

IEA-Advanced Motor Fuels ANNUAL REPORT 2020

Japan



Japan

Drivers and Policies

Fossil fuel plays a central role as a source of energy in Japan. The country's domestic sources of fossil fuel are limited, however, making it dependent on imports. The Basic Act of Energy Policy was enacted in June 2002 for the purpose of ensuring the steady implementation of energy policy.

The point of the energy policy is to first and foremost ensure stable supply ("Energy Security") and to realize low-cost energy supply by enhancing its efficiency ("Economic Efficiency") on the premise of "Safety." It is also important to maximize efforts to pursue environment suitability ("Environment").

The Basic Energy Plan is revised every four years. Its fifth edition¹ was issued on July 3, 2018, and indicated a policy for 2030 and 2050. Currently, Japan is discussing the sixth basic energy plan for the summer of 2021.

In the transportation sector, in order to improve the energy efficiency of automobile transportation, the "New fuel economy standards for passenger cars" was issued. It stipulates the following: (1) Target year: FY2030, (2) Standard value: 25.4km/L (32.4% improvement from FY2016 results), (3) Scope: Gasoline vehicles, diesel vehicles, LPG vehicles, electric vehicles, and plug-in hybrid vehicles. However, on October 26, 2020, Japan's prime minister declared, "Japan aims to realize a carbon-neutral society by 2050." In response, the Ministry of Economy, Trade and Industry (METI) formulated a "Green Growth Strategy towards 2050 Carbon Neutrality" in collaboration with related ministries and agencies. This strategy is an industrial policy to meet the challenging goal of achieving carbon neutrality by 2050, a vision upheld by the Suga administration that aims to generate a positive cycle of economic growth and environmental protection.²

Advanced Motor Fuels Statistics

Figure 1 shows the energy sources used in the transportation sector³ in Japan. Oil related energy accounts for 97.8% of total usage. The market for alternative fuels is very small in Japan, as is the number of alternative fuel vehicles (Table 1). Methanol, CNG, hybrid, EVs, and FCVs currently constitute the environmentally friendly vehicles.

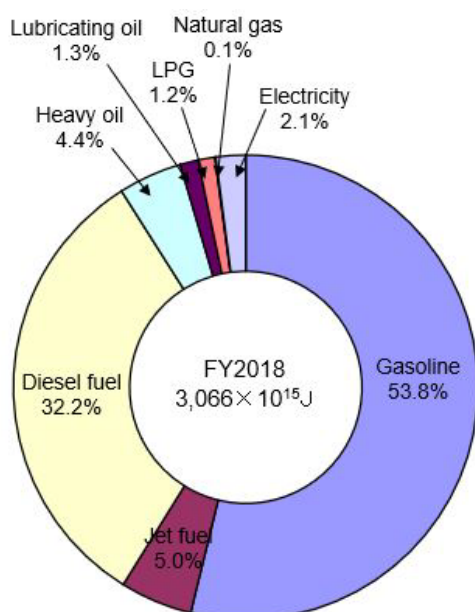


Fig. 1. Energy Sources Used in the Transportation Sector in Japan in 2018

¹ Agency for Natural Resources and Energy, 2018, "Cabinet Decision on the New Strategic Energy Plan" website, https://www.meti.go.jp/english/press/2018/0703_002.html

² Ministry of Economy, Trade and Industry, December 25, 2020, https://www.meti.go.jp/english/press/2020/1225_001.html

³ Energy White Paper 2020, Agency for Natural Resources and Energy, June 2020 (in Japanese)

The number of hybrid vehicles is rather large, owing to the number of passenger hybrid vehicles. CNG vehicles currently account for the largest number of vehicles in the low-emission truck category. The penetration of FCVs in the market has expanded; Japan has 3,695 FCVs.

Table 1. Current Penetration of Environmentally Friendly Vehicles in Japan

Vehicle Type	Methanol ⁴	CNG ⁵	Hybrid ⁶	EV ³⁷	FCV ³⁷	Vehicle Registration ⁷
Passenger vehicles	0	1,616	9,145,172 (PHV: 136,208)	117,315	3,695	39,313,588
Light, mid, and heavy-duty trucks	576	6,410	45,190	1,563	0	5,924,307
		20,649				
Buses	0	1,585			0	226,271
Special vehicles	0	4,129			0	1,612,856
Small vehicles	0	11,242	1,494,319	4,839	0	31,313,053
Total	576	45,631	9,587,425	123,717	3,695	78,390,075

Research and Demonstration Focus

Hydrogen

The Strategic Roadmap for Hydrogen and Fuel Cells (revised version), which includes new goals and specific explanations of the new efforts to be undertaken, was announced on March 12, 2019 based on the Basic Hydrogen Strategy (December 26, 2017).

The strategy sets the following two goals toward the realization of a hydrogen-powered society: 1) To identify three fields and 10 related priority areas for Japan in technological development, and 2) To strive to continuously engage in evaluating technological development projects, creating linkages between areas of demand and technical seeds and enhancing collaboration with overseas countries.

The following targets on mobility are included:⁸

(1) FCV: 800,000 by 2030

Cost of FCV: achieving a cost reduction of FCV to the level of HV around 2025 [Price difference ¥3M (\$28,500 US) → ¥0.7M (\$6,650 US)], reducing cost of main elemental technologies around 2025 [fuel cell system around ¥20k (\$190 US)/kW → ¥5k (\$48 US)/kW, hydrogen storage system around ¥0.7M (\$6,650 US) → ¥0.3M (\$2,850 US)]

(2) FC Bus: 1,200 by 2030

- Expansion of regions where FC buses run
- Reducing FC bus's price by half [¥105M (\$997,500 US) → ¥52.5M (\$498,750 US)]
- Self-sustainability by FY2030

(3) Hydrogen refueling station (HRS)

- 320 by FY2025, some 900 by FY2030
- Making HRS independent by the second half of the 2020s
- Reduction of cost for construction and operation by FY2025 [construction cost ¥350M (\$3.325 million US) → ¥200 M (\$1.9 million US), operation cost(¥34M (\$323,000 US)/year → ¥15M (\$142,500 US)/year)]

⁴ LEVO, the Organization for the Promotion of Low Emission Vehicles (cumulative total number: out of production)

⁵ Japan Gas Association, as of March 2020 (cumulative total number), <https://www.gas.or.jp/ngvj/spread/> (in Japanese)

⁶ Next Generation Vehicle Promotion Center, as of March 2019 (estimated numbers of vehicles owned) <http://www.cev-pc.or.jp/tokci/hanbai.html> (in Japanese)

⁷ Automobile Inspection and Registration Information Association, as of October 2020, <http://www.airia.or.jp/publish/statistics/number.html>

⁸ Agency for Natural Resources and Energy, The Strategic Roadmap for Hydrogen and Fuel Cells (revised version), November 18, 2019, https://www.meti.go.jp/english/press/2019/0918_001.html

Setting of cost target for each component [compressor ¥90M (\$855,000 US)→¥50M (\$475,000 US, high pressure vessels ¥50M (\$475,000 US)→¥10M (\$95,000 US)]

Hydrogen stations for fuel cell vehicles were operated in 137 locations nationwide in December 2020.⁹

Natural Gas

Approximately half of the natural gas vehicles (NGVs) in Japan are commercial vehicles such as trucks, buses, or 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 announced the Giga CNG in December 2015 [12].¹⁰ The introduction of this heavy-duty CNG truck to the market is expected to increase the use of NGVs for long-distance transportation.

In FY 2018, the 3-year project subsidized by the Japanese Ministry of Environment for development and demonstration of heavy-duty LNG trucks was completed. The trucks' performance with a running range of more than 1,000 km and the availability of LNG filling stations that can also supply CNG were demonstrated. The CO₂ emissions from heavy-duty LNG trucks were reduced by about 10%, compared to the latest diesel trucks. Isuzu Motors Limited and the Organization for the promotion of Low Emission Vehicles (LEVO) are continuing this project after 2019.

Biofuel

With respect to initiatives aiming to encourage the use of biofuels in Japan, in 2019, sales of gasoline blended with Ethyl tert-butyl ether (ETBE) again achieved the target stipulated in the Act on Sophisticated Methods of Energy Supply Structures [500,000 kL (crude oil equivalent) of bioethanol and 1.94 M kL of bio-ETBE each year from 2018 to 2020], which was announced in April 2018.¹¹ According to trade statistics, approximately 66,000 tons of ethanol were imported in 2019, mainly from Brazil, as raw material for ETBE (equivalent to roughly 153,000 kL of ETBE).¹²

The [Guidelines for Biodiesel Usage in the Construction Industry](#) were partially revised in April 2019.

Bio-jet fuel has recently reached the practical adoption phase as a biofuel derived from the same fatty sources as biodiesel. On February 3, 2020, a communique from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) announced a partial revision to how the standard specifications for alternative jet fuels for aircraft (ASTM D7566) should be handled.¹³

Outlook

In a “Green Growth Strategy towards 2050 Carbon Neutrality,” the electrification of automobiles will be promoted. Comprehensive measures will be taken to achieve 100% electrified vehicles (electric vehicles, fuel cell vehicles, plug-in hybrid vehicles, hybrid vehicles) 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 CO₂ through the production, use, and disposal of automobiles in 2050.

Additional Information Sources

- Agency for Natural Resources and Energy, Energy White Paper 2020, June 2020, https://www.enecho.meti.go.jp/en/category/whitepaper/pdf/2020_outline.pdf

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 industry in the world. AMF TCP activities facilitate an international network on advanced motor fuels.

⁹ Next Generation Vehicle Promotion Center, http://www.cev-pc.or.jp/suiso_station/index.html (in Japanese)

¹⁰ Isuzu Motors Limited, website, <https://www.isuzu.co.jp/world/index.html>

¹¹ Japan Biofuels Supply LLP, website, <http://www.jbsl.jp/effort/index.html> (in Japanese)

¹² Japan Alcohol Association, website, <http://www.alcohol.jp/statis/import.pdf> (in Japanese)

¹³ Ministry of Land, Infrastructure, Transport and Tourism, Airworthiness Division, Notification No.1718, <https://www.mlit.go.jp/notice/noticedata/pdf/20200204/6-015.pdf> (in Japanese)