Biofuels to Decarbonize Transport

From the Task

By Tomas Ekbom, Glaucia Mendes Souza, and Hannah Edgren

Dear Reader, this is our last newsletter for 2022 and in this edition, we feature an article on biofuels and developments in Japan. We thank our colleagues at Nedo (New Energy and Industrial Technology Development) in Japan for their contribution.

Current progress in the triennium

During the autumn of 2022 we completed the migration and launch of our new website and have added new information about the task, projects, reports, publications, and the calendar with events. The website link to IEA Bioenergy Task 39 is here.

Task 39 has held three virtual business meetings during 2022 and one two-day physical meeting in Sweden in September with a workshop and a study visit to the world's first biomass pyrolysis to pyrocrude-for-HVO plant by PyroCell at Setra sawmill in Gävle, Sweden.

Task 39 continues to actively organize and participate in other webinars and conferences with the goal of sharing the networks insights on how decarbonization of the transport sector can contribute to a "green economic recovery".

As of end of 2022 seventeen countries participates in Task 39: Austria, Belgium, Brazil, Canada, China, Denmark, European Commission, Estonia, Germany, Ireland, Japan, The Netherlands, New Zealand, South Korea, Sweden, and the US. Australia is taking part but is awaiting confirmation. In addition, US Grains Council participates as a limited sponsor.

The Task leadership is continuing its efforts to expand Task membership and currently trying to recruit other countries including Norway, Finland, India, and Türkiya. With the collaboration among these countries, Task 39 is set to deliver cooperative research projects to address and assess policy, markets, and sustainable biofuel implementation issues.

Publication via the peer-reviewed literature, to reach the broader transport biofuels community is listed below with selected papers:

- Improvement opportunities for policies and certification schemes promoting sustainable biofuels with low GHG emissions. Part 1: A review of policy frameworks (Jinke et al. 2022) (link)
- Sustainability assessment of ethanol and biodiesel production in Argentina, Brazil, Colombia, and Guatemala (Canabarro et al., 2023) (link)

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Task 39 Programme of Work

The mission of Task 39 is to facilitate and advance development and deployment of sustainable, lower carbon intensity biofuels to decarbonise the transport sector. Our method is to assist member countries transport biofuels stakeholders in their efforts to develop and deploy sustainable, lower carbon intensive biofuels through a coordinated focus on technology, commercialization, sustainability, policy, markets, and implementation.

The Task leads and coordinates activities in the three main program areas of:

1) **Technology and Commercialization** (T-projects): Technical/commercial aspects of producing and using low carbon intensity (CI) liquid and gaseous biofuels for transport, including both "conventional" and "advanced" biofuels

2) **Sustainability** (P-projects): Sustainability and carbon intensity metrics are playing an ever-increasing role in the policies used to develop and use biofuels. Biofuels sustainability/LCA assessment will stay a priority for the Task

3) **Policy** (P-projects): Policy analysis, the "right" policies (such as LCFSs) significantly influence the rate and extent of development, deployment, and use of biofuels (e.g., bioethanol, biodiesel, renewable diesel, drop-in biofuels, etc.).

From the previous triennium, the **Intertask project Success stories and lessons learned** is in the final stage of completion. The list of **ongoing** and proposed projects is provided below.

- **T39-T1** Ongoing progress in the commercialization of SAF/biojet fuel
- **T39-T2**: Progress in the commercialization of drop-in biofuels and co-processing to produce low-CI transport fuels
- T39-T3: "*Extend assessment of decarbonisation of the marine transport sector and evaluate the commercial production and use of biofuels*"
- **T39-T4**: Assessment of demonstration plants and commercialization progress
- T39-T5: "*Phase 2- Successes and Lessons Learned for Advanced Biofuel Technologies Commercialization (possibly InterTask with Tasks 40 and 45)*"
- **T39-T6**: Inter-Task project 'Synergies of green hydrogen and bio-based value chains deployment'
- **T39-P1**: Implementation Agendas compare-and-contrast report of each member country's biofuels policies that have been/are being used to develop, deploy and expand biofuels production and use
- T39-P2: "*Assessment of the sustainability of biofuels pathways, including social and environmental aspects of sustainability, the specific CI impact of "new/advanced" feedstocks, and also further compare and harmonize leading LCA models to support biofuels categorization and regulation (possibly InterTask with Tasks 45)*"
- **T39-P3**: Improvement opportunities for policies and certification schemes promoting sustainable biofuels with low GHG emissions. Part 2: Robustness of GHG emission certification and verification –a case study of selected biofuel value chains and policies
- **T39-P4**: Biofuel's production and use status in "emerging" economies.

We appreciate your readership and value your input and feedback.
Thank you for participating in the IEA Bioenergy Task 39 network!

Tomas, Glaucia and Hannah

Task 39 Members

Starting from 2023 Task 39 will have 16 member countries participating as listed per below. Each country is represented by a National Team Leader (NTL) and additional representatives as well as an ExCo member. Furthermore, external experts may be involved as well.

Australia has taken part during 2022 as Observer and is in decision to take active part in 2023. As no confirmation has been given at the ending of 2022, they will not be a full Member. In addition, US Grains Council participates as a Limited Sponsor making the total number of members to 17.

Current IEA Bioenergy Task 39 Members (from 2023)

Member Country	Task Representative (s) with NTLs in bold	ExCo Member
Austria	**Andrea Sonnleitner,** Dina Bacovsky	Hannes Bauer
Belgium	**Robert Malina**	Thibaut Masy
Brazil	**Glaucia Mendes Souza**, Rubens Maciel Filho, Luiz A Horta Nogueira	Pietro Adamo Sampaio Mendes
Canada	**Jack Saddler**	Oshada Mendis
China	**Fuli Li**	Dou Kejun
Denmark	**Sune Tjalfe Thomsen**	Mikael Pedersen
Estonia	**Ain Ladoja**	Kristo Kaasik
European Commission	**Marco Buffi**, Nicolae Scarlat	Maria Georgiadou
Germany	**Franziska Müller-Langer**, Nicolaus Dahmen	Birger Kerckow
Ireland	TBD	Luis Gay-Tarazona
Japan	**Yuta Shibahara**	Shinji Furukawa
New Zealand	**Paul Bennett**	Paul Bennett
South Korea	**Jin Suk Lee**	In-Gu Lee
Sweden	**Tomas Ekbom**, Hannah Edgren	Jonas Lindmark
The Netherlands	**Paul Sinnige**, José Muisers, Stephan Janbroers	Ir Kees Kwant
United States	**Ling Tao**	Jim Spaeth

Current IEA Bioenergy Task 39 Limited Sponsor(s)

Organization	Task Representative (s)	Alternative
US Grains Council	Isabelle Ausdal	Mackenzie Boubin

A Limited Sponsor participates in Task 39 with same terms as other participating countries. Their participation is limited to one Task and to one triennium and there is no ExCo representation.

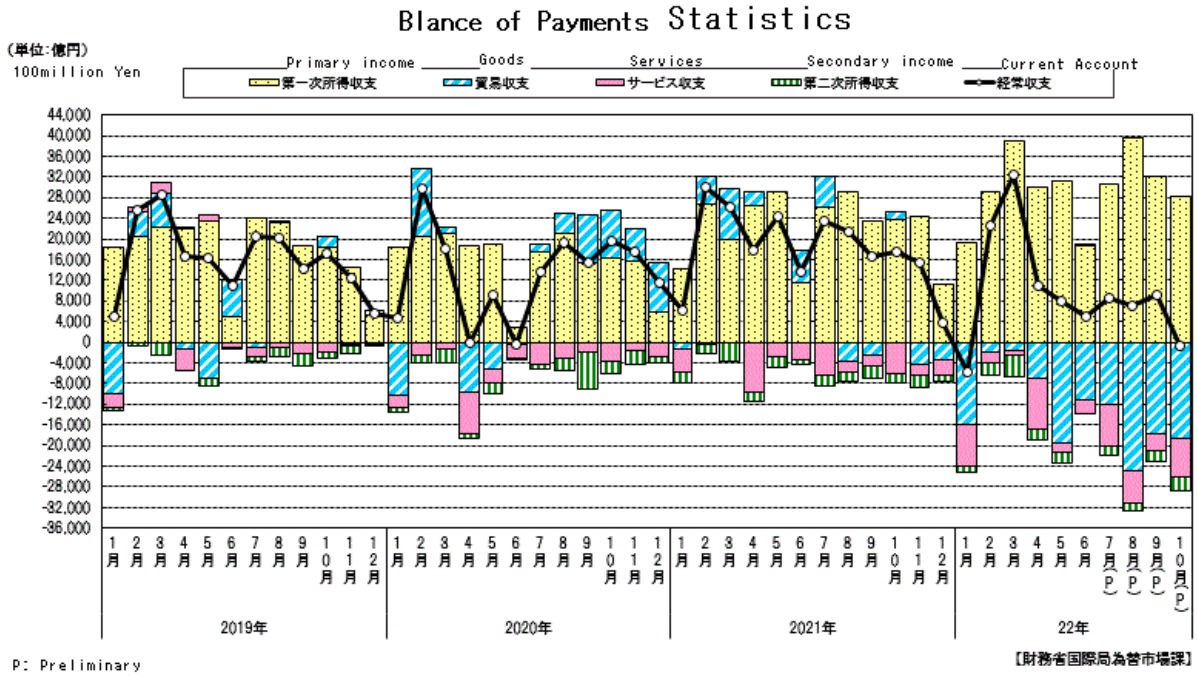
Biofuels production and consumption in Japan

By Yuta Shibahara, NEDO

1. Overview of alternative fuels for transportation

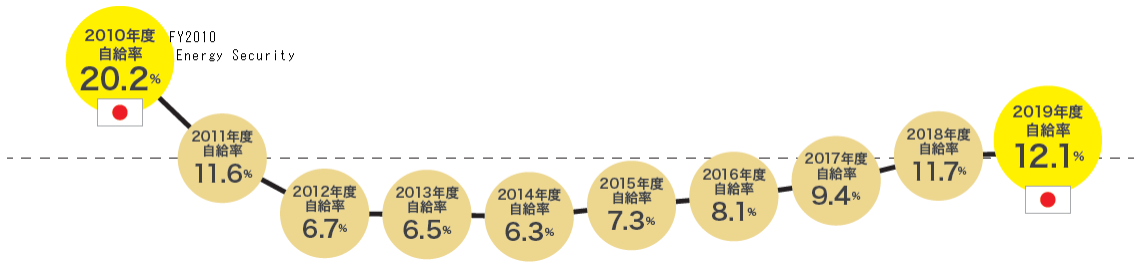
The transportation fuel situation in Japan, where fossil resources are scarce, reflects the peculiarity of the country's dependence on imports for almost all raw materials, as well as the current situation in which Japan faces the risk of a trade (current account) deficit.

1 -1: (Trade) Current Account Trends



**1: Ministry of Finance: Balance of Payments (Japanese)*

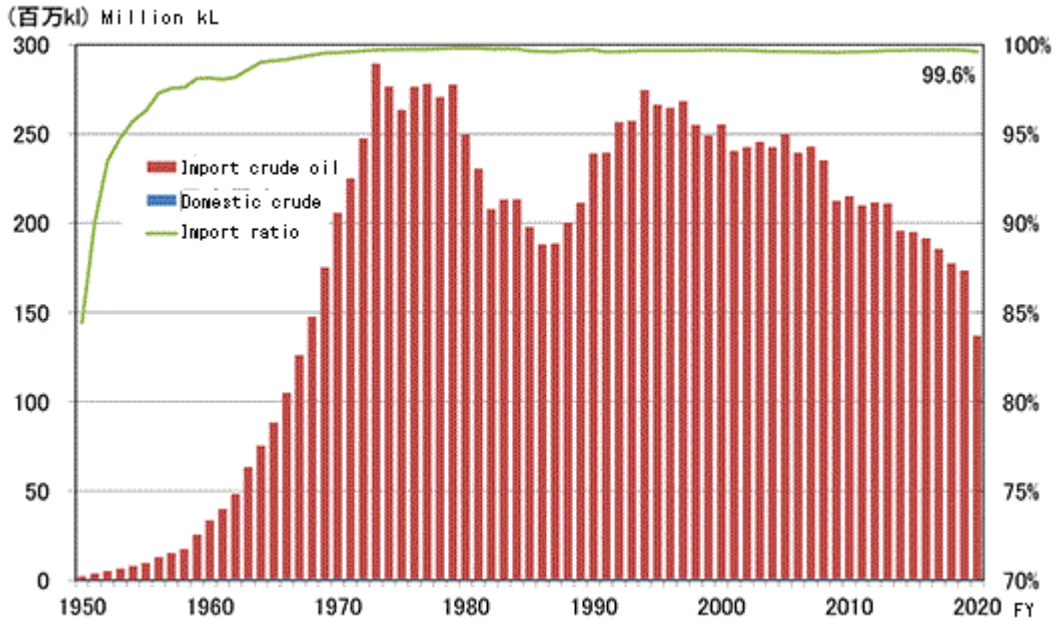
1 -2: Energy self-sufficiency rate Trends



**2: Agency for Natural Resources and Energy: Japan energy issues (Japanese)*

Japan's primary energy self-sufficiency rate ranks 35th among 36 OECD countries.

1 -3: Domestic and Imported Crude Oil Supply Trends



**3: Agency for Natural Resources and Energy: Energy White Paper 2022 (Japanese)*

Regarding the utilization of petroleum products in this environment, especially for passenger cars for ground transportation passenger vehicles, the demand has been concentrated on gasoline engine vehicles for a long time, and the current transportation fuel is driven by gasoline fuel as a whole, which is different from the development of diesel fuel in Europe and other countries.

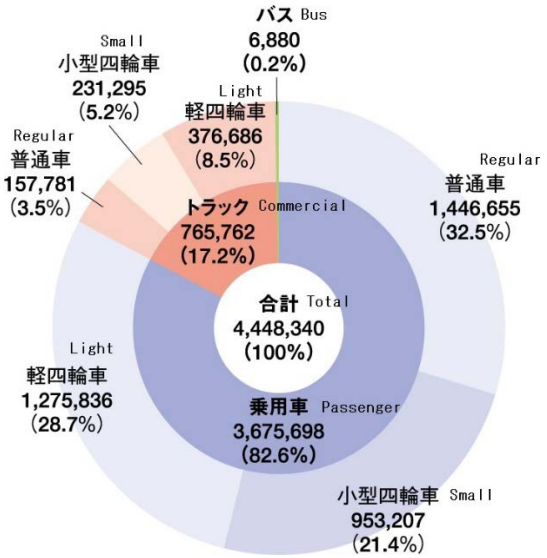
1-4: Passenger vehicle sales by fuel 2021/12-2022/11

	2022 Dec.	2022 Jan.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	TTL	Ratio
EV	2,419	1,691	2,281	4,219	1,610	1,572	3,379	2,169	2,034	3,279	1,953	3,268	27,455	1.3%
FCV	158	166	163	140	82	28	49	14	10	31	79	57	819	0.04%
PHV	3,052	4,037	2,756	3,543	2,269	2,953	3,306	4,147	2,863	4,623	1,932	2,184	34,613	1.7%
HV	88,527	91,610	84,293	132,602	70,781	65,190	78,472	88,621	76,555	104,676	97,654	106,055	996,509	48.8%
Gasoline	84,611	74,942	81,978	126,830	72,246	60,554	74,770	81,999	63,410	85,894	75,084	71,259	868,966	42.5%
Diesel	12,523	9,477	13,256	17,203	6,518	6,095	9,699	9,753	9,439	13,080	9,489	10,078	114,087	5.6%
Other(LPG)	9	3	2	7	3	13	5	8	5	2	11	3	62	0.003%
S.TTL	191,299	181,926	184,729	284,544	153,509	136,405	169,680	186,711	154,316	211,585	186,202	192,904	2,042,511	100%

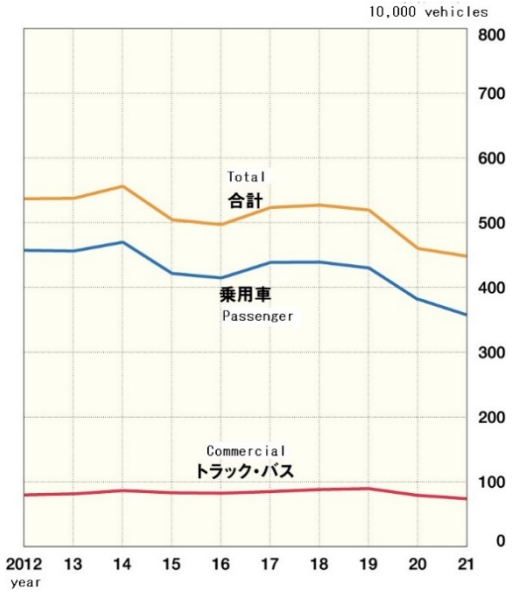
**4: Japan Automobile Dealers Association - Monthly statistical data aggregated [excluding small vehicles] (Japanese)*

1-5: Vehicle production

2021 Production volume and composition ratio by vehicle type



Automobile production volume 2012-2021



**5: Japan Automobile Manufacturers Association - Excerpt from the production of four-wheelers*

With regard to the "S+3E (Safety + Energy Security, Economic Efficiency, Environment)" which is the major premise of Japan's energy policy, the importance of ensuring a stable supply of energy is further recognized in light of the recent global situation (COVID19 and War).

In recent years, efforts to become Carbon Neutral in 2050 have begun, and especially since 2020. The various technological developments of fossil fuel alternatives for transportation have been closely watched, and new fuel technology development projects (HEFA, FT Synthesis, AtJ, etc.) that do not use BioDiesel technology (FAME/HVO) as a development step, have begun to be promoted rapidly and concretely, making further domestic production an important/heavy issue.

The specific directions of alternative fuels in each mode of transport are:

Land Transportation Mode: Development of fossil alternative fuels (Synthetic Fuels, etc.) as a complement to electrification,

Maritime Transport Mode: IMO-led development of new fuels (hydrogen/ammonia, etc.) and those for transport ships,

Aviation Transport Mode: SAF (Sustainable Aviation Fuel) deployment led by ICAO.

However, the mandatory reduction of GHG emissions (as well as increasing the reduction rate) from 2027 by the ICAO/CORSIA standards for Int'l aviation is seen as a leading and urgent issue among fossil alternative fuels for transportation, and the momentum for domestic SAF production is rapidly growing as an important theme for addressing this. Thus, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Ministry of Economy Trade and Industry (METI), the Ministry of Agriculture, Forestry and Fisheries (MAFF), the Ministry of the Environment (MOE), New Energy and Industrial Technology Development Organization (NEDO) and others are conducting R&D aimed at implementing.

SAF, is a hybrid weave of policy/operation/technology development, as a functional development, with an eye to Energy Security.

**6: METI Public-Private Council to Promote SAF Introduction*

In the latter part of this article, I would like to introduce some of the states of our efforts to make transportation fuels carbon neutral, focusing on the deployment of SAF.

2. Trends in Related Policies

The following is a summary of recent policy developments related to transportation fuels in Japan.

2020. Oct: Former Prime Minister Suga's Policy Speech

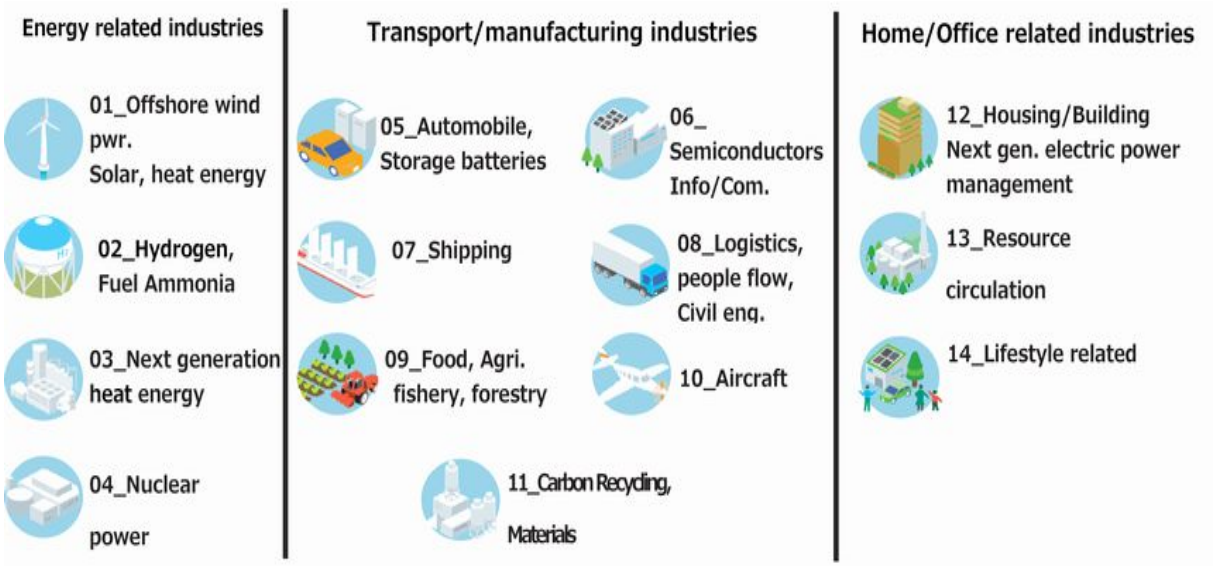
Japan declared that it would aim to realize "carbon neutrality by 2050"

2021. Apr: Climate Change Summit

Japan has also set a new target to reduce greenhouse gas emissions by 46% in FY 2030 from FY 2013 levels.

2021. Jun: Formulated the Government Green Growth Strategy (14 priority areas)

2-1: 14 growth sectors



**7: METI: Green Growth Strategy*

2 -2: Green Innovation Fund established (10 years, total of 2 trillion yen, 19 areas)

	Project	Adoption	Budget (100 million Yen)
①	Cost Reductions for Offshore Wind Power Generation	2022/1/21	1,195
②	Development of Next-Generation Solar Cells	2021/12/28	498
③	Large-scale Hydrogen Supply Chain Establishment	2022/8/26	3,000
④	Hydrogen Production through Water Electrolysis Using Power from Renewables	2022/8/26	700
⑤	Hydrogen Utilization in Iron and Steelmaking Processes	2022/1/7	1,935
⑥	Fuel Ammonia Supply Chain Establishment	2022/1/7	688
⑦	Development of Technology for Producing Raw Materials for Plastics Using CO_2 and Other Sources	2022/2/18	1,262
⑧	Development of Technology for Producing Fuel Using CO_2, etc.	2022/4/19	1,152.8
⑨	Development of Technology for Producing Concrete and Cement Using CO_2	2022/1/28	567.8
⑩	Development of Technology for CO_2 Separation, Capture, etc.	2022/5/13	382.3
⑪	Realization of carbon neutrality in the field of waste and resource recycling	TBD	TBD
⑫	Next-generation Storage Battery and Motor Development	2022/4/19	1,510
⑬	Development of in-vehicle computing and simulation technology for energy saving in EV etc.	2022/7/19	420
⑭	Building a smart mobility society	2022/7/19	1,130
⑮	Next-generation Digital Infrastructure Construction	2022/2/25	1,410
⑯	Next-generation Aircraft Development	2021/11/5	210.8
⑰	Next-generation Ship Development	2021/10/26	350
⑱	Development of CO_2 reduction/absorption technology for food, agriculture, forestry and fisheries industries	Reviewing	159.2
⑲	Promotion of carbon recycling using CO_2 as a direct raw material using bio-manufacturing technology	TBD	1,767

**8: NEDO: Green Japan, Green Innovation*

2021. Oct: Cabinet Decision on the 6th Basic Energy Plan

Japan will continue strenuous efforts in its challenge to meet the lofty goal of cutting its emissions by 50%.

**9: METI: The 6th Strategic Energy Plan*

2021. Dec: Prime Minister Kishida's State of the Union Address

"Establishing a Clean Energy Strategy/Realizing over 150 trillion yen in Public-Private GX investments over the next 10 years"

Government Green Transformation (GX) Promotion Subcommittee

2022. May: Interim arrangement

2022. Nov: Progress since interim reorganization

Growth-Oriented Carbon Pricing (CP) Initiative:

Accelerating with Upfront Investment Support GX Economic Transition Bonds" and Measures to Promote Emissions Reduction "Levies (Taxes) and Emissions Trading System"

3. Current status of alternative fuels for each mode of transportation

The current status of each transport mode is shown below.

1. Land (vehicle) transport mode

We recognize that conversion to EVs/FCVs and the use of Synthetic (drop in fuel)/Hydrogen Fuels are necessary investment areas.

Passenger Vehicles: 100% electric vehicles (EV, FCV, PHEV, HV) in new car sales by 2035

Commercial Vehicles: < 8 t > 20～30% electric vehicles in new car sales by 2030
Electric vehicles + vehicles suitable for decarbonization by 2040 100%
< 8 t or more > 2040-year target set by 2030

While electrification will be the driving force in reducing GHG emissions from new vehicles, the continued need for Carbon-Neutral fuel supply for used passenger vehicles and large commercial vehicles will make Drop-In fuel arrangements effective for the time being without any facility changes.

**10: METI: Green Growth Strategy Through Achieving Carbon Neutrality in 2050*

(2021/06/18, 05-Automobile, 11 Carbon recycling)

3-1: Usage Result of Bioethanol

											Clude oil equivalent 10,000kL
	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Result	21.4	21.5	25.5	30.9	40.8	44.1	50.4	49.9	47.9	51.2	53.6

METI: Japan technical review committee for the introduction of biofuels (2022/09/02 6th Meeting excerpt)

To meet the demand for other Drop-In types, the technology development of Synthetic Fuel (Power to Liquid) has started, and the oil company has started R&D in the NEDO GI Fund Project (2 -2 (8)).

**11: Development of technology for improving production yield and utilization technology of synthetic fuels*

2. Maritime Transport Mode

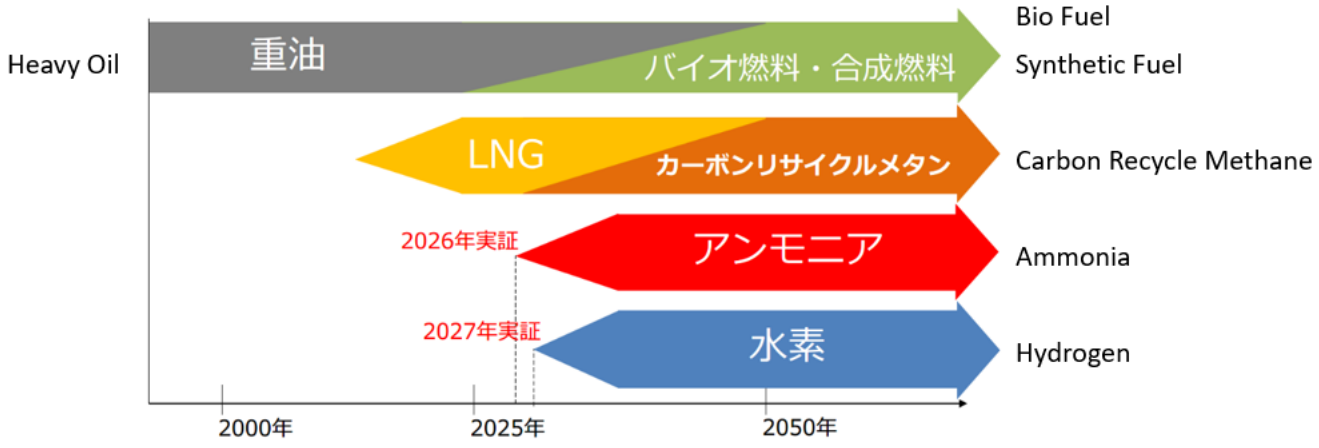
International Maritime Organization (IMO) adopted the following GHG emission reduction strategies in 2018.

- Efforts to improve overall international shipping fuel efficiency by 40% by 2030 and 70% by 2050 (vs 2008)
- Reduce GHG emissions by more than 50% by 2050 (vs 2008)
- Aim for zero GHG emissions as soon as possible this century

The Japanese government has been leading discussions on reduction targets at the IMO since FY2022, aiming to reach an agreement in FY2023, to achieve a 2050 Carbon Neutral international shipping policy.
*12: MLIT: 2022/6/13 PR

Synthetic fuel (Carbon Recycle Methane), Ammonia, and Hydrogen are considered essential for fuel conversion in ships, and for these Zero-Emission ships, new markets are expected to be created in the international shipping sector.

3 -2: Ship fuel conversion image



*13: MLIT: Clean energy strategy Progress from the interim summary (Japanese)

In order to promote the development of these ships' technologies, NEDO GI Fund Project <2 -2 (17)> has started R&D.
*14: Next-generation Ship Development

3. Aviation Transport Mode

At the 41st General Assembly of ICAO (International Civil Aviation Organization) held in September-October 2022, the long-term goal of 2050 decarbonizing the international aviation sector was adopted, and the CORSIA (Carbon Offsetting and Reduction Scheme for International Aviation) standards were also reviewed.

- Use of 2019 emissions as the CORSIA baseline for the pilot phase (2021 -2023)
- Use of *85%* of 2019 emissions as the CORSIA baseline after the pilot phase (2024 -2035)
- Changes to the percentage use of the sectoral and individual operator's growth factors for the calculation of offsetting requirements under CORSIA, as follows:

  2030-2032: 100% sectoral, and 0 % individual

  2033-2035: 85% sectoral and 15% individual

Reducing GHG emissions in international aviation is a more pressing issue as the standards become mandatory for operators starting in 2027.

*15: ICAO ENVIRONMENT: 2022 CORSIA periodic review

To introduce SAF to 10% of fuel consumption in 2030, the Japanese aviation industry needs to develop and commercialize the technology for Domestic SAF (including CORSIA-eligible fuel registration and certification) and build a SAF supply chain16: MLIT: Study Group on CO_2 Reduction in the Field of Aircraft Operations (2022/09/01 5th, Japanese)

METI: Public-Private Council for the Promotion of SAF (2022/04/22 First, Japanese)

Prior to these Needs, NEDO supplied FT Synthesis technology and completed SAF with microalgae to regular domestic flights in the SAF Pilot Project from 2017 to 2021.

We are currently working on the following technology development projects with the aim of implementation through further supply expansion.

In addition, 2 -2: Green Innovation Fund Project (8) will implement the ATJ process technology project.

3-2: Development of technology for producing SAF

Objective: Develop Alcohol-to-JET(ATJ) technology to produce SAF from ethanol as one of the various options for realizing a decarbonized society and the perspective of energy security.

Target: Achieve a liquid fuel yield rate of 50% or higher and a production cost at the 100 yen/L level (ranged from 100 to 199 yen) with the aim of supplying the fuel to aircraft by 2030.

**17: Development of technology for producing SAF*

3-2: NEDO SAF Project①

Project List		Raw Material	Technology	Term	Company in charge
1.	Pilot scale R&D of SAF integrated production process				
①	R&D of neat biojet fuel manufacturing pilot plant by high performance entrained bed gasification and FT synthesis	Wood chips	Gasification, FT synthesis	2017-21	Mitsubishi Heavy Industries, JERA, Toyo Engineering, JAXA
②	Development of integrated process for neat SAF production using fast-growing Botryococcus	MicroAlgae	HEFA	2017-21	IHI
2.	Construction of supply chain model through demonstration				
①	Demonstration of production technologies for SAF derived from Domestic 2nd generation BioEthanol	2G BioEtol	AtJ	2020-22 2022-24	Biomaterial in Tokyo, Sanyu
②	Building a commercial supply chain for SAF and reducing manufacturing costs using UCO processes	UCO, MicroAlgae	HEFA	2020-21	Euglena
③	Demonstration of SAF production by biomass gasification FT synthesis and establishment of supply chain	Construction waste, Wood pellet	Gasification, FT synthesis	2021-24	JERA, MHI, TEC, Itochu
④	Building a commercial supply chain for SAF and reducing manufacturing costs through domestic UCO processes	UCO	HEFA	2021-24	JGC, Revo Int'l, Cosmo
⑤	Demonstration of SAF supply chain model using vegetable oil that does not compete with food	Non-edible plant, UCO	HEFA	2022-24	J-Oil Mills
⑥	Construction of SAF demonstration supply chain model using low-pressure, low-hydrogen-consumption multifunctional catalysts	Non-edible plant	HEFA	2022-24	Green Power Development
3.	Fundamental technology development for MicroAlgae				
①	Demonstration of a next-generation business model for SAF based on cascading use of microalgae biomass	MicroAlgae		2020-22	Euglena, Denso, Itochu, Mitsubishi Chemical
②	Development of open-closed hybrid culture technology for marine diatoms	MicroAlgae		2020-24	J-Power
③	R&D related to construction and long-term large-scale demonstration of a large-scale microalgae culture system that applies power plant exhaust gas and flexible plastic film type photobioreactor technology in an outdoor tropical climate environment	MicroAlgae		2020-24	Chitose
④	Establishment and development of research bases and basic technologies related to the industrialization of microalgae-	MicroAlgae		2020-24	IMAT
4.	Technology development for SAF production [Green Inovation Fund Project]				
①	Development and deployment of ATJ commercial plant using ATJ (Alcohol To Jet) process technology	BioEtoh	AtJ	2022-26	Idemitsu

4. Summary

In the field of alternative fuels for transportation, which is not yet electrified, it is expected that Synthetic Fuels (PtL, Power-to-Liquids) will be implemented in the Market in the future, but it is thought that it will take time to reduce the cost of H_2 production and establish efficient production technology. On the other hand, with the decarbonization of the aviation sector approaching the start of the mandatory ICAO/CORSIA GHG emission limitation in 2027, the early social implementation of SAF is essential and the establishment of a market by around 2030 is urgent.

NEDO and other Japanese R&D institutes need to accelerate their efforts to develop manufacturing technology for SAF using biomass as raw material and are working to reduce GHG emissions and achieve Carbon Neutrality by 2050 under a system aimed at improving the quality and expanding the production of alternative fuels for transportation.

Remarks

*1: Ministry of Finance Balance of Payments (Japanese)
https://www.mof.go.jp/english/policy/international_policy/reference/balance_of_payments/index.htm

*2: Agency for Natural Resources and Energy Japan energy issues (Japanese)
https://www.enecho.meti.go.jp/about/special/johoteikyo/energyissue2021_1.html?ui_medium=lpene

*3: Agency for Natural Resources and Energy Energy White Paper 2022 (Japanese)
https://www.enecho.meti.go.jp/about/whitepaper/2022/html/2-1-3.html

*4: The Japan Automobile Dealers Association compiled monthly statistical data excluding minicars (Japanese).
http://www.jada.or.jp/data/month/

*5: Excerpt from the production of four-wheeled vehicles by the Japan Automobile Manufacturers Association (Japanese)
https://www.jama.or.jp/statistics/facts/four_wheeled/index.html

*6: METI Public-Private Council to Promote SAF Introduction (2022/04/22 Part 1, Japanese)
https://www.meti.go.jp/shingikai/energy_environment/saf/001.html

*7: METI Green Growth Strategy
https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html

*8: NEDO Green Japan, Green Innovation
https://green-innovation.nedo.go.jp/en/

*9: METI The 6th Strategic Energy Plan
https://www.enecho.meti.go.jp/category/others/basic_plan/pdf/strategic_energy_plan.pdf

*10: METI Green Growth Strategy Through Achieving Carbon Neutrality in 2050 (2021/06/18, 05-Automobile, 11-Carbon recycling)
https://www.meti.go.jp/english/policy/energy_environment/global_warming/ggs2050/index.html

*11: Development of technology for improving production yield and utilization technology of synthetic fuels
https://green-innovation.nedo.go.jp/en/project/development-fuel-manufacturing-technology-co2/

*12: MLIT 2022/6/13 PR (Japanese)
https://www.mlit.go.jp/report/press/kaiji07_hh_000238.html

*13: MLIT Clean energy strategy Progress from the interim summary (Japanese)
https://www.meti.go.jp/shingikai/sankoshin/sangyo_gijutsu/green_transformation/010.html

*14: Next-generation Ship Development
https://green-innovation.nedo.go.jp/en/project/development-next-generation-vessels/

*15: ICAO ENVIRONMENT 2022 CORSIA periodic review
https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-and-Covid-19.aspx

*16: MLIT Study Group on CO2 Reduction in the Field of Aircraft Operations (2022/09/01 Part 5, Japanese)
https://www.mlit.go.jp/koku/koku_tk8_000004.html

*17: Development of technology for producing SAF
https://green-innovation.nedo.go.jp/en/project/development-fuel-manufacturing-technology-co2/

In the News

Reports and Research

- June – Sustainable biomass supplies can contribute 20–30% of the future global and European energy supply, leading to reduced overall mitigation costs, including realizing the net CO2 removal from the atmosphere using BECCS concepts. Specific options, pathways, and preconditions are key to achieving such a substantial contribution of sustainable biomass in future (2050) energy and material supply (with a focus on the European setting) (Read more).

Policy and Regulatory Developments

- July – The European Parliament has taken a positive step on EU renewable energy policy. The Committee on Industry, Research and Energy (ITRE) has decisively voted in favor of increasing the ambition for GHG emissions reduction in transport while leaving Member States free to use crop-based biofuels in their transport energy mix (Read more).
- July – Strategic Biofuels, the leader in developing negative carbon footprint renewable fuels plants, announced that the State of Louisiana has enhanced its nation-leading carbon capture and sequestration (CCS) legislation with provisions that provide additional carbon dioxide (CO2) reservoir storage security for projects in Caldwell Parish, the site of Strategic Biofuels' Louisiana Green Fuels project (Read more).
- July – The U.K. government on July 19 released its Jet Zero strategy. The initiative, in part, requires at least 10 percent sustainable aviation fuel (SAF) use by 2030. It also aims to kickstart a domestic SAF industry, supported by a new £165 million ($197.91 million) Advanced Fuels Fund (Read more).
- July – The government of India on July 4 announced it is expanding the excise duty exemption on ethanol and biodiesel to encourage higher biofuel blends, according to a notice published by the Ministry of Finance (Read more).
- August – The U.S. Senate passed the Inflation Reduction Act of 2022. The bill includes a wide range of provisions benefiting the biofuel and bioenergy industries, including a new tax credit for sustainable aviation fuel (SAF), a new technology-neutral tax credit for clean transportation fuels, and a new tax credit for clean hydrogen production (Read more).
- September – The European Parliament stressed the need for renewable energy to be increasingly used and energy consumption to be drastically slashed by 2030 during an historic vote. MEPs voted on September 14 to raise the share of renewables in the EU's final energy consumption to 45% by 2030, under the revision of the Renewable Energy Directive (RED) -a target also backed by the European Commission under its *RepowerEU* package (Read more).
- September – The UK government has revealed the Emissions Trading Scheme (UK ETS) will align its measurement of the environmental credentials of sustainable aviation fuels (SAFs) with sustainability rules that underpin the UK's biofuels policy until 2025 (Read more).
- September – the U.S Department of Energy announced a $46 million award for 22 projects to decarbonize the transportation and generation sectors. The projects will develop waste conversion and carbon capture technologies to produce fuels from biomass and waste streams, and enable algal systems to capture carbon and turn it into alternative clean energy sources (Read more).
- October – The European Parliament has adopted its position on European-wide rules to decarbonise the shipping sector with FuelEU Maritime (Read more).
- November – The EU Parliament and council reached a provisional agreement on revised carbon emissions reduction targets for new passenger cars and light commercial vehicles (Read more).

- November – The UK government has agreed with the Trade Remedies Authority's recommendation on anti-dumping and countervailing measures on imports of Biodiesel from the USA and Canada. It has also accepted the recommendation on anti-dumping measures on imports of Wire Rod from China (Read more).
- December – The EU Agricultural Outlook for Markets, Income and Environment 2022-2032, published by the Commission's DG for Agriculture and Rural Development, forecasts that demand for renewable ethanol will increase to 7.7 billion litres per year in 2030 before levelling out and decreasing slightly to 7.4 billion litres per year in 2032 (Read more).
- December – The International Air Transport Association (IATA) estimates that sustainable aviation fuel (SAF) production will reach at least 300 million litres by the end of the year — a 200% increase on last year's production of 100 million litres (Read more)
- December – Biodiesel, renewable diesel and sustainable aviation fuel (SAF) producers are headed for a feedstock supply crunch during 2022-2027 if current trends do not change, the International Energy Agency (IEA) revealed (Read more).

Industry Developments

- July – In Finland, Neste, MAN and Altens signed a partnership contract aimed at promoting biofuels in France. France is a strong market for biodiesel and FAME, but many OEMs would like to see more renewable diesel, HVO100, on the market. The objective of this partnership is to promote the common vision of Neste, MAN and Altens of the crucial role that biofuels can and must play in the sustainability transformation of the transportation of goods and people (Read more).
- August – In the UK, Imperial College London is establishing a ground-breaking research institute dedicated to developing clean, safe, and sustainable air-travel. Supported by a £25 million (€30 million) philanthropic donation, the Brahmal Vasudevan Institute for Sustainable Aviation will pioneer the breakthroughs and technologies needed to support the aviation industry's transition to zero pollution (Read more).
- August – Fulcrum Bioenergy, a clean energy company pioneering the creation of renewable, drop-in transportation fuels from landfill waste, have announced that it has completed a $20 million equity investment in Fulcrum by SK Innovation, the energy arm of South Korea's SK Group. In addition, Fulcrum and SK Innovation will work together to enter into an exclusive licensing agreement providing the opportunity to explore the possibilities of bringing Fulcrum's patented and proprietary waste-to-fuel process to South Korea and select countries in Asia (Read more).
- August – Strategic Biofuels, the leader in developing negative carbon footprint renewable fuels plants, announced today that the Port of Columbia, home to the Louisiana Green Fuels project (LGF) has been awarded a $1 million grant from the Department of Homeland Security and FEMA through its Port Security Grant Program. The PSGP is part of a series of grant programs created by Congress and implemented by DHS to help strengthen defenses around the nation's critical infrastructure (Read more).
- September – Canadian company Anaergia has signed an agreement with European Energy. Under the terms of this agreement Anaergia is to supply European Energy with up to 60,000 tonnes per year of liquefied biogenic Carbon Dioxide for a period of 10 years (Read more).
- September – In the United States (US), renewable natural gas (RNG) and renewable fuels company Aemetis Inc., has announced that it has finalized US$7 billion worth of sustainable aviation fuel (SAF) and renewable diesel (RD) supply agreements. The supply contracts cover 100 percent of Aemetis Riverbank plant production capacity for up to 10 years (Read more).

- September – In Brazil, Shell, Raízen, Hytron, USP and SENAI Form a Partnership to Convert Ethanol Into Renewable Hydrogen. First of its kind in the world, the agreement includes the construction of two plants that will produce hydrogen from ethanol and a fueling station for buses that circulate around the University of São Paulo (USP) campus, in São Paulo (Read more).
- October – Italy-headed oil and gas major Eni S.p.A. has revealed that it is investigating the possibility to build a third biorefinery, this time at its industrial site in Livorno (Read more).
- October – TEBO Group of Industries and the University of British Columbia (UBC) have started a new research partnership aimed at driving highly sustainable and carbon-efficient construction and infrastructure technology (Read more).
- October – Honeywell (NASDAQ: HON) announced a new, innovative ethanol-to-jet fuel (ETJ) processing technology that allows producers to convert corn-based, cellulosic, or sugar-based ethanol into sustainable aviation fuel (SAF). Depending on the type of ethanol feedstock used, jet fuel produced from Honeywell's ethanol-to-jet fuel process can reduce greenhouse gas (GHG) emissions by 80% on a total lifecycle basis, compared to petroleum-based jet fuel (Read more).
- November – DHL Global Forwarding, the air and ocean freight specialist of Deutsche Post DHL Group, and GoodShipping have expanded their long-standing partnership with the purchase of 60 million litres of sustainable marine fuel 8R (Read more).
- November – Ryanair, Europe's largest airline and global energy group, Shell, today (Thurs 1 Dec.) signed a Memo of Understanding (MOU) to advance the supply of sustainable aviation fuel (SAF) at over 200 Ryanair airports across Europe, with particular focus on SAF supply at RYR's largest bases like Dublin and London Stansted (Read more).
- December – Neste is helping the data centre specialist LCL make a switch to renewable energy sources for its emergency power generators by providing the company with Neste MY Renewable Diesel™ (Read more).
- December – All Nippon Airways (ANA) and the Japan Overseas Infrastructure Investment Corporation for Transport and Urban Development (JOIN) have signed a memorandum of understanding to cooperate on initiatives aimed at manufacturing and procuring sustainable aviation fuel (SAF) (Read more).

Upcoming Meetings, Conferences & Webinars

7th Central European Biomass Conference 18 - 20 Jan 2023, Graz, Austria
https://www.cebc.at/7_mitteleuropaeische_biomassekonferenz_cebc_2023?_lang=englisch
The Austrian Biomass Association, the Styrian Chamber of Agriculture and BEST - Bioenergy and Sustainable Technologies GmbH are hosting the 7th Central European Biomass Conference CEBC2023 in cooperation with Messe Congress Graz from 18th to 20th of January, 2023.

20th International Conference on Renewable Mobility 'Fuels of the Future' 23 - 24 Jan 2023, Berlin, Germany
https://www.fuels-of-the-future.com/en
The aim of the **International Conference** is to provide participants with an up-to-date status report on the many different legislative initiatives and to discuss corresponding recommendations for action, to present current market developments and project examples of renewable mobility, and to provide a broad platform for the exchange of experience.

Nordic Pellets Conference (NPC), 1-2 February, 2023, Gothenburg, Sweden
https://www.svebio.se/evenemang/nordic-pellets-conference-2023/

The Swedish Bioenergy Association (SVEBIO), the Swedish Pellets Association (PelletsFörbundet) and Bioenergy International welcomes participants on-site to Nordic Pellets Conference 1-2 February 2023 in Gothenburg, Sweden.

Program: Market situation and policy development, development in production of pellets, pellets use in industry, Sourcing, storage and trade, pellets use in residential sector – boilers and stoves, and sustainability, biodiversity, climate, and emissions.

Lignofuels 2023 8-9 Feb, 2023, Helsinki, Finland
https://www.wplgroup.com/aci/event/lignocellulosic-fuel-conference-europe/

Returning for its 12th edition next year, Lignofuels 2023 live conference will not only give the participants an insight on the current challenges and opportunities from the industry, but will also provide updates and future forecasts on the latest industry's technology trends. It will feature numerous interactive sessions, presentations and case studies from key industry players and provide excellent live networking opportunities with your senior level peers, including leaders from advanced generation biofuels companies from across the globe.

Advanced Biofuels Conference (ABC) 20-21 September, 2023, Gothenburg, Sweden
https://www.svebio.se/evenemang/advanced-biofuels-conference-2023/

The Swedish Bioenergy Association (SVEBIO) and Bioenergy International welcomes participants, online and on-site, to its 9th edition of Advanced Biofuels Conference 2023 in Gothenburg, Sweden. To be held as a hybrid event – with both online and on-site participation.

This conference gathers leading actors and stakeholders in the global biofuels industry. This is where you gain insights and meet market players and people active to develop new projects. The conference will show latest developments in European and international policy, energy system transition to renewable fuels, new technologies and partnerships – with leading companies presented.

USGC Global Ethanol Summit, 16-18 October, 2023, Washington DC, USA
https://grains.org/event/october-16-18-2023-global-ethanol-summit/

US Grains Council will be hosting their biannual Global Ethanol Summit. Previous summits have been organised as meetings for Minister level officials and senior level industry leaders, ethanol producers, and refiners across global ethanol markets. The Summit engages some 350 participant leaders about the benefits of creating or expanding ethanol policies with a role for trade. The Summit features informative general sessions, networking, and dedicated trade time, the Global Ethanol Summit is the leading opportunity to hear from thought leaders on the future of global ethanol use and to build partnerships with industry leaders.