Diversity in Carbon Neutrality

-Accelerating Decarbonization with Sustainable Fuels -

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Chair, Fuel & Lubricants Subcommittee

Who We Are?

- JAMA (**J**apan **A**utomobile **M**anufacturers **A**ssociation, Inc.) is a non-profit industry **association comprising Japan's 14 manufacturers** of passenger cars, trucks, buses and motorcycles.

Established	April 3, 1967
Our Objective	• To promote the sound development of the automobile industry and contribute to social and economic welfare.
Our Activities	• Conducts studies and surveys related to automobile production, distribution, trade and use. • Assists in the rationalization of automobile production, and helps establish policy for the development, improvement and promotion of production technology. • Establishes and promotes policies related to automobile trade and international exchange. • Carries out other activities involved in meeting its organizational objectives.
Member Companies	DAIHATSU, HINO, HONDA, ISUZU, Kawasaki Let the Good Times Roll, mazda, MITSUBISHI MOTORS, FUSO, NISSAN MOTOR CORPORATION, SUBARU, SUZUKI, TOYOTA, UD TRUCKS, YAMAHA

JAMA Stance on Carbon Neutrality

JAMA Member Companies will Make Maximum Efforts towards Carbon Neutrality by 2050.

JAMA Stance

JAMA member companies, together with their global stakeholders, will make maximum efforts towards carbon neutrality by 2050 by developing technologies to further reduce automotive CO_2 emissions so that they can provide optimal choices for consumers in countries/regions worldwide.

- The goal is carbon neutrality (CN).

  Approaches to achieving CN should be technology-neutral.

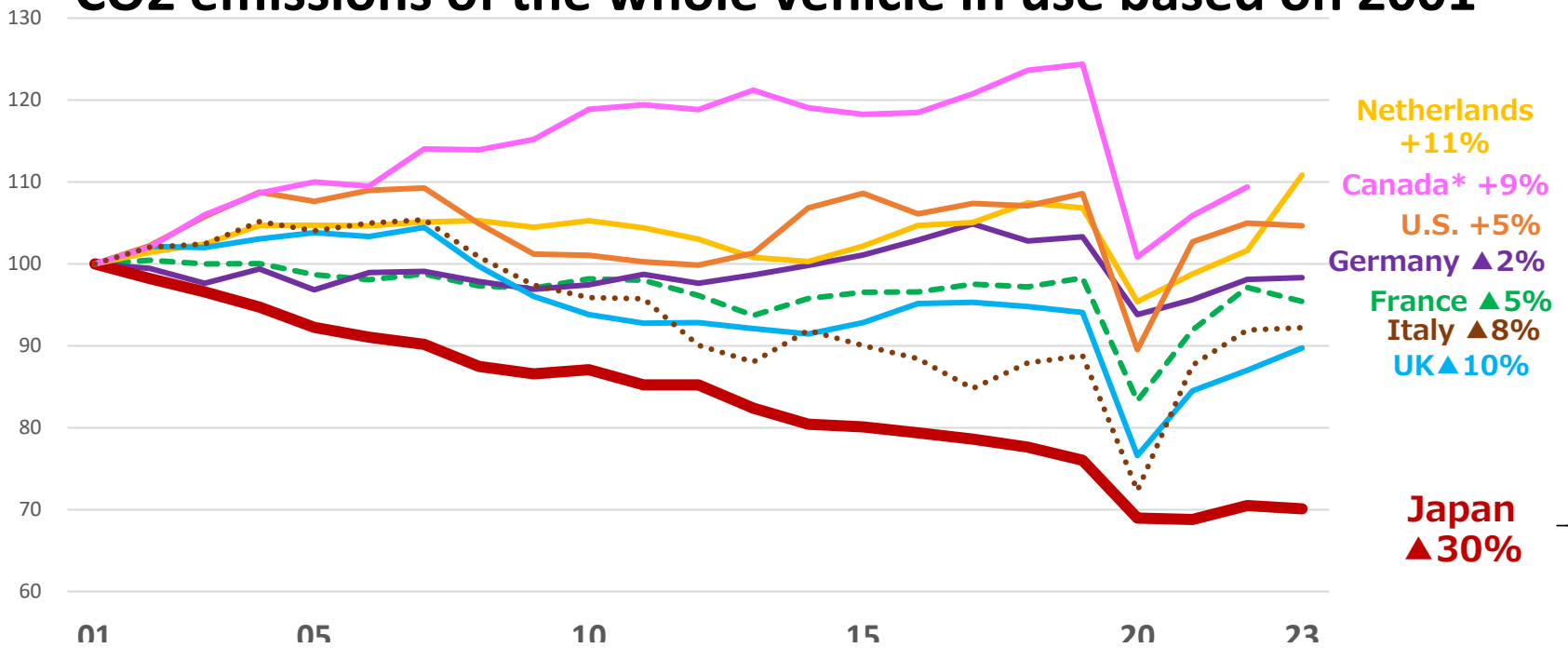
  ➡ **A diversity of options is crucial to achieving our goals.**

- There are optimal pathways to CN for individual economies.

CO2 emissions from road transport sector in Japan

- CO2 emissions in Japan's road transport sector have declined significantly (-30%) since 2001. Limited rebound after the COVID-19 pandemic.
- Relying solely on fuel efficiency is insufficient. A "Four-Pillar" integrated approach is essential to balance CO2 reduction with industrial and social needs.

CO2 emissions of the whole vehicle in use based on 2001

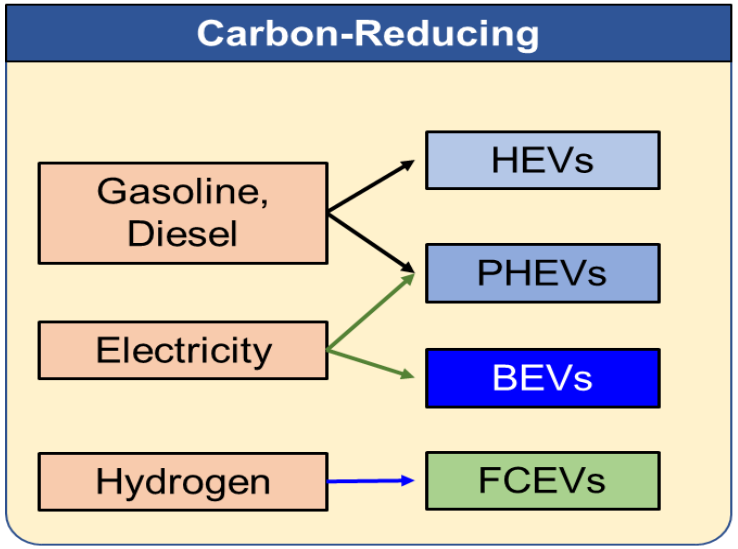


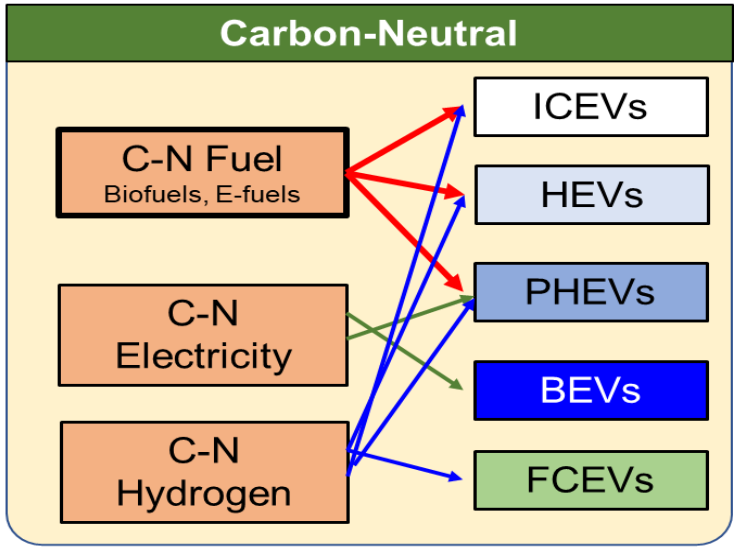
Integrated approach
(four pillars)

- Fuel-efficient vehicles : automotive industry
- Diversification of fuels : Fuel industry
- Efficient driving : Users
- Improving traffic flow : Government

Importance of carbon neutral energy

- It is **important to use carbon-neutral energy**, not only type of vehicle.
- **Sustainable Fuel** is one of the **promising options** for achieving carbon-neutral society.
- The rapid adoption and use of carbon-neutral fuels is desired to **prevent the decline of valuable existing fuel infrastructure and ICE development**, and to **reduce CO2 from the existing vehicle stock.**



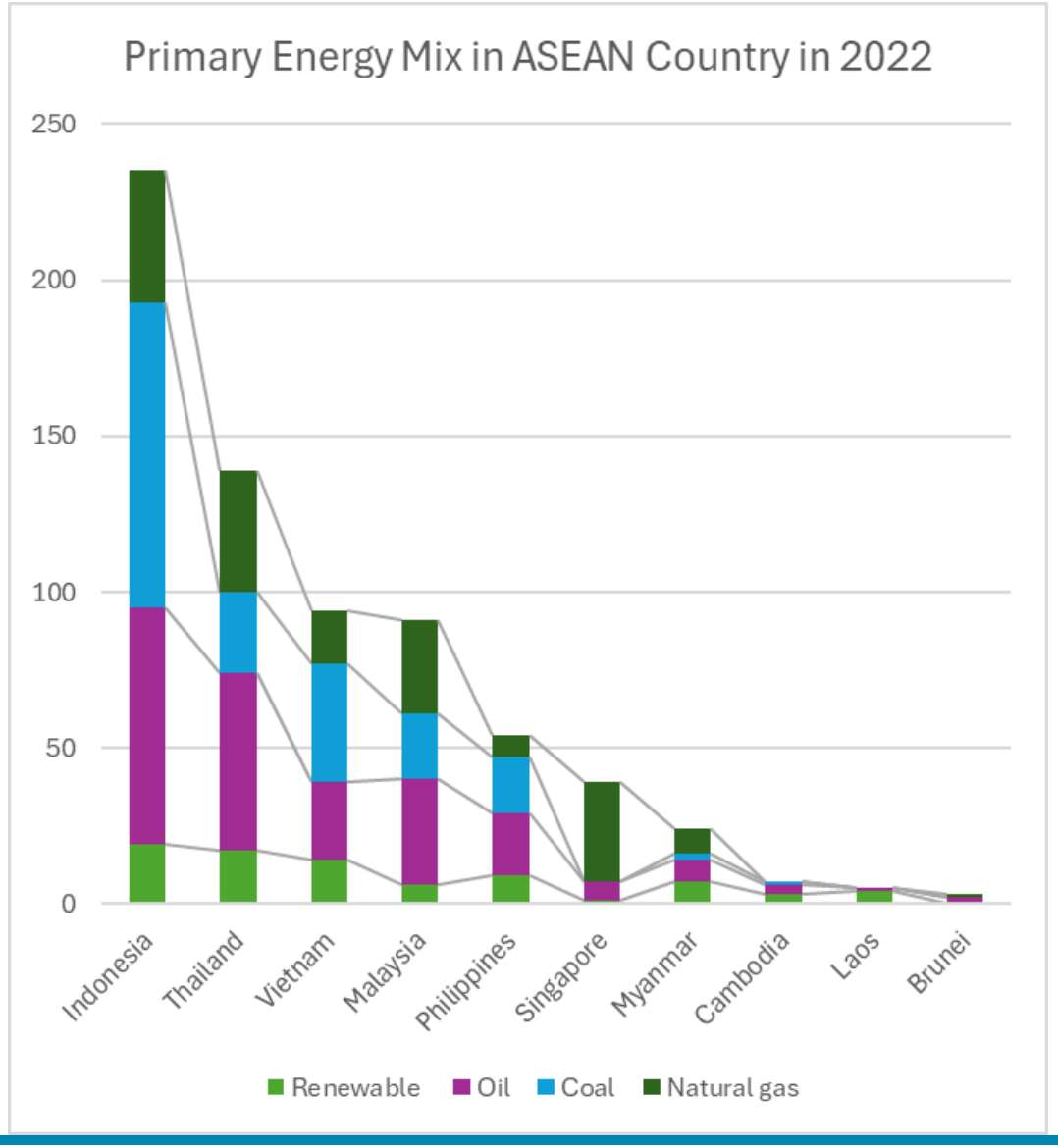


HEV: Hybrid Electric Vehicles
PHVs: Plug-in Hybrid Vehicles
BEV: Battery Electric Vehicles
FCEV: Fuel Cell Electric Vehicles

ICE: internal combustion engine

The mix of the primary energy in ASEAN

- **Current Mix (2022)**: The table on the right shows primary energy sources for each ASEAN nation.
- **Renewable Share**: Renewables currently account for 13% of total energy in ASEAN.
- **Paths to 100%:** Considering diverse national circumstances, what is the optimal path to 100% renewable energy?
- **Carbon-Neutral Mobility**: Electricity, liquid fuels, hydrogen, and methane gas can all be derived from renewable sources.
- **Agricultural Potential**: ASEAN's equatorial location ensures high yields for biomass and agricultural products.



Benefits of using bio-based resources/Required actions

1 Improvement of Air Quality

- Need to reduce GHG emissions and PM/PN

2 Utilization of Domestic Resources

- Need to upgrade domestic industry

3 Transition Away from Reliance on Fossil Fuel

- Need to move away from dependence on crude oil imports

4 Pursuing Nature Positive (NP)

- Utilize biofuels as sustainable energy, based on the latest scientific knowledge, to address negative impacts (e.g., ILUC and competition with food) while aiming for richer, healthier natural environments.

5 Building an optimal value chain

- A comprehensive approach across the entire value chain—from crop production through fuel consumption—and corresponding government policies and support are required.

NP : An international goal to halt nature loss by 2030 and restore it by 2050.

Biofuel Policies in the ASEAN Transport Sector

- **Cost-Effectiveness**: Biofuels can be used in Internal Combustion Engine (ICE) vehicles, which are more affordable than EVs.
- **Agricultural Growth**: As fuel demand continues to rise in ASEAN, biofuel production will significantly promote the agricultural sector.
- **Strategic Import Partner**: Japan currently imports ethanol from the US and Brazil but seeks to import from ASEAN to minimize transportation costs.

	Current Policies	Future
Indonesia	E5	E10 (mandatory, 2028)
Malaysia	Non	E10 (under consideration)
Thailand	E10, E20, E85	E20 (promotion)
Philippines	E10 (mandatory, nationwide)	E20 (voluntary)
Vietnam	E5 (mandatory)	E10 (mandatory, 2026)

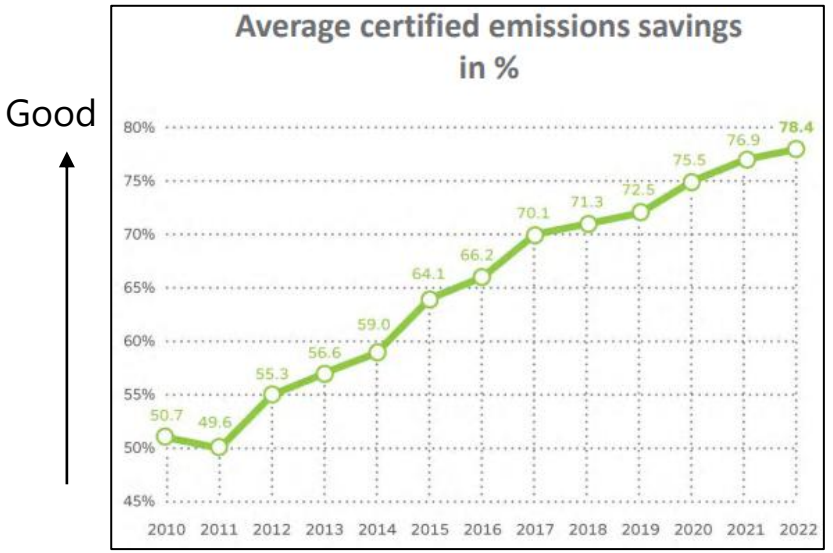
	Current Policies	Future
Singapore	Non	Non
Brunei	Non	Non
Cambodia	Non	Under consideration
Laos	Non	Under consideration
Myanmar	Non	Under consideration

Promotion of Higher Blend Ratios in E10/E20 Implementing Countries

- **Higher Blend Ratios:** For countries that have already introduced E10/E20, we propose moving toward **higher blends, such as E85**, to further reduce CO_2.
- **Continuous CI Reduction:** Focus on further **reducing the Carbon Intensity** of biofuels themselves for the future.
- **Synergy with Synthetic Fuels:** Combining biofuels with **synthetic fuels** is also crucial.
- **Countries that have not introduced ethanol:** should **consider the possibility** of doing so.

Biofuels	GHG reduction rate	
E85	60 ～ 67% (Sugarcane, Sugar beet)	Flex Fuel Vehicle
E100	48 ～ 69% (Corn)	
E100	70% (Sugarcane)	
E20	14% (Sugarcane)	Gasoline Vehicle
FT Synthetic Fuel	82 ～ 85%	
B10	9% (UCO: Used cooking oil)	Diesel Vehicle
HVO100	65 ～ 83% (Sunflower、UCO)	

Renewable ethanol: GHG emission savings



Cooperation with Malaysia and Indonesia

- Since the 2010s, JAMA has **conducted joint research** with the governments of Malaysia and Indonesia and with the automotive associations (MAA, GAIKINDO) to study the introduction of FAME.
- With Indonesia, we are currently carrying out joint activities on the introduction of high FAME content diesel fuel and bioethanol as part of a bilateral policy dialogue (**Biofuel Co-creation TF**).
- We **would like to collaborate with governments and automotive associations** in various countries on CNFs (biofuels and synthetic fuels).

FAME: **F**atty **A**cid **M**ethyl **E**ter (Biodiesel fuel)
B: Biodiesel fuel(FAME) e.g. B10; 10%FAME Diesel fuel
E: Bio Ethanol e.g. E10; 10%Ethanol Gasoline

	2015 - 2020	2021	2022	2023	2024	2025	2026
Malaysia	B10, B20, B30 Test w/MPOB						
Indonesia	B20, B30 Test w/MOE						
				B40 Test w/MOI, MOE		B50 w/MOI, MOE	
					E10 w/MOI, MOE		

Bilateral policy dialogue
Biofuel Co-creation TF

Summary of presentation

- Biofuels have benefits for;
  - ① Enhance Energy Security (Reduction of oil imports)
  - ② Utilize domestic resources and promote agriculture
  - ③ Create employment in the manufacturing sector
- E10 and E20 are already implemented in several ASEAN countries.
  - ➡ Next steps: Expanding countries and further reduce CO2 emissions.
- Expanding the use of biofuels requires comprehensive efforts across the entire supply chain and government support.
- Feedstocks vary by country;
  - ➡ Let’s discuss standardization to facilitate the mutual utilization of biofuels within ASEAN.
- Leveraging ASEAN’s renewable electricity (solar) and biomass waste, we should also explore the potential of synthetic fuels.
- Japan relies heavily on imports biofuels
  - ➡ Importing from ASEAN offers a clear advantage in reducing transportation costs.
- If you are interested in biofuel adoption, we invite you to contact us for collaboration on technology, policy, and institutional frameworks.

Thank you very much for your attention

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