	832	837
>as bio-ETBE	757	784	847	784	850	830	837	831	832	837
Ending Stocks	89	84	60	78	62	64	92	87	78	81
Fuel Ending Stocks	46	44	22	23	16	18	55	35	25	25
Refineries Producing Fuel Ethanol (Million Liters)										
Number of Refineries	3	1	1	1	1	0	0	0	0	0
Feedstock Use for Fuel Ethanol (1,000 MT)										
Rice	1	0.5	0.5	0.5	0.5	-	-	-	-	-
Market Penetration (Million Liters)										
Fuel Ethanol Use	757	784	847	784	850	830	837	831	832	837
Gasoline Pool *	52,849	51,904	50,999	49,785	46,052	44,768	44,781	44,645	43,826	43,624
Blend Rate (%)	1.4%	1.5%	1.7%	1.6%	1.8%	1.9%	1.9%	1.9%	1.9%	1.9%

Note: * Covers gasoline and all additives including any biocomponents (biofuels) when used like ethanol. Estimated volumes for synthetic alcohol and bioethanol for alcoholic beverage production are excluded.

Source: ANRE, Japan Customs, Japan Alcohol Association

Production

Japan has not produced domestic fuel bioethanol since the National Federation of Agricultural Cooperative Associations (JA Zen-noh) halted ethanol production from high-yield rice in 2021. The country's annual production of petroleum-derived synthetic ethanol, estimated at 50–100 million liters, has been declining. Additionally, J.Alco produces several million liters of industrial ethanol from domestic and imported molasses at its facility in Izumi, Kagoshima.

Trade

Currently, Japan's bioethanol fuel consumption is entirely dependent on imports. In 2024, Japan imported approximately 1.83 billion liters of ETBE[13], which included 777 million liters of imported ETBE made from U.S. corn-based ethanol and Brazilian sugarcane-based ethanol. In addition, Japan imported 45 million liters of Brazilian ethanol used by Japanese oil refineries to produce ETBE domestically. Thus, total fuel ethanol imports amounted to 822 million liters in 2024.

Most industrial ethanol is trans-shipped through bonded areas in Ulsan, South Korea, creating discrepancies in trade statistics that sometimes list South Korea as the export destination rather than Japan. Japanese food manufacturers often request sugarcane-based ethanol. Traders are reluctant to import U.S. corn-based ethanol for non-fuel markets because the separation of storage tanks is not economically feasible. As a result, Brazil dominates Japan's non-fuel ethanol market. For further details, see JA2021-0072.

Ethanol imports from Pakistan declined due to Pakistan's tariff preferences for non-fuel ethanol exports to the EU. However, following the EU's suspension of these preferences in June 2025, Japan began increasing imports of Pakistani ethanol. In 2024, FAS/Tokyo estimates that Japan imported 430 million liters of bioethanol for industrial use.

Japan also imports synthetic ethanol, primarily from South Africa, the UK, and EU countries. Imported volumes for synthetic alcohol and bioethanol for alcoholic beverage production are estimated and excluded from Table 4.

[13] 1 liter of bio-ETBE contains 0.4237 liters of bioethanol.

Section IV. Biodiesel

Current Status of Biodiesel in Japan

Until February 2025, the METI and Japanese oil refineries had not actively promoted the use of fatty acid methyl ester (FAME) biodiesel for on-road transportation due to limited demand and feedstock availability. Biodiesel production in Japan has historically been small-scale and focused on local projects.

Production of FAME biodiesel peaked in 2015 at approximately 15.4 million liters but gradually declined. The COVID-19 pandemic further reduced the availability of used cooking oil (UCO) from restaurant operations, causing production to drop to 9.7 million liters in 2022. As pandemic-related restrictions eased, biodiesel production rebounded to 10.6 million liters in 2023, according to the latest energy statistics from ANRE.

Policy Developments and Future Potential

Published in February 2025, the 7th Strategic Energy Plan encourages greater usage of biodiesel. ANRE has convened expert committees to explore strategies for increasing biodiesel consumption. As Japan begins producing SAF, some hydrogen-derived renewable diesel (HDRD) may be generated as a by-product, potentially boosting biodiesel availability.

However, expanding biodiesel consumption will require the GOJ to address two key challenges. The first is quality control. The GOJ must ensure that biodiesel meets consistent performance and safety benchmarks. The second challenge is the taxation structure. Japan exempts biodiesel from the oil and coal tax (2.8 yen/liter), but unlike on-road ethanol, on-road biodiesel is subject to the on-road diesel local tax (32.1 yen/liter) when blended with on-road diesel (e.g., B3, B5)[14]. Biodiesel producers have frequently, though unsuccessfully, petitioned METI and the Ministry of Finance to revise the tax structure to expand the biodiesel market. Revising tax policies to incentivize biodiesel production and usage is necessary, especially for on-road use.

Japanese off-road users are increasingly interested in biodiesel as a sustainable fuel option. West Japan Railway Company (JR West) plans to introduce biodiesel for its diesel locomotives. In 2024, JR West conducted a test run using Neste's renewable diesel on the Gantoku Line in Yamaguchi Prefecture. Additionally, many developers are adopting biodiesel for large construction equipment to reduce GHG emissions. Airports have also begun using biodiesel for ground support equipment to minimize on-ground GHG emissions.

Biodiesel Production and Municipal Initiatives

Municipalities have played a significant role in promoting biodiesel through environmental projects. For example, the City of Kyoto operates Japan's largest municipal biodiesel project, with a daily production capacity of 5,000 liters. In FY 2024, Kyoto produced 360,000 liters of biodiesel from UCO, which was used to fuel city buses and garbage trucks.

[14] The Quality Control Act, which limits biodiesel content to 5 percent (B5) in on-road diesel, only sets out requirements for fossil fuels and does not extend to B100 or 100 percent biodiesel.

Revo International Inc. provides a UCO collection service. Revo produces biodiesel with a daily capacity of 30,000 liters at its Kyoto facility. In 2024, Revo exported 8.2 million liters of biodiesel to Switzerland. In April 2025, Revo launched a new factory in Tahara, Aichi, with a daily production capacity of 30,000 liters of biodiesel and 480 liters of HDRD/SAF. Revo has applied for international certifications, including ASTM standards, and, upon certification, plans to supply SAF to Chubu Nagoya Centrair International Airport.

Table 5 highlights major biodiesel plants in Japan, all of which use UCO as feedstock to produce FAME biodiesel.

Table 5. Japan's Major FAME Biodiesel Plants and Daily Production Capacity

Company	City	Prefecture	Capacity (liters/day)	Note
Revo International	Uji Tawara	Kyoto	30,000	
Revo International	Tahara	Aichi	30,000	Launched in Apr. 2025
Sanwa Energy	Kishiwada	Osaka	23,000	Coming Soon
Daiseki Eco Solution	Tokai	Aichi	10,000	
Sanwa Energy	Sayama	Saitama	7,200	Launched in Feb. 2024
Daiki Axis SP	Matsuyama	Ehime	7,000	
City of Kyoto	Kyoto	Kyoto	5,000	
Bio Energy Kyushu	Kumamoto	Kumamoto	4,500	
Biodiesel Okayama	Okayama	Okayama	4,250	
Eco ERC	Obihiro	Hokkaido	3,600	
Shiraoi Oil&Fat	Shiraoi	Hokkaido	3,000	
Aburatou	Toyosato	Shiga	2,400	
Daiki Axis SP	Inashiki	Ibaraki	2,000	

Note: Production capacity does not reflect the production volume.

Challenges in Securing Feedstock

The primary challenge for expanding biodiesel production in Japan is securing sufficient UCO feedstock, most of which is already being utilized. According to UCO Japan, in FY 2022, Japan generated approximately half a million metric tons (MT) of UCO, distributed as animal feed (180,000 MT), exported, primarily to Singapore for SAF production (110,000 MT), chemical manufacturing such as soap and ink (50,000 MT), and biodiesel feedstock (20,000 MT).

Starting in 2021, Japanese feed manufacturers faced a UCO shortage and imported 200,000 MT of palm oil for compound feed in 2022. UCO Japan estimates that 370,000 MT of UCO were disposed of in the sewage system, but 190,000 MT may be recoverable.

Additionally, Cosmo Oil's HEFA SAF plant in Sakai began operations in March 2025, further increasing demand for UCO. However, securing domestic UCO supply will be increasingly difficult. For more information about Japan's oil products market, see the Japan Oilseeds and Products Annual.

Section V. Sustainable Aviation Fuel (SAF)

Overview of SAF Projects in Japan

Table 6 outlines major SAF projects announced by Japanese oil refineries, excluding several small-scale pilot projects supported by the NEDO and the Ministry of the Environment.

Cosmo Oil, JGC Holdings, and Revo International have formed a joint venture, Saffaire Sky Energy, and completed Japan's first SAF plant at Cosmo's Sakai refinery in December 2024. The plant has an annual production capacity of 30 million liters of SAF, utilizing the hydro-processed esters and fatty acids (HEFA) pathway with UCO as the feedstock. After a successful test run, the plant began supplying SAF to airlines in April 2025. Cosmo Oil has launched a nationwide advertising campaign, promoting the company's SAF production.

Table 6. Ongoing Major Japanese SAF Projects

Oil Company	Main Partners	Location	Operation Start	Estimated Annual Production (million L) & Feedstock		Status
Cosmo	JGC, Revo	Sakai, Osaka	Apr 2025	30	UCO	Operation
ENEOS	Mitsubishi	Arida, Wakayama	2026→ 2028	400	UCO, animal fat	Planned
Idemitsu		Chiba	2026→2028	100	Ethanol	Planned
Idemitsu		Tokuyama	2028	250	UCO, oil/fat	Planned
Taiyo Oil	Mitsui	Okinawa	2028	220	Ethanol	Planned
Cosmo	Mitsui	Sakaide	2027→2029	220	Ethanol	Planned
Fuji Oil Corp.	Itochu	Sodegaura, Chiba	2027→ no go	180	UCO, oil/fat	Canceled

ENEOS, Japan's largest oil refinery, and Mitsubishi Corporation are advancing the front-end engineering design for a HEFA SAF production plant at the ENEOS Arida Refinery in Wakayama. The plant aims to produce 400 million liters of SAF annually using UCO and animal fats, with operations expected to begin in FY 2028—two years later than originally planned. ENEOS terminated crude oil refining operations at the Arida plant in October 2023, raising concerns about job retention in the region. In 2022, Idemitsu Kosan received 29.2 billion yen (approximately $266 million[15]) for a five-year project to develop and commercialize its SAF supply chain using alcohol-to-jet (ATJ) pathway. The company plans to procure 180 million liters of bioethanol annually to produce 100 million liters of neat SAF, with the pilot production scheduled to begin in 2026 at its Chiba Prefecture facility (JA2022-0041). However, Idemitsu has pushed back the operating schedule to 2028.

Cosmo Oil is collaborating with Mitsui & Co. to develop an ATJ SAF manufacturing facility at its Sakaide refinery in Kagawa Prefecture, using LanzaJet's technology. The facility aims to produce 220 million liters of SAF annually, with operations now expected to begin in 2029—two years later than

[15] $1 USD = 109.84 yen in 2022 (Federal Reserve Bank of St. Louis)

originally planned. Cosmo has committed an additional 100 billion yen to this project, citing confidence in long-term demand growth and prioritizing early investment.

Taiyo Oil Co. and Mitsui & Co. have also proposed an ATJ SAF manufacturing facility in Okinawa, targeting annual production of 200 million liters of SAF starting in FY 2028. Taiyo Oil views Okinawa as a strategic hub location for supplying SAF to East and Southeast Asian markets.

Despite these ambitious projects, several challenges are delaying investment decisions and project timelines. Obstacles include escalating costs for building SAF plants, difficulty in securing workers for plant construction, increasing prices and limited supply of UCO and other feedstocks, and challenges in scaling up ATJ SAF production technologies.

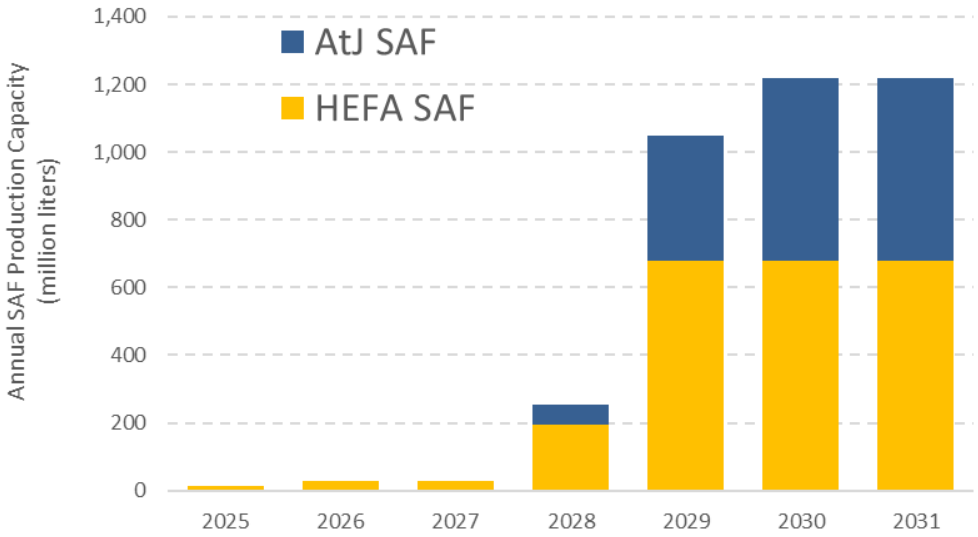
In May 2025, Fuji Oil Company announced the cancellation of its planned HEFA SAF plant in Sodegaura, Chiba, citing concerns over profitability. This marked the first cancellation of a large-scale SAF plan in Japan.

Feedstock Requirements and Policy Needs

If the aforementioned projects proceed as planned, Japan's SAF production will be about 1.2 billion liters by 2030 (Figure 8). The country will require approximately 1 billion liters of CORSIA-eligible bioethanol by 2030, in addition to the demand for on-road bioethanol. Furthermore, Japan will need significant quantities of CORSIA-eligible oil and fat feedstocks to meet SAF production targets. Securing sufficient feedstocks will be a major challenge.

To advance SAF initiatives, the Japanese private sector requires clear policy guidance with minimal uncertainty. The need for regulatory clarity is a key reason why METI is proactively developing SAF standards under the Sophisticated Act (see Section II: Policy and Programs). The Public-Private Council for Promoting the Introduction of SAF continues to discuss effective SAF introduction in Japan.

Figure 8. Proposed Annual SAF Production Capacity



Note: Estimated by FAS/Tokyo based on Table 6.

Section VI. Solid Biomass

Please see the Japan Biomass annual report.

Section VII. Notes on Statistical Data

General Terms

ATJ: alcohol-to-jet process to produce SAF
Bioethanol: ethanol produced from biomass, forestry and other biomass feedstock
Biodiesel: fatty acid methyl ester produced from both animal or plant lipids, both virgin (first time use) or waste streams (such as used cooking oils)
B3, B5: blend of biodiesel with petroleum diesel with the number indicating the maximum percentage by volume of biodiesel in the blend.
B100: 100 percent pure biodiesel.
CPTPP: Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CI Value: carbon intensity value, a value measuring GHG emissions released when consuming products (e.g., ethanol, gasoline). This value is derived from LCA. The unit of value is g-CO_2eq/MJ.
COP: the Conference of the Parties
CORSIA: Carbon Offsetting and Reduction Scheme for International Aviation
E3: blend of 97 percent gasoline and 3 percent bioethanol
E10: blend of 90 percent gasoline and 10 percent bioethanol
e-fuels: electrofuels (synthetic fuels) made from carbon dioxide and hydrogen, including e-SAF or e-kerosene
EPA: economic partnership agreement
ETBE: ethyl tert-butyl ether
EV: electric vehicle
FAME: fatty acid methyl esters
FY: Japanese fiscal year (April-March), for example, FY 2025 is April 2025 – March 2026.
GHG: greenhouse gas
GX: green transformation
LCA: life cycle assessment
HEFA: hydro-processed esters and fatty acids process to produce SAF
HDRD: hydrogen-derived renewable diesel
HS: harmonized system of tariff schedule codes
INDC: intended nationally determined contribution
NDC: nationally determined contribution
SAF: sustainable aviation fuel
UCO: used cooking oil
USJTA: U.S.-Japan Trade Agreement

Units

g-CO_2eq: grams of carbon dioxide equivalent of GHG emission
l: liter, 1l = 0.264 gallon
LOE: liters of crude oil equivalent; unit of energy used by METI
MJ: megajoule, 1 MJ = 1,000,000 joule
MT: metric ton, 1 MT = 1,000 kg = 2,204.6 pounds = 1.1 short ton
MT-CO2eq: metric ton CO_2 equivalent of GHG emission

Organizations and Companies

ANRE: The Agency for Natural Resources and Energy of METI
ASEAN: Association of South-East Asian Nations
EU: The European Union
FAS/Tokyo: Tokyo Office of Agricultural Affairs of the Foreign Agriculture Service
GOJ: The Government of Japan
ICAO: The International Civil Aviation Organization
IMO: The International Maritime Organization
ISCC: The International Sustainability and Carbon Certification
JA Zen-noh: National Federation of Agricultural Co-operative Associations
JBSL: Japan Biofuels Supply LLP
JR West: West Japan Railway Company
LDP: The Liberal Democratic Party
METI: The Ministry of Economy, Trade and Industry
MLIT: The Ministry of Land, Infrastructure, Transport and Tourism
NEDO: New Energy and Industrial Technology Development Organization
PAJ: Petroleum Association of Japan
UNFCCC: The United Nations Framework Convention on Climate Change

Conversion Factors

1 liter crude oil equivalent (LOE) = 9,250 kcal = 38.7 MJ
1 liter of bio-ETBE contains 0.4237 liters of bioethanol
1 liter of bioethanol = 0.607 LOE

Energy Content

Gasoline 43.10 GJ/MT
Bioethanol 26.90 GJ/MT
Diesel 42.80 GJ/MT
Biodiesel 37.50 GJ/MT

Feedstock-to-Ethanol Yield Rates

Rice: 1 MT = 371 liters (actual value by Zen-noh in 2019)

Trade Codes

Total ethanol trade: HS codes 2207 (estimated volumes for synthetic alcohol and bioethanol for alcoholic beverage production are excluded.)
Industrial ethanol trade: HS codes 2207.10-121, 2207.10-122, 2207.10-123, 2207.10-199 (some only)
Ethanol for ETBE production trade: HS code 2207.10-191
Bio-ETBE trade: HS code 2909.19-010
SAF trade: no designated HS code

Attachments:

No Attachments