

Japan's Policy for Reducing GHG in Mobility Sector

METI, Japan

2018. Apr.

1.CO2 Emission and Energy Consumption of Transportation Sector in Japan

2.Policy Target and Concept

3.Policy for Improving Entire Fuel Economy

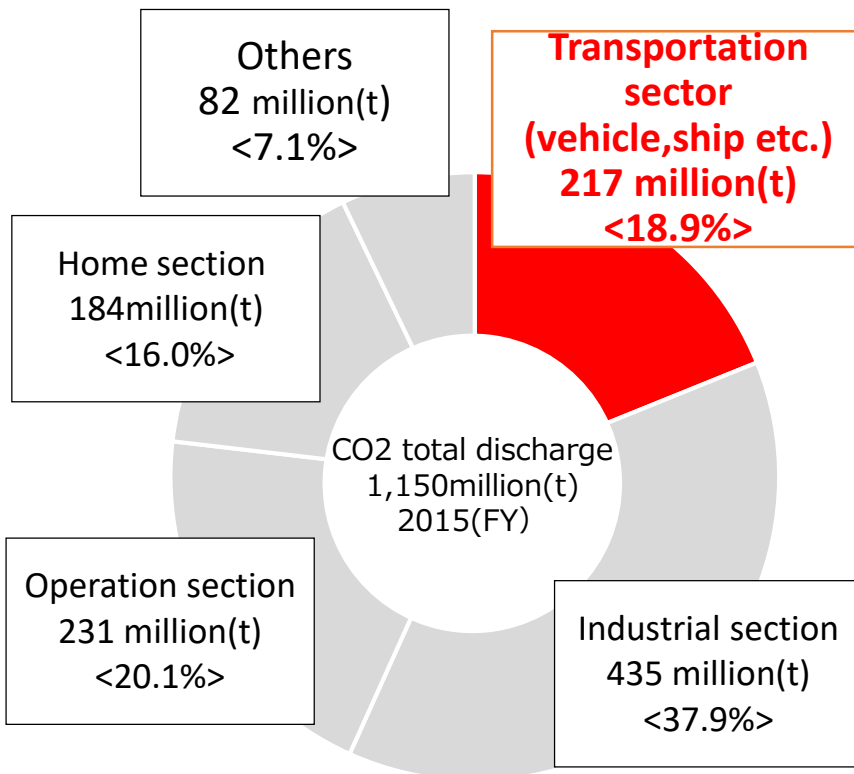
4.Policy Support for Penetration of ZEV

5.Next Step

Reducing CO2 emission from transportation sector is essential for achieving Japan's INDC

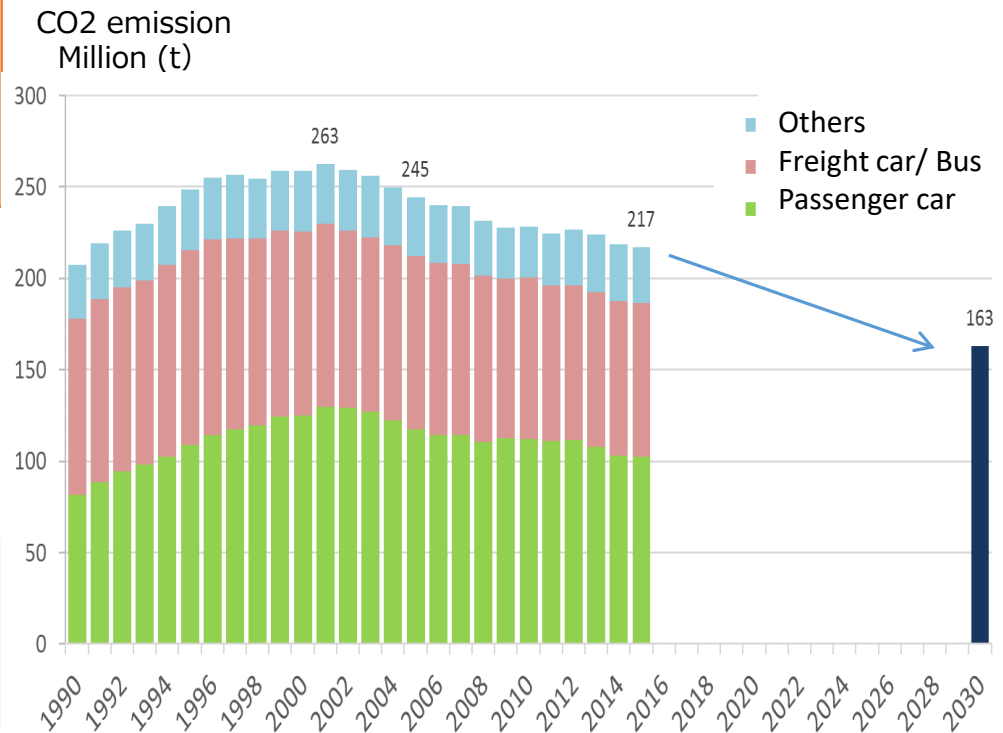
- Transportation sector contributes to entire CO2 emission by 19% in Japan.
- It is planned to be **reduced by 25% in 2030**. Comprehensive measures including ambitious fuel economy regulation is needed.

CO2 emission (2015)



Source: Joint Meeting (METI's committee and MOE's council)(2018)

Trend of CO2 emission in transportation sector

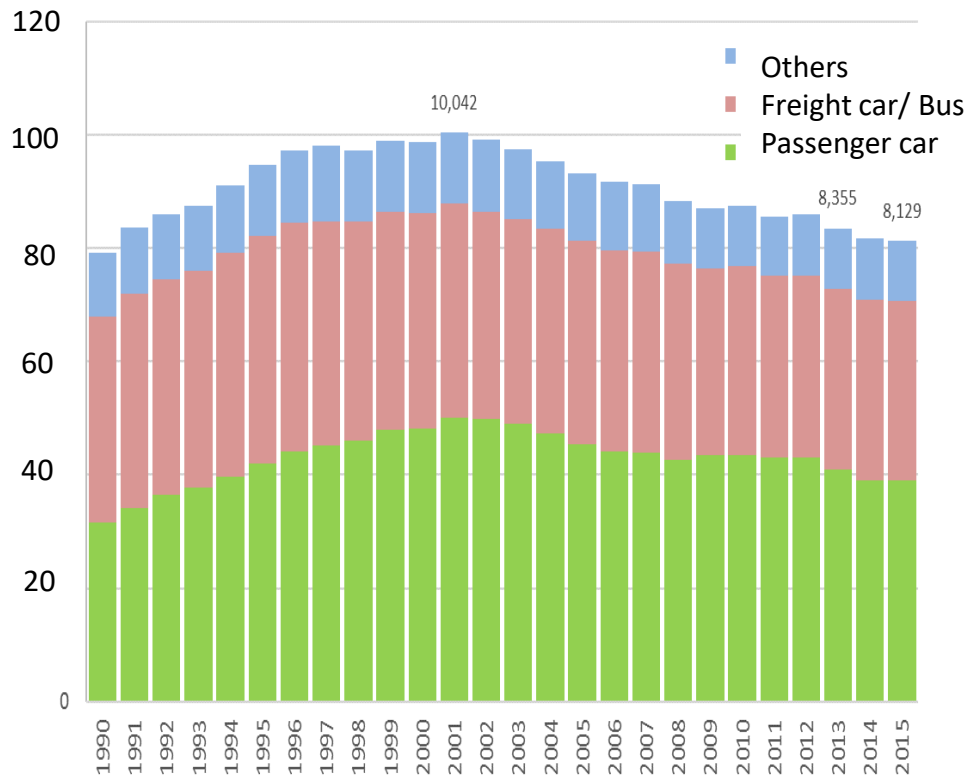


Source : METI (ANRE)
Joint council's material by METI and MLIT

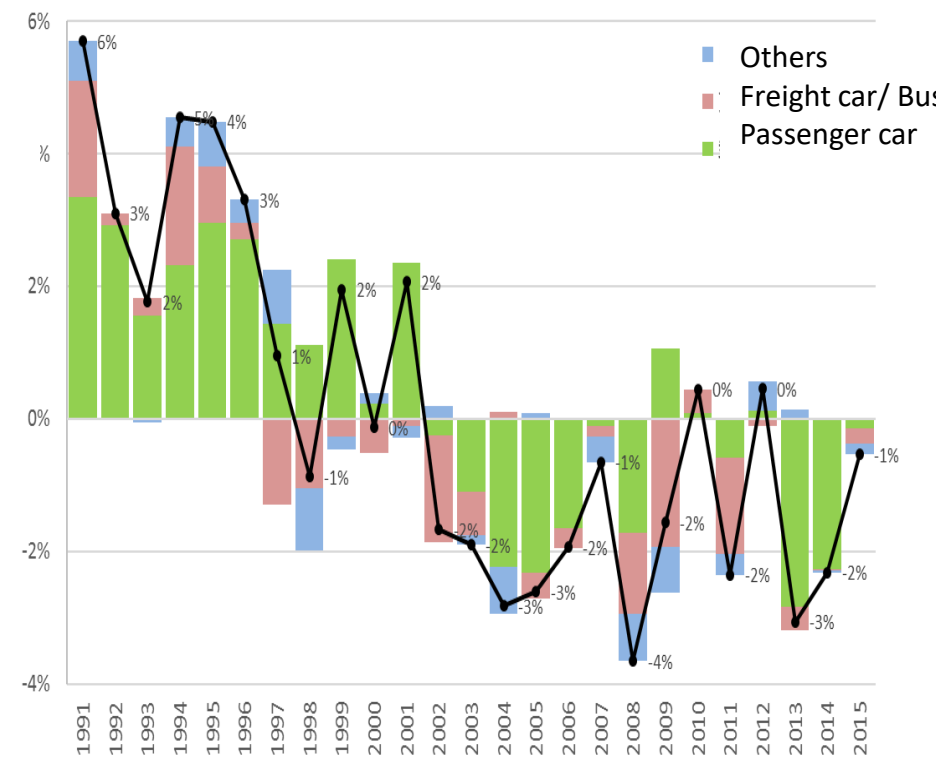
(Reference) Trend of Energy Consumption in Transportation sector

- Half of energy consumption is from commercial vehicle.
- Consumption from passenger car started decreasing after 2001.

Crude oil equivalent (Million kL)



(year-to-comparison)



Source : METI (ANRE)
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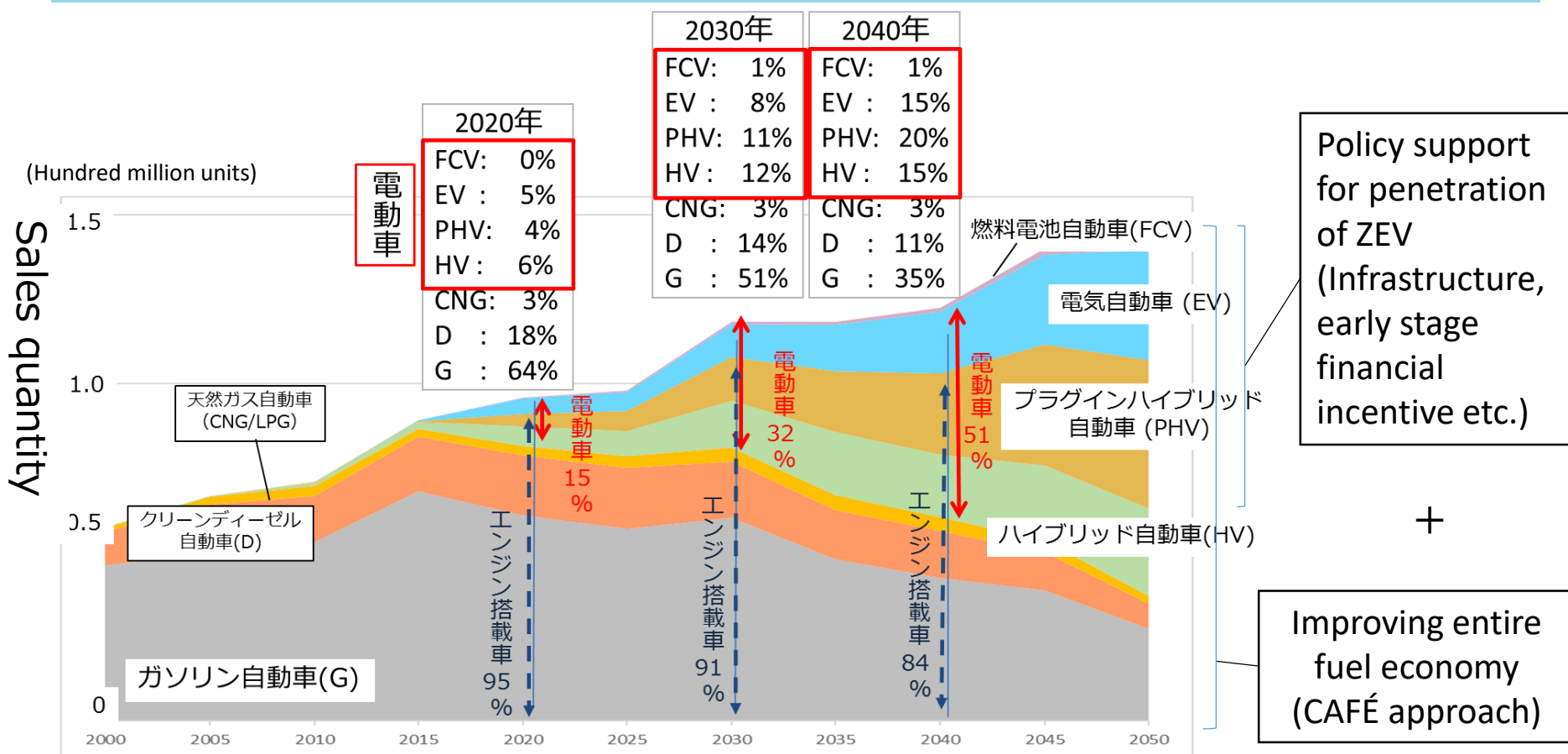
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Balanced Policy Mix and Technological Neutrality are Important for Reducing entire CO2

- Even in 2DS scenario, 91% of automobiles are with combustion engine in the world in 2030. Balanced policy mix of **improving entire fuel economy** and **policy support for penetration of ZEV** is important.
- For promoting OEMs' effort for developing technologies based on each OEMs' strength, **technological neutrality** is important. Mandating specific % of EV sales or supply could harm innovation and consumer benefit.

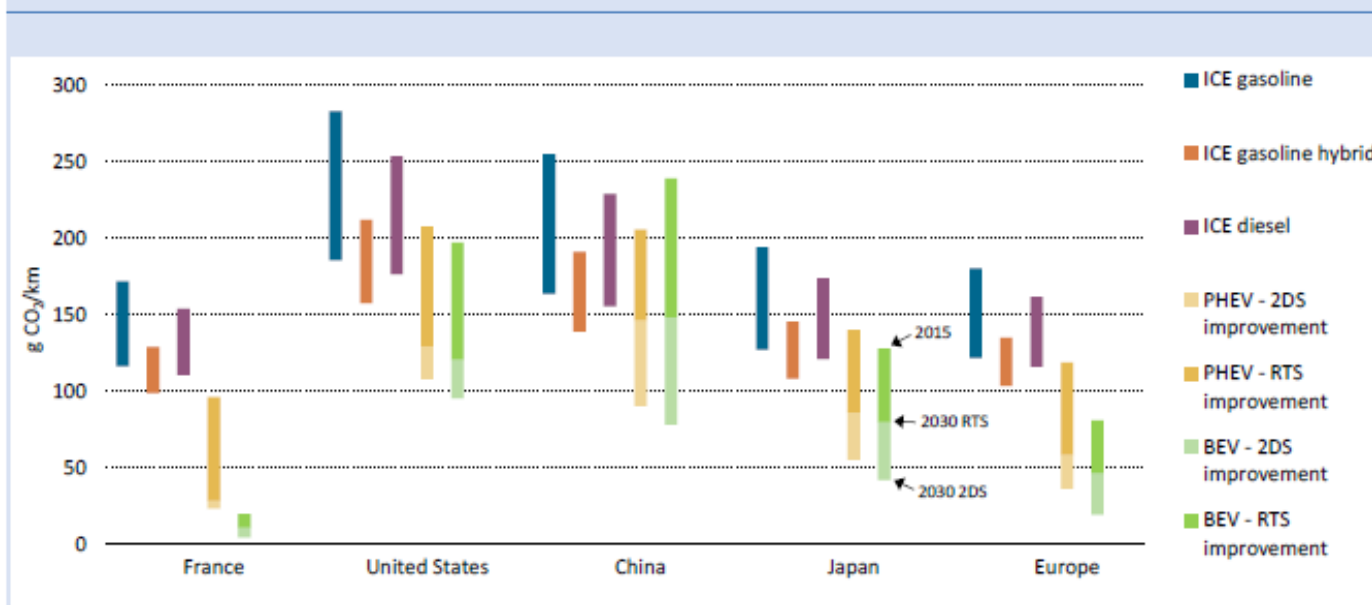


Source: IEA 「ETP(Energy Technology Perspectives) 2017」

Reducing “Well to Wheel” Emission

- “Well to wheel” emission differs among countries with different generation mix.
- For reducing “well to wheel” emission, energy policy for promoting zero emission power generation is needed.
- In order for consumer to choose based on “well to wheel” emission, how to express fuel economy needs to be discussed.

Figure 10 • On-road well-to-wheel CO₂ emissions for PLDV for various powertrain technologies by country or region: RTS and 2DS, 2015 to 2030



Source: Global IEA
EV Outlook 2017

Japan Set Ambitious Policy Target in 2030

- Japan set ambitious policy target of next generation cars' penetration in 2030.
※These are not regulatory requirement for car makers.
- While HEV has achieved target successfully already, achieving EV/PHV target of 20-30% and FCV target is a big challenge. Strong policy initiative is needed.

	2017	2030
Conventional cars	63.97%	30~50%
Next generation cars	36.02%	50~70%
HEV	31.2%	30~40%
EV PHV	0.41% 0.82%	20~30%
Fuel Cell Vehicle	0.02%	~3%
Clean Diezel Vehicle	3.52%	5~10%

«Reference»
New car passenger car unit sales:
4.386 million (2017)

【Sources】
Next Generation Vehicle Strategy 2010
Automotive Industry Strategy 2014

「EV・PHV Roadmap」(Mar, 23rd, 2016,)

- EV・PHV stocks target
 - **1 Million EV/PHV stocks by 2020**

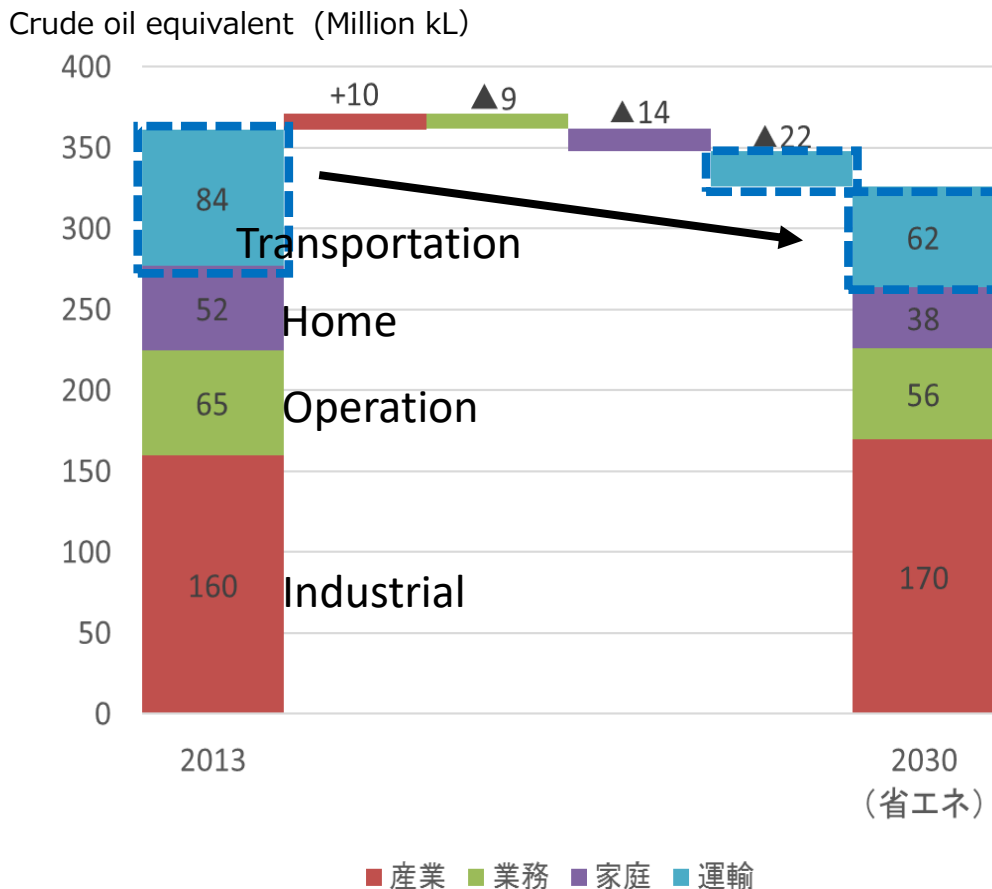
「Hydrogen / Fuel Cell Strategy Roadmap (March 22, 2016)」

- FCV stocks target
 - Spread of about 40 thousand FCVs by 2020, about 200 thousand ones by 2025, about 800 thousand ones by 2030."
- Dissemination policy of Hydrogen infrastructure
 - About 160 places" by 2020 and "320 places" by 2025 will be installed.

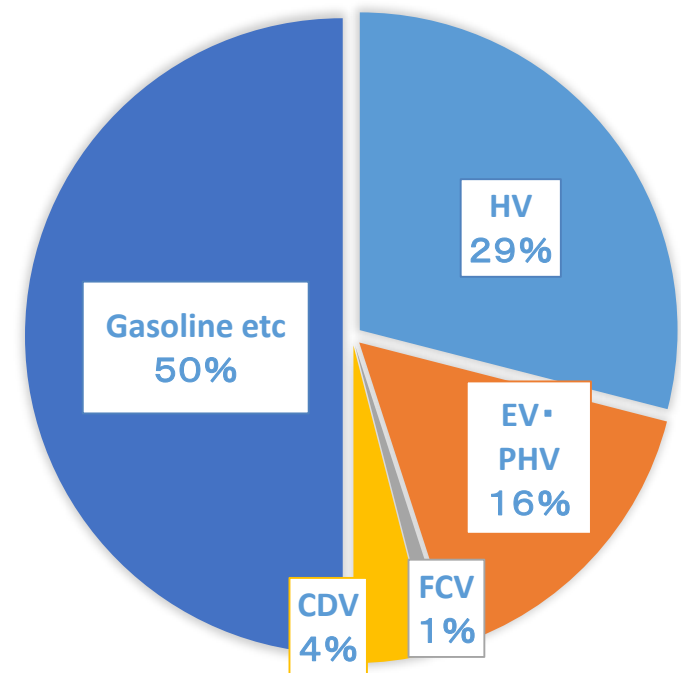
By achieving 2030 target, energy consumption from transportation sector will be cut by 26% in Japan

- By achieving 2030 target of next generation cars, half of automobiles in Japan will be replaced by next generation cars in 2030.
- Energy consumption from transportation will be reduced by 26% in 2030.

Prospect of Supply and Demand of Energy



Prospect of Each car category's stock ratio in 2030(FY)



Source : relevant material of [Long-term Prospect of Supply and Demand of Energy]

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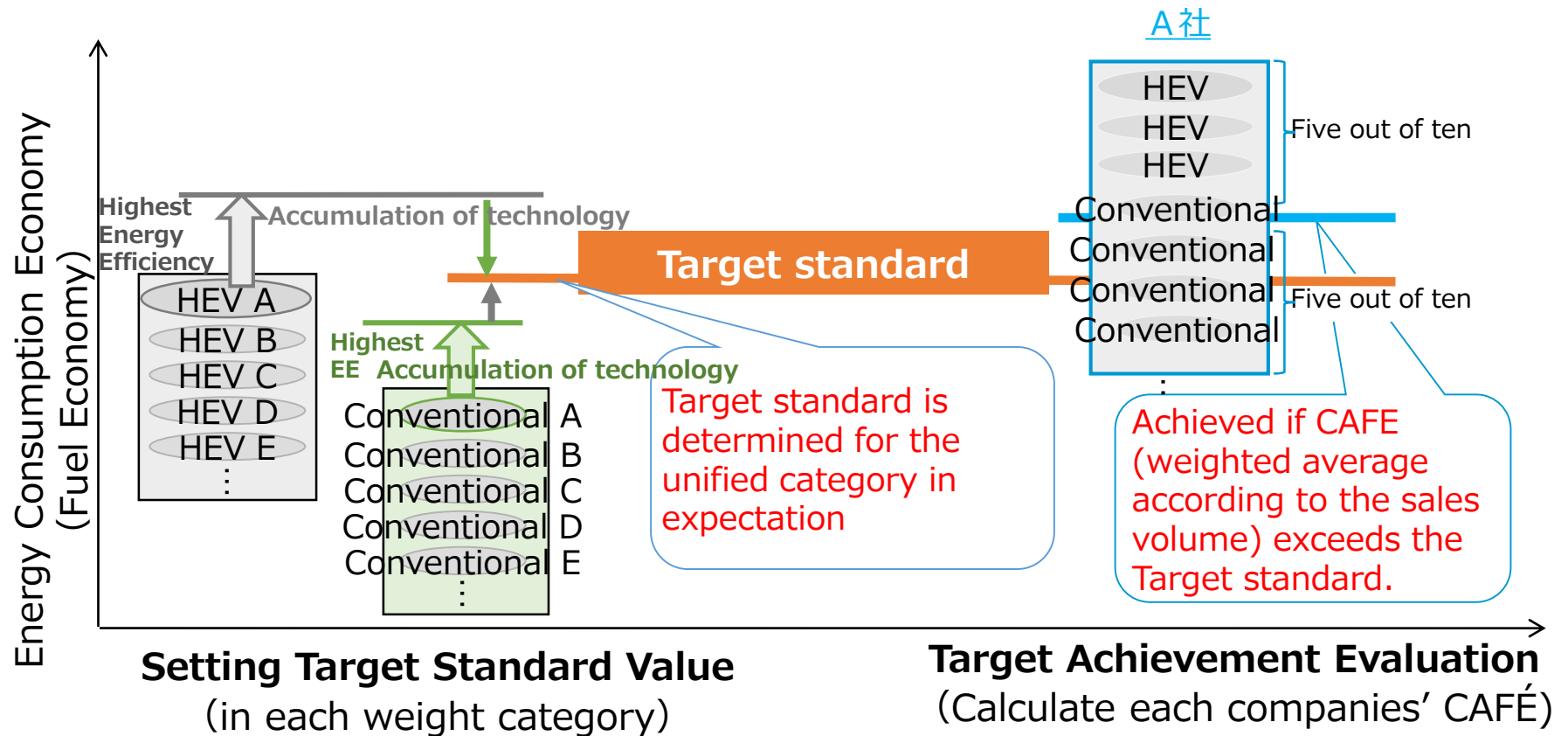
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Fuel Economy regulation in Japan: CAFÉ, Top Runner Approach

- Japan has a fuel economy regulation based on Act on the Rational Use of Energy.
:Top runner approach, CAFÉ regulation

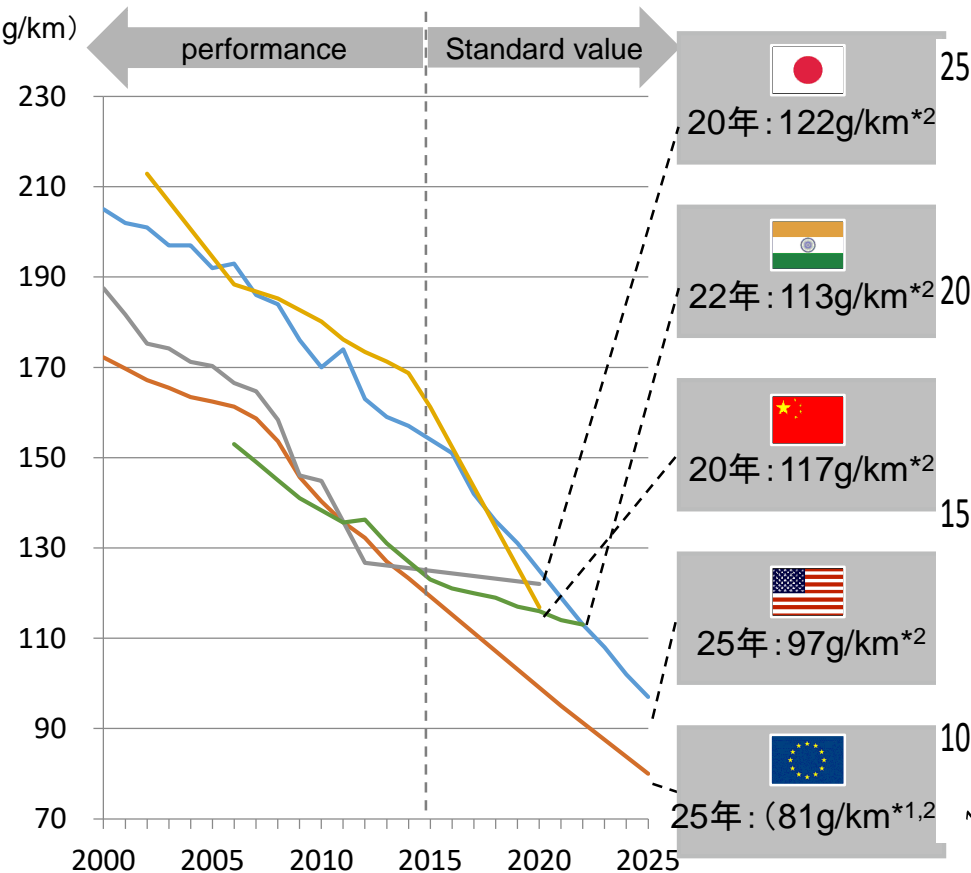
Setting Target Standard and Target Achievement Evaluation (2020's regulation)



Post 2020 Fuel Economy Standard is under discussion in Japan

- Japan's fuel economy has improved steadily and it has already achieved 2020 target (20.3km/l which is equivalent to CO2 emission of 122g/km).
- Post 2020 fuel economy standard is under discussion in Japan since March 6th 2018.

Trend of each country's CO2(FE) regulation



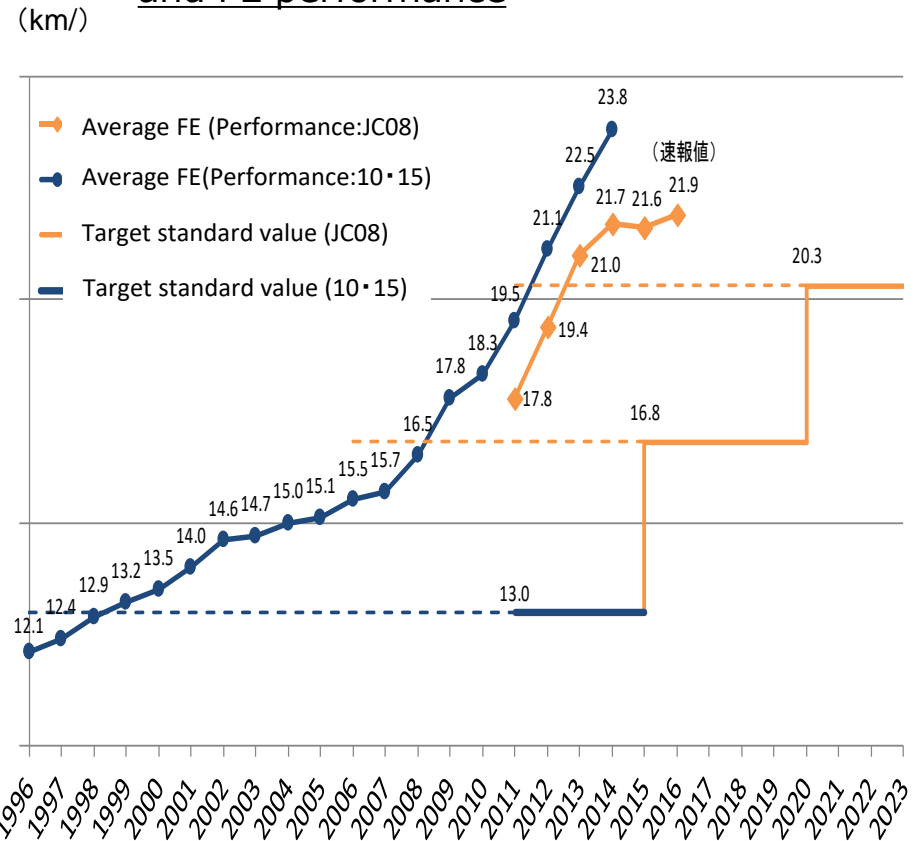
Based on NEDC mode.

*1: Calculated based 15% reduction compared to 2021's (95g/km)

*2: Performance by 2014 In Japan and U.S.A, Performance by 2015 In China, India, and EU.

Source: The International Council On Clean Transportation 「CO2 emissions from new passenger cars in the EU: Car manufacturers' performance in 2016」

Trend of fuel economy(FE) standard and FE performance



Source : Based on MLIT's data

Joint council's material by METI and MLIT

※Trend is based on only gasoline cars

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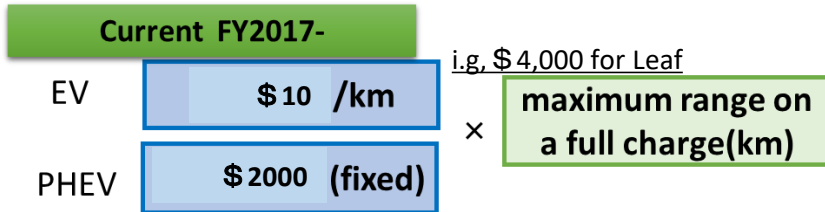
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Subsidy scheme and trend of EV/PHV and Public chargers

- Subsidy for buying next generation vehicle and for installing infrastructure and Tax incentive (next page) are main policy tools for supporting penetration of ZEV.

Subsidy scheme for car purchase

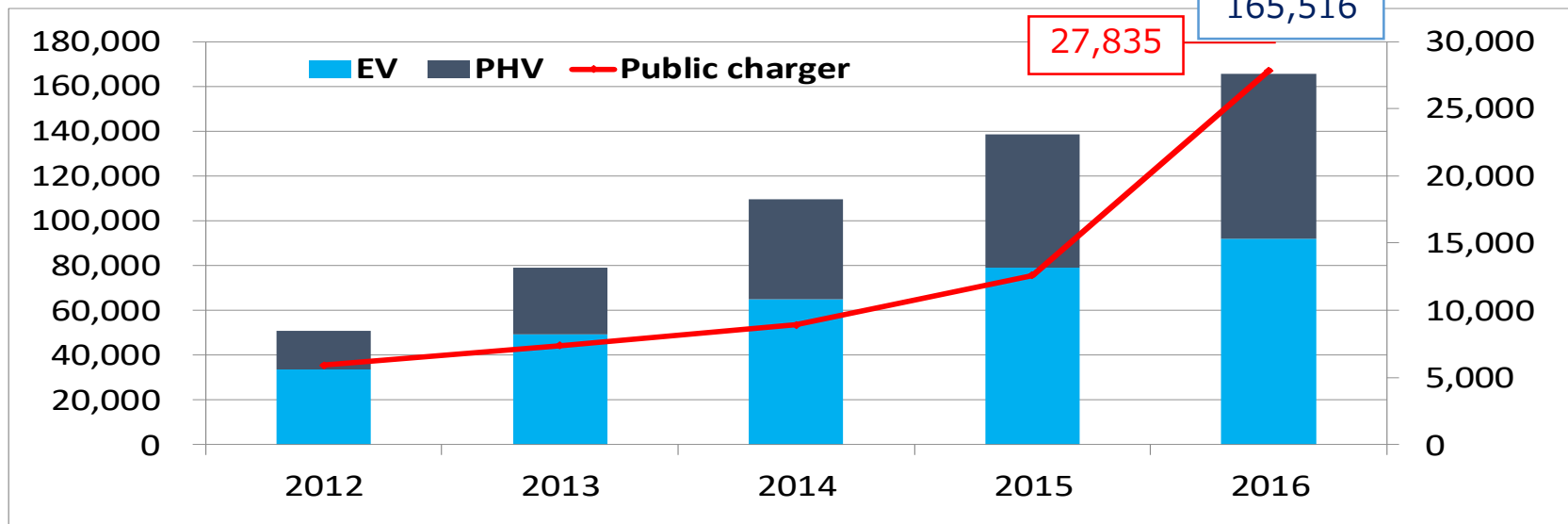


Subsidy scheme for charger installation

No.	Installation Site	Public/Private	Eligibility	Subsidy rate
#1	Service Areas on Highways, etc	Public	Apparatus	fixed amount
			Construction	fixed amount
#2	Hotels, Shops, etc.	Public	Apparatus	1/2
			Construction	fixed amount
#3	Apartment complexes, Factories and Firms	Private	Apparatus	2/3 or 1/2
			Construction	fixed amount
#4	billing devices	—	Apparatus	1/2
			Construction	fixed amount

EV・PHV (units)

Public Charger (units)



Financial support (Tax reduction)

2017

Object/ Requirement		Tax		Special measurement							
EV,FCV,PHV CNG (Achieved 2018’s regulation or 2009’s regulation(10% NOx)) CD (Achieved 2009’s or 2018’s regulation)		Automobile Acquisition Tax		No Tax							
		Automobile Weight Tax (New car inspection,Continued inspection)		Tax Exemption							
	FE performance (→)			2015 FE standard			2020 FE standard				
	Emission performance (↓)			Achiev ed	+5%	+10%	Achie ved	+10 %	+20 %	+30 %	+40 %
Gasoline (include HEV), LPG	50% reduction to 2018’s regulation or 75% reduction to 2005’s regulation	Automobile acquisition tax				20% reduct ion	20% reduct ion	40% reduc tion	60% reduc tion	No Tax	
		Automobile Weight Tax	New car inspecti on			25% reduction		50% reduc tion	75% reduc tion	Tax Exemption	
			Contin ued inspecti on								Tax Exe mpti on

Promoting Battery R&D Projects

- For improving battery performance, the government supports R&D projects of next generation battery.

RISING2

2016 - 2020

FY 2018 budget: JPY 3.1 billion (US\$ 31 million)

Responsible organization: Kyoto University, AIST (※), Automotive companies, Battery Companies, Other Universities etc.

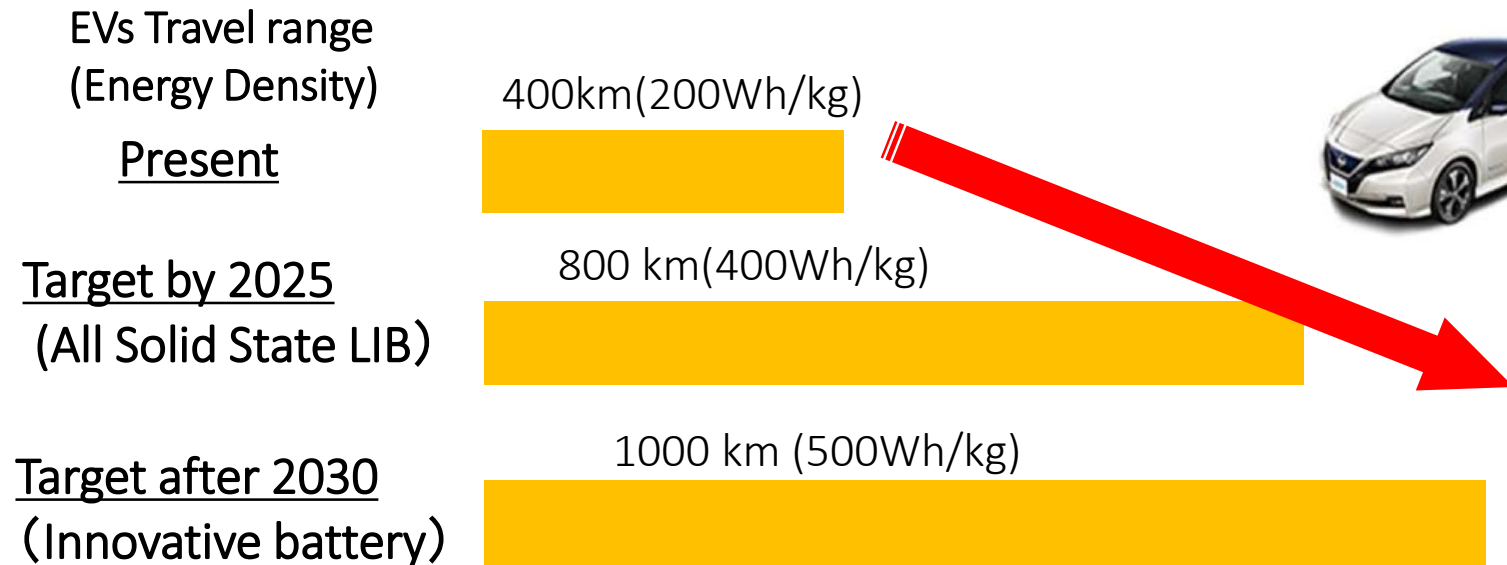
All Solid State LIB

2018 - 2022

FY 2018 budget: JPY 1.6 billion (US\$ 16 million)

Responsible Organization: LIBTEC(Lithium Ion Battery Technology and Evaluation Center) etc

※National Institute of Advanced Industrial Science and Technology



Basic Hydrogen Strategy (key points) (Dec.26th,2017)

- Vision with a view to 2050 + action plan up to 2030
- Hydrogen as a New Energy Option Along with Renewable Energy
- ⇒ Leading the world's carbon free development with Japan's advanced hydrogen technology
- Target: Realizing the same cost as gasoline and LNG
(Current: \$ 1/Nm³ ⇒ \$0.3/kg by 2030 ⇒ **\$0.2/kg by 2050**)

<3 elements for reducing H2 cost>

- [supply sides] { ① **Make it cheap**(=utilize overseas brown coal, surplus renewable energy etc)
② **Developing supply chain** for mass production and transportation
[user side] ... ③ Mass usage(**Automobile** ⇒ **Power Generation** ⇒ industry)

①②Main action as supply side

- **Produce massive amount of hydrogen from cheap material**
 - Utilizing brown coal(less than 1/10th of coal) and oversee renewable energy (about 1/10th of domestic's)
- **Mass importation by developing an international supply chain**
 - Promote the development of brown coal hydrogen production and mass transport technology of hydrogen **by international hydrogen transport project between Japan Australia / Brunei**, aiming for commercialization around '30.
- **Make maximum use of local renewable energy**
 - **Toward the hydrogen base of Fukushima (Namie Town)**, pioneering the future utilization of surplus renewable energy through demonstration of the world's largest renewable hydrogen production. Hydrogen from Fukushima is also used in Olympic games in 2020.

③Main action as user side

- **Accelerate dissemination of FCV/FC bus/hydrogen station**
 - 'Toward self-sustainable business regarding FCV in the latter half of the 2020s,
 - ① **Low cost technology development** (reduce Station cost by half by 2020),
 - ② **Regulatory reform** (realization of station unattended, etc.),
 - ③ **Advance strategic improvement of the station** (a new company established this spring is accelerating development)
 - **Horizontal deployment** of hydrogen utilization not only for FCV but also for buses, forklift trucks, trucks, ships, etc
- **Commercialization of hydrogen power generation - Mass consumption**
 - Promoting demonstration and technology development towards commercialization around 2030, such as the world's first hydrogen electric power plant (Kobe) commenced demonstration operation from the beginning of the year.

Budget for Hydrogen and Fuel Cells in FY 2018

Phase 1

Installation Fuel Cell

Focus on implementation from the present

Disseminate stationary FCs

Subsidies for Stationary FCs [8.9 billion yen]

Promote the accelerated introduction and cost reduction of Ene-farm. From FY 2017, support for stationary FC for business and industrial use is added.



Disseminate FCVs

Subsidies for HRSs [5.7 billion yen]

Support HRS installations and promote creating new FCV demand.



Support for FCVs [Included in 15 billion yen]

Phase 2

H2 Power Plant/ Mass Supply Chain

Realized in the late 2020s

Phase 3

CO2-free Hydrogen

Realized in around 2040

Build a H2 supply chain

Demonstrations for global H2 supply chain 9.4 billion yen]

Demonstrate how hydrogen can be produced from untapped overseas energy resources, transported in the form of liquefied hydrogen or organic hydride, and used to generate power. Implement P2G field tests, etc.



R&D of FC, etc.

R&D of FCs [2.9 billion yen]

Conduct R&D for better performance and lower costs of FCs, and demonstrate stationary FCs for business use



Stationary FC for business use

R&D of HRSs [2.4 billion yen]

Develop technologies for lower costs and safety of HRSs, and collect data for reviewing regulations.

R&D of H2 production, transport and storage

R&D for producing, transporting and storing H2 derived from renewable energy [0.9 billion yen]

Develop technologies of high efficiency water electrolysis units, tanks for storing liquefied hydrogen, etc. with the use of renewable energy sources.

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The Strategic Commission for the New Automotive Era

- Minister Seko (Minister of Economy, Trade and Industry) started “The Strategic Commission for the New Automobile Era” on 18th April to set Japan’s automobile industry’s strategy for solving global issues related to mobility.
- Issues to be discussed:
 - Strategic action toward “CASE”
 - Promoting innovation of battery industry
 - Promoting electrified vehicles
 - Ecosystem of battery
 - Integration of automobile policy and energy policy
 - Transforming automobile supply chain
 - Digitalization and standardization of car development



Committee Members

OEM: CEO of Toyota, Honda, Nissan, Mazda

Supplier: CEO of Akebono Brake

Scientist: Zempachi Oguimi Professor Kyoto University, etc

Investor: Hiromichi Mizuno Board Member of PRI, United Nations

Gen Isayama General Partner & CEO

etc.

- The Electric Vehicle Symposium & Exhibition (EVS) is **the world's largest international exhibition and symposium for all fields related to Electric Vehicle (EV), such as battery electric vehicles, hybrid electric vehicles (HEV) and fuel cell vehicles (FCV).**

Venue	<u>Kobe Convention Center, Kobe, Japan</u> <i>Kobe International Conference Center / Kobe International Exhibition Hall</i>
Date	<u>September 30 - October 3, 2018 (4 days)</u> Multilateral policy dialog on September 30th, 3:00PM – 5:00PM
Hosted by	Japan Automobile Research Institute (JARI)
Cooperation with	Society of Automotive Engineers of Japan (JSAE) World Electric Vehicle Association (WEVA) Electric Vehicle Association of Asia Pacific (EVAAP)
Supported by	Ministry of Economy Trade and Industry Ministry of Land, Infrastructure, Transport and Tourism Ministry of the Environment Japan Automobile Manufacturers Association (JAMA) , etc.
Contents	a) Plenary session <i>Opening & Closing ceremony, Keynote speeches, Panel discussion</i> b) Technical Session (Oral and Dialogue session) <i>held as EVTeC 2018* in conjunction with JSAE</i> c) Exhibition & Ride-&-Drive d) Technical tour e) Welcome reception, Gala

