EV regulation in Japan

～According to the attribute of the reference guide～

Nobutoshi HORIE

Environmental Policy Division,

Road Transport Bureau

Related Laws

国土交通省

MLIT・METI

ACT ON THE RATIONAL USE OF ENERGY

- Fuel Efficiency standards
- Labeling

(Test methods are covered by Road Vehicle Act)

MLIT

ROAD VEHICLE ACT

- Registration
- Maintenance / Annual Inspection
- Vehicle Type Approval
- Safety & Environmental Requirement

END OF LIFE VEHICLE RECYCLING LAW

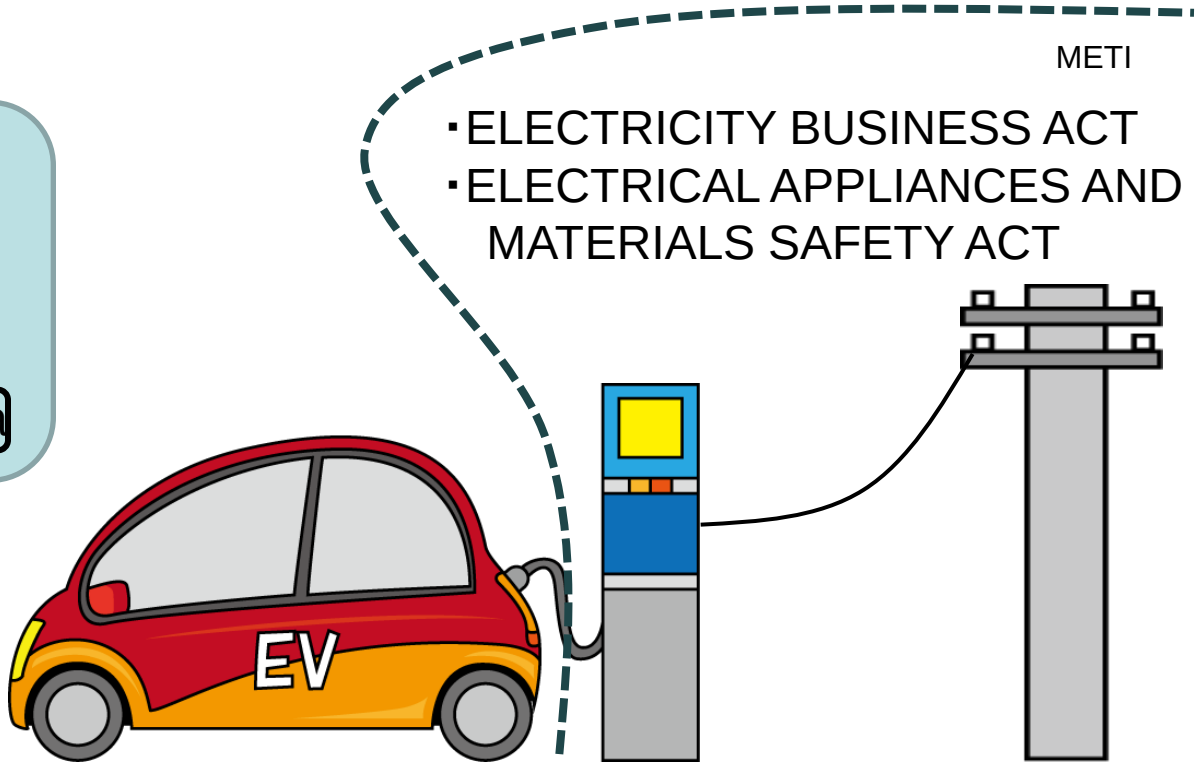
METI

- Obligations of Vehicle Manufacturers, etc.
- Standard of Recycling by Dismantler

(Using Vehicle Registration data)

METI

- ELECTRICITY BUSINESS ACT
- ELECTRICAL APPLIANCES AND MATERIALS SAFETY ACT



Vehicle Range / Efficiency : Driving Mode

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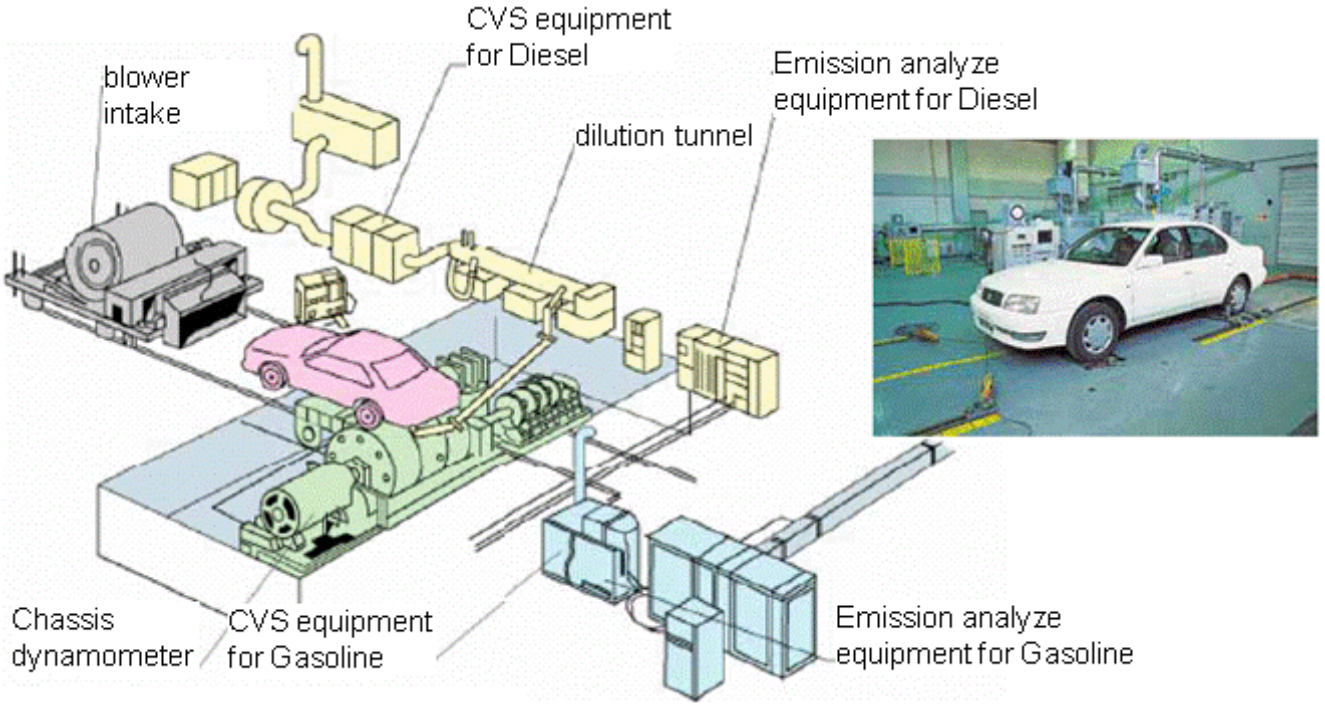
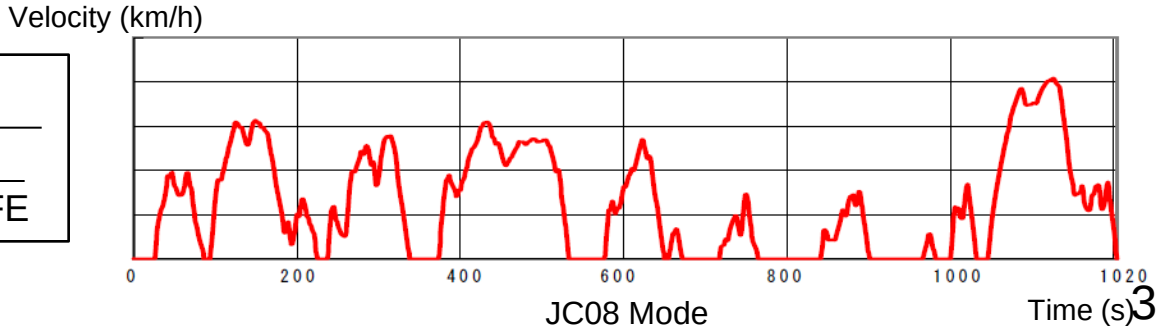
- Light Duty Vehicle（≦3.5ton） is using “JC08 mode”
- “JC08 mode” are used in FY2020 standard, as is the case in FY 2015 standard.



$$\text{JC08 mode} = \frac{1}{\frac{0.25}{\text{Cold start FE}} + \frac{0.75}{\text{Hot start FE}}}$$



Vehicle Range / Efficiency : Driving Mode

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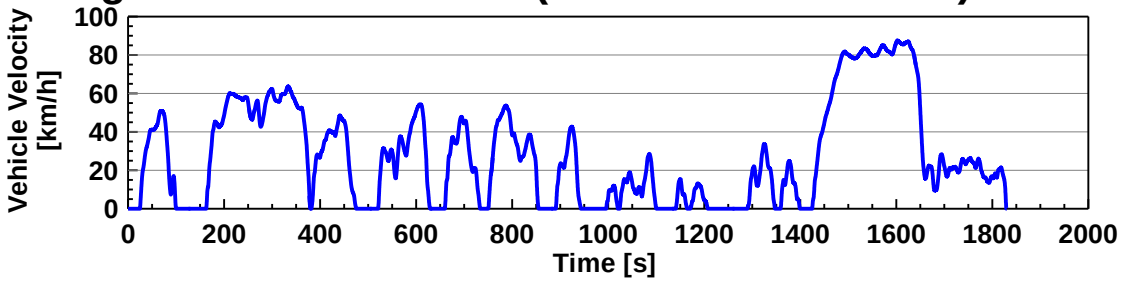
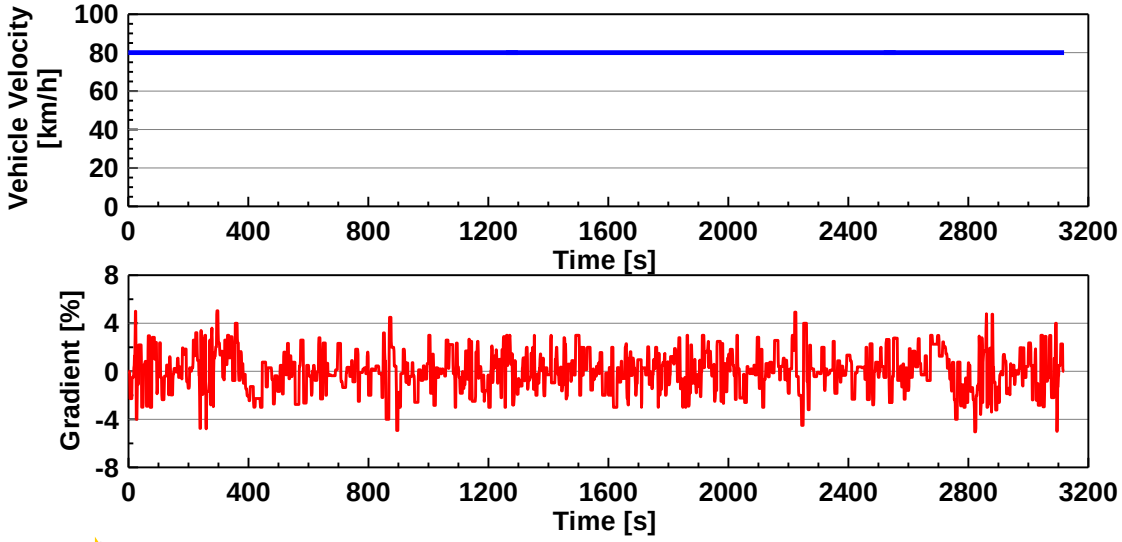
“Heavy Duty Vehicle Mode”

→ **Urban Driving Mode = JE05 Mode (Emission Test Mode)**



→ **Interurban Driving Mode**
= 80km/h Constant Speed Mode with Road Gradient (FE Test Only)



Evaluation of Fuel Efficiency by *Simulation Method*

Include *HILS* in case of HV

Vehicle Range / Efficiency : EV

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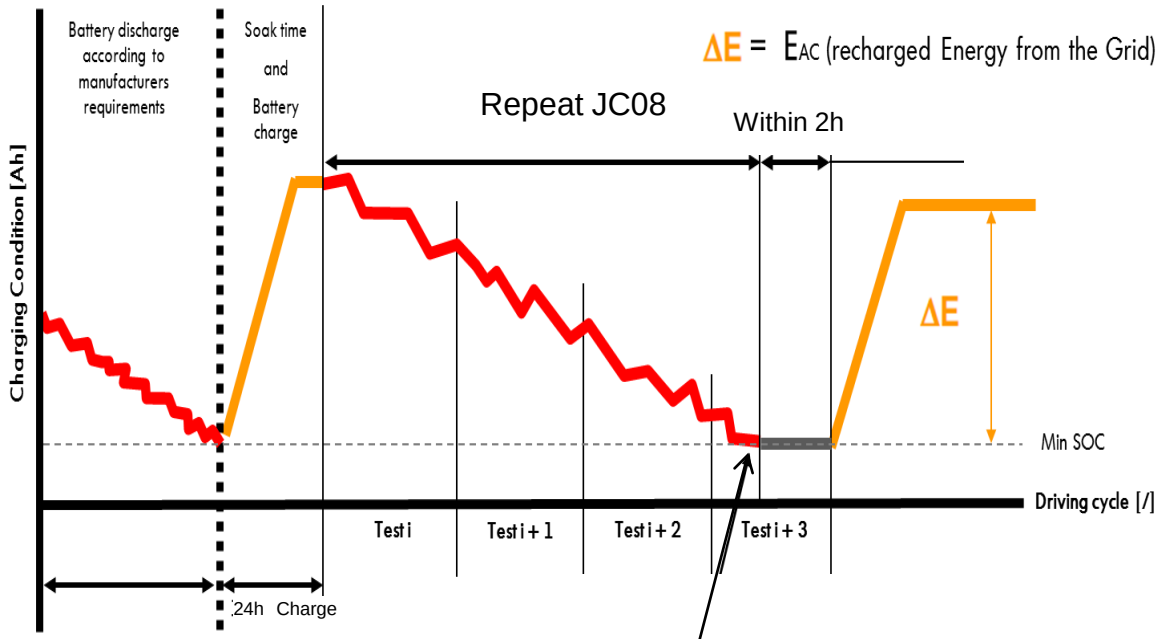
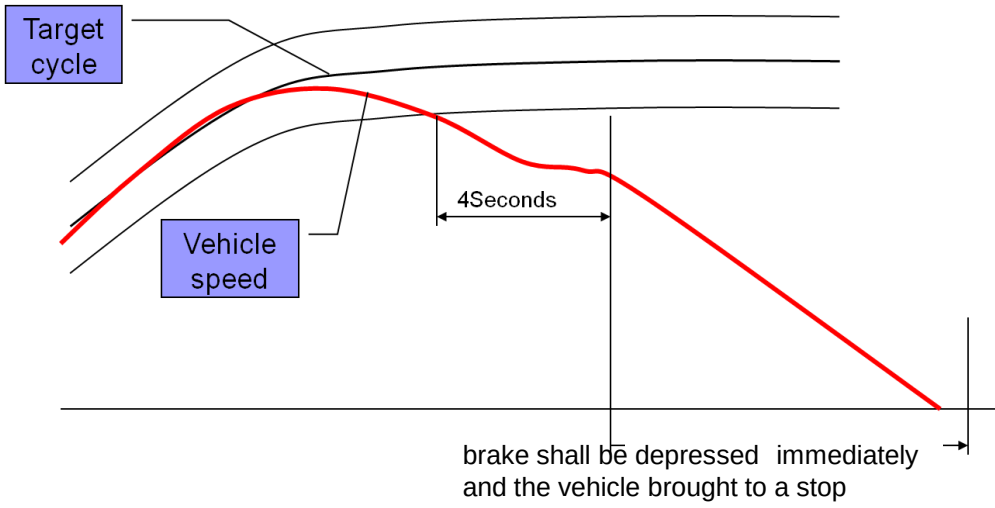
Test Procedure: TRIAS 99–011–01



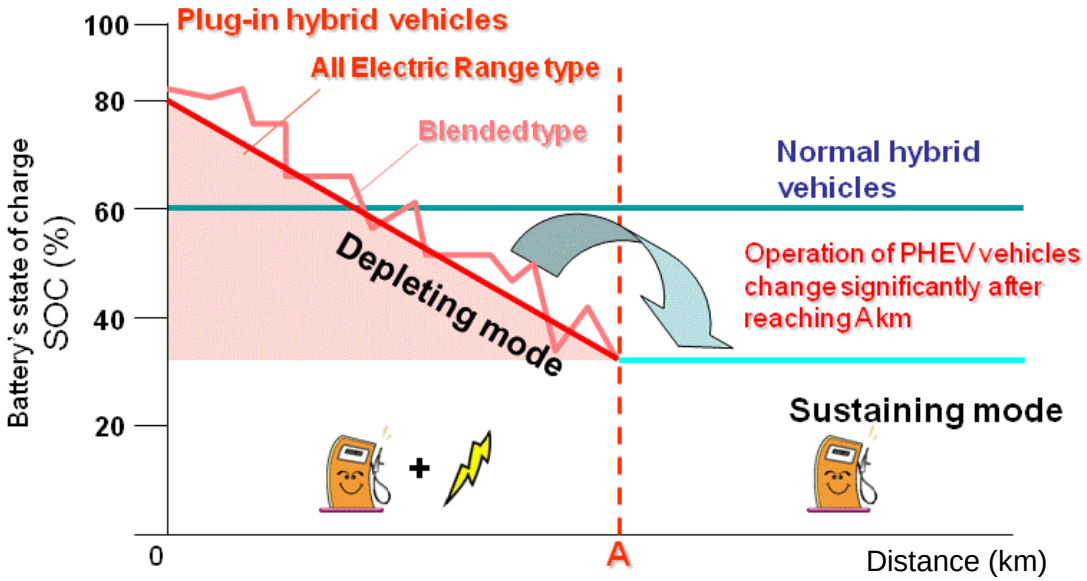
$$C = \frac{E \times 1000}{D}$$

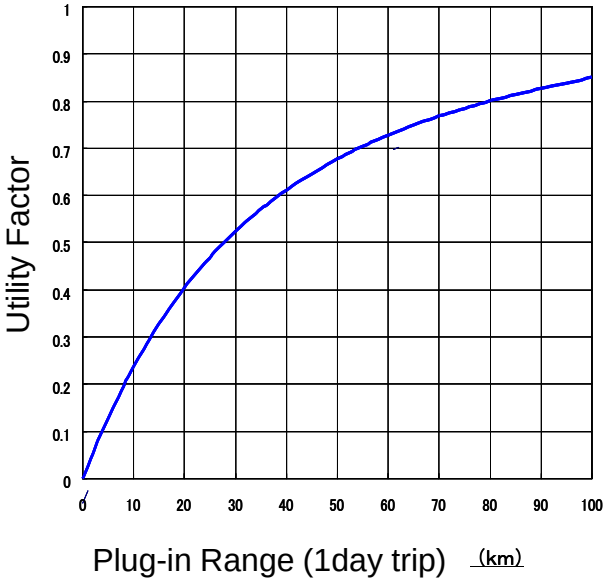
C : AC power consumption rate (W•h/km)
E : AC charging power (kW•h)
D : Per-charge range (km)

○The break-off criteria shall have been reached when the vehicle cannot follow the driving trace for 4 seconds or more.



Plug-in Hybrid Vehicles





※JCAPﾃﾞｰﾀ自動車使用実態調査による

Depleting mode: Vehicle is operated by consuming electric energy supplied from external source) (while reducing battery's state of charge (SOC))

A km: Plug-in range

Sustaining mode: By using regenerated electric energy, operation of the vehicle is controlled so the SOC value remains constant.

$$FC_{PHEV} = \frac{1}{\frac{UF(R_{CD})}{FC_{CD}} + \frac{1 - UF(R_{CD})}{FC_{CS}}}$$

FC_{PHEV}: PHV combined Fuel consumption
R_{cd}: Plug-in Range
FC_{cd}: Fuel consumption in CD range
FC_{cs}: Fuel consumption in CS range

Lists of FY2015 FE standards

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PV and CV

	Standards（ｋｍ／Ｌ）	Average Energy Efficiency Improvement [FY２００４ → FY２０１５]
Passenger Vehicles 	７．４～２２．５	１３．６ｋｍ／Ｌ → １６．８ｋｍ／Ｌ（２３．５%）
Small Buses（3.5 tons or less） 	８．５～９．７	８．３ｋｍ／Ｌ → ８．９ｋｍ／Ｌ（７．２%）
Small Trucks（3.5 tons or less） 	７．９～２３．２	１３．５ｋｍ／Ｌ → １５．２ｋｍ／Ｌ（１２．６%）

HDV

	Standards（ｋｍ／Ｌ）	Average Energy Efficiency Improvement [FY２００２ → FY２０１５]
Fixed Route Buses（exceeding 3.5 tons） 	４．２３～６．９７	４．５１ｋｍ／Ｌ → ５．０１ｋｍ／Ｌ（１１．１%）
Other Buses（exceeding 3.5 tons） 	３．５７～９．０４	６．１９ｋｍ／Ｌ → ６．９８ｋｍ／Ｌ（１２．８%）
Trucks（exceeding 3.5 tons） 	４．０４～１０．８３	６．５６ｋｍ／Ｌ → ７．３６ｋｍ／Ｌ（１２．２%）
Tractors（exceeding 3.5 tons） 	２．０１～３．０９	２．６７ｋｍ／Ｌ → ２．９３ｋｍ／Ｌ（９．７%）

FY2015, 2020 FE standard for PV

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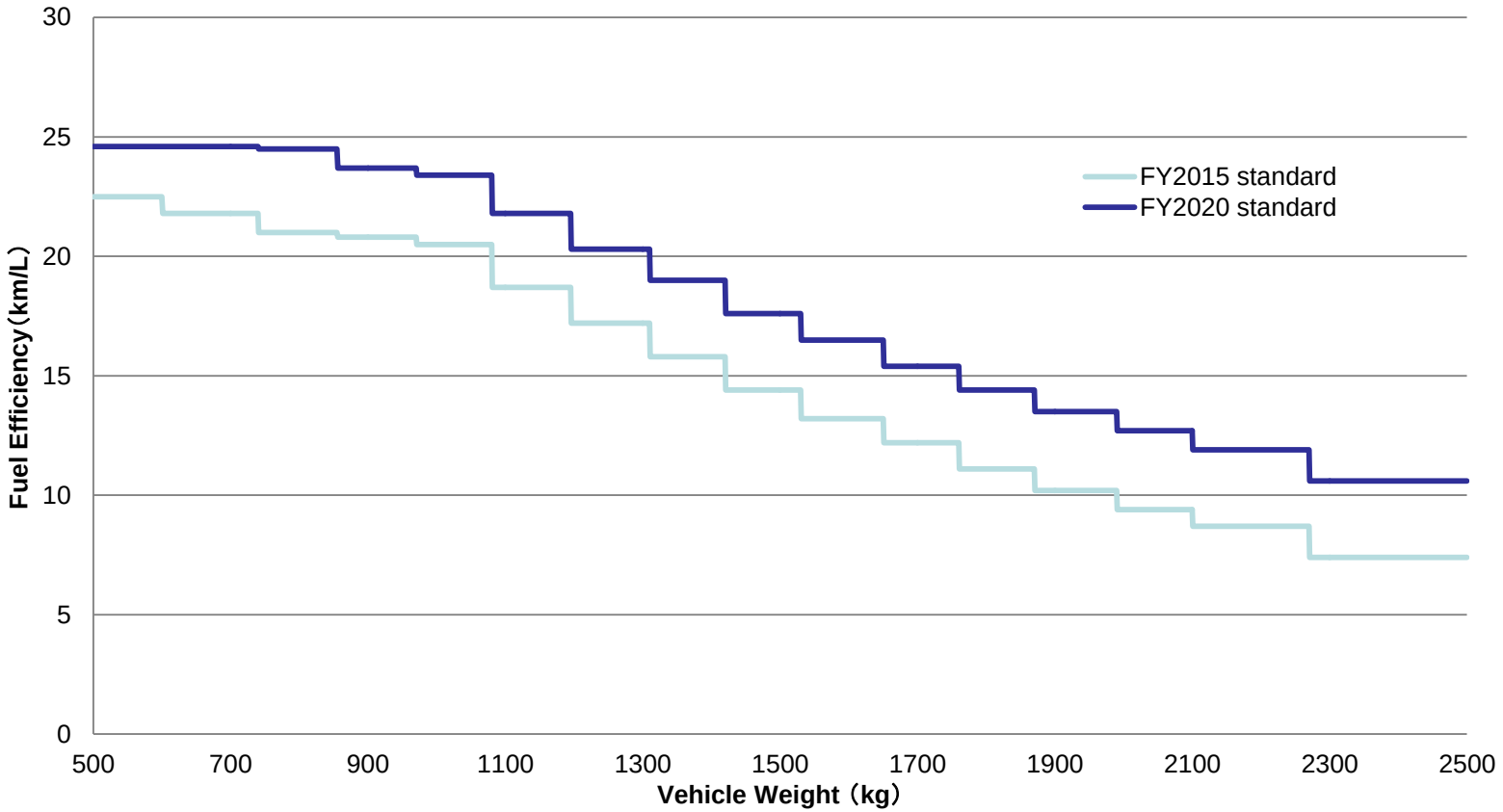
- On Oct 2011, the Joint committee under MLIT and METI concluded the new standard toward FY2020 for Passenger Vehicles.
- FY2020 Standard will require the automotive manufacturers to improve fuel efficiency at the highest level in the world.



Cooperative Average Fuel Efficiency Standard

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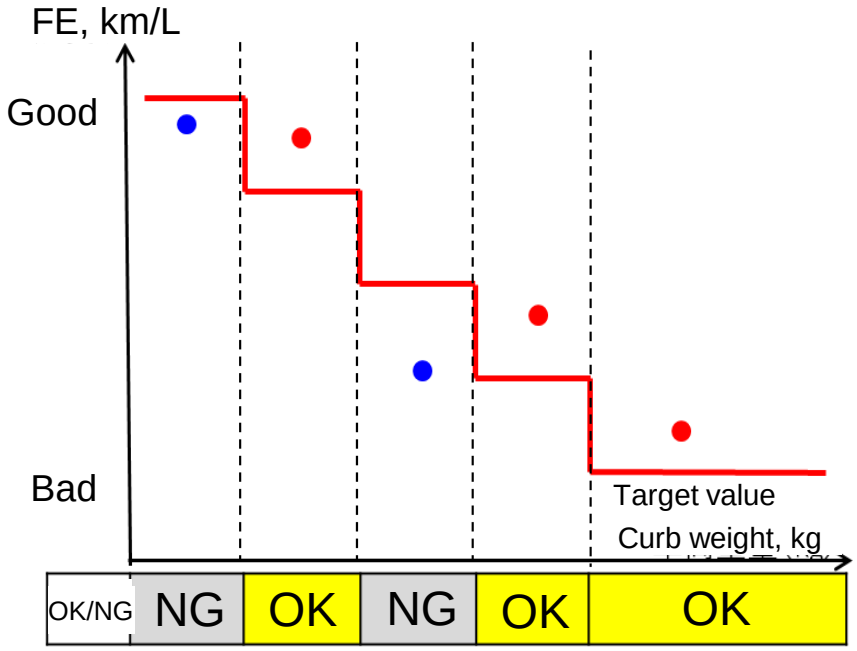
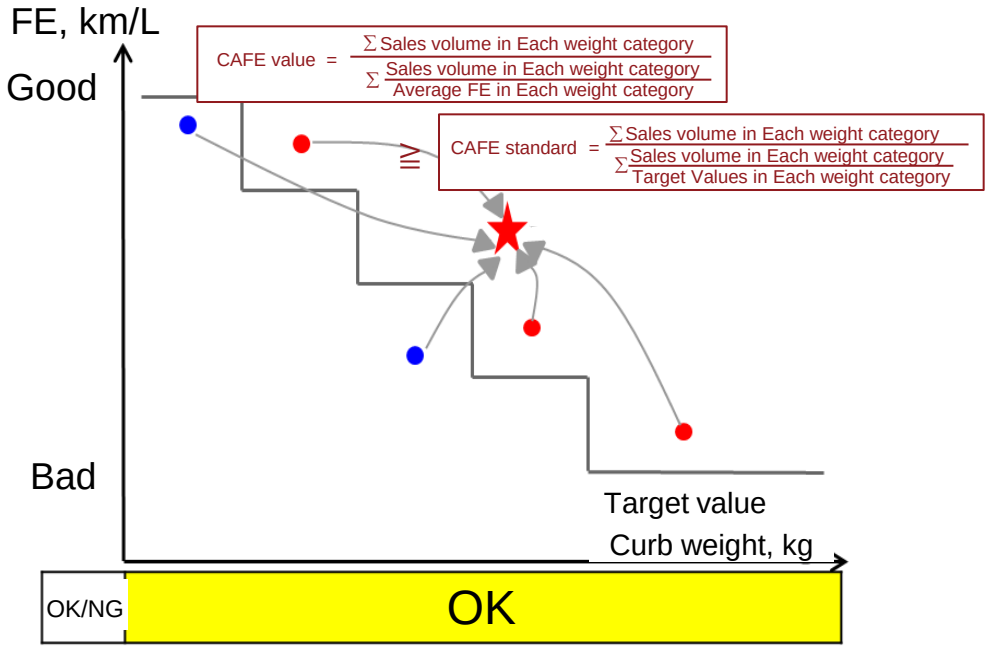
- Recently, technologies for improving fuel efficiency have been diversified, and those developing costs are increasing. In this context, it is difficult for manufacturers to achieve fuel efficiency target in all weight categories in weight category based standard, because manufacturers cannot focus and have to diversify their developing resources.
- CAFE (Cooperate Average Fuel Efficiency) standard is introduced, like US and EU.
- Each manufacturer is expected to focuses on developing their home ground techniques in each manufacturer, and technologies will be more sophisticated and diversified, in CAFE standard.

Weight Category based Standard



→ Not accomplished because there are some weight categories which cannot be accomplished

Cooperative Average Fuel Efficiency Standard



→ Accomplished in CAFE standard

Electric Vehicles / Plug-in Hybrid Electric Vehicles

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- The number of EV and PHEV models is too small, and we don't have enough information to make appropriate target values. So, we exclude EV and PHEV from the target scope of the new standard.
- Manufacturers can add EV and PHV by converting its electric efficiency to fuel efficiency, in case they meet the minimum requisite.

	Mitsubishi i-MiEV	Nissan Leaf	Toyota Prius Plug-in Hybrid
			
Cruising distance	180km	200km	26.4km *
Electric efficiency	9.09km/kWh	8.77 km/kWh	8.74 km/kWh
	Electric energy (3.6 MJ/kWh), Gasoline energy (32.9 MJ/L) Converted FE km/L = Electric efficiency ÷ 3.6 MJ/kWh × 32.9 MJ/L		
Converted FE	**83.1 km/L**	**80.2 km/L**	**44.6 km/L (combined)**

* Electric drive distance

Source : Manufacturer's HP

Requisite condition:

CAFE value ≥ CAFE standard × 0.9

← *To improve conventional vehicles' fuel efficiency in the same manner*

Other EV Regulations

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No need to match or surpass specific spec

But need to provide information for Vehicle Type Approval

(Except safety related regulations..like High voltage protection)

- Vehicle range(EV)
- Driver user information(all)
- Battery performance (Capacity)

Covered by Industrial standards

- Off-Board Charging System

Under Discussion

- Battery Durability
- Battery Re-use

It is necessary to think about Obligingness to depend on environmental effect and the Flexibility Severity Elaborateness for developing technology .

Other laws cover

- Vehicle as electricity supply
- Wireless Charging (RADIO ACT)

Labeling

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○ MLIT announce Fuel Efficiency performance on our HP for consumer understanding of fuel efficiency, and to promote high FE performance vehicle through the choice of consumers

○and put FE performance sticker depend on their achievement of standard .

Fuel efficiency announcement

Every month, We are uploading FE performance of each type vehicle which are sold as a New car to our Home Page

（別紙）

（例　様式1－1）

○○○○○○○(車種)

車名	通称名	型式	原動機 型式	原動機 燃料	変速装置の型式及び変速段数	車両重量(kg)	乗車定員(名)	10・15モード 燃費値(km/L)	10・15モード 1km走行における○○2排出量(g－○○2/km)	10・15モード 燃費基準値(km/L)	主要燃費改善対策	その他燃費値の異なる要 主要排出ガス対策	その他燃費値の異なる要 駆動形式	その他燃費値の異なる要 その	（参考）低排出ガス認定レベル	燃費基準達成レベル
○○	MLIT	DBA-○○1	○○	○	○AT(E)	1160～1200	○	20.5	113	16.0	V・EP	3W+EGR	F		☆☆☆☆	125
		DBA-○○1	○○	○	○AT(E)	1170～1210	○	17.5	133	16.0	V・EP	3W+EGR	F		☆☆☆☆	105
		DBA-○○2	○○	○	○AT(E)	1220～1260	○	18.5	125	16.0	V・EP	3W+EGR	A		☆☆☆☆	115
●●	※ MLIT2	DBA-●●1	○○	○	○AT(E)	1230～1250	○	18.3	127	16.0	EP	3W	F		☆☆☆☆	110
△△	MLIT3	DBA-△△1	△△	△	CVT	2110～2160	△	7.0	332	7.8		3W+EGR	R			

記載の順は、以下の通りとしてください。
1．燃費の良い通称名順
2．同一通称名中、燃費の良い型式順
3．同一型式中、燃費の良い順

（注）JC08モード燃費値を有する車両については、10・15モード燃費値に下線を引いています。
※印は、○○によるOEM生産車です。

FE performance sticker

+20%

+10%

+5%

FY2015FE standard

End of Life Vehicle Recycling LAW

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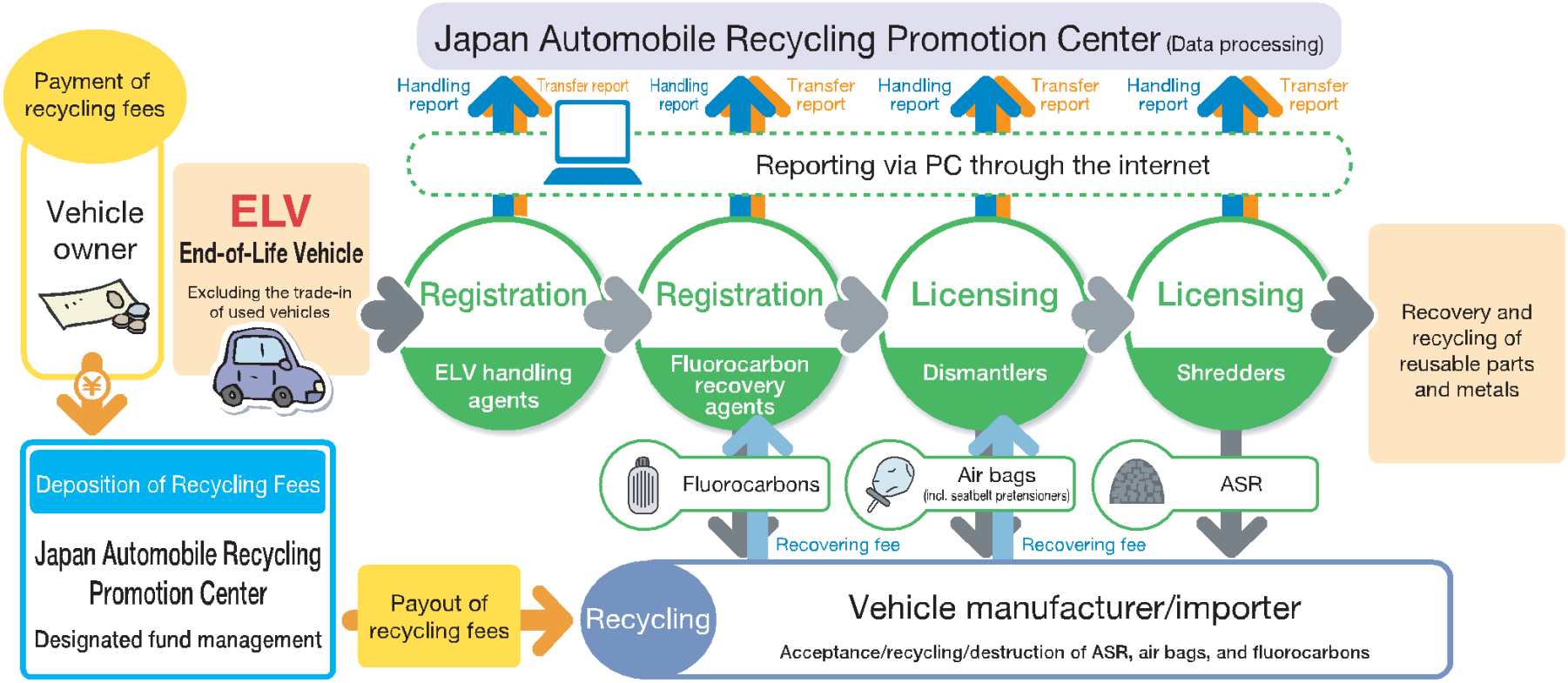
○Shredder dust, airbags and fluorocarbons recovered are collected by the vehicle manufacturer or importer for recycling purposes

○Batteries shall be retrieved from end of life vehicles by ELV handling agents , and shall be recycled by themselves to the extent technologically and economically possible, or delivered to a person who can professionally recycle batteries



Tax incentive for environmentally friendly vehicles

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By introducing tax incentive for vehicles with superior environmental performance(Eco-Car), we have promoted the spread of environmentally friendly vehicles.

Vehicle tax in Japan

Tax Name		Overview	Tax price(※)
at the time of acquisition	Acquisition Tax	5%(3%) tax depending on price of automobile.	**\100,000** (≒US$1,100)
at the time of owning	Weight Tax	Taxation depending on automobile weight.	**\7,500/year** (≒US$80)
	Owner Tax	Taxation depending on engine capacity	**\34,500/year** (≒US$380)

※The case of Prius(TOYOTA) :the price \2,000,000, less than 1.5 ton weight , less than engine capacity1,500cc vehicle

Eco-Car Tax Reduction（Weight Tax・Acquisition Tax）

○Each weight tax and acquisition tax for Eco-Car are reduced.

The target of requirement（the case of passenger vehicle）			Rate of tax reduction
	Fuel efficiency	Emission	
Electric vehicles, Plug-in hybrid vehicles, Natural gas vehicles, Diesel passenger vehicles.			Exemption
Gasoline Vehicles (including hybrid vehicles)	Surpass the 2015 fuel efficiency standard by 20%	Surpass the 2005 emission standard by 75%（☆☆☆☆）	Exemption
	Surpass the 2015 fuel efficiency standard by 10%		75%-reduction
	Satisfy the 2015 fuel efficiency standard		50%-reduction

The tax of when you registered a new Eco-Car is reduced.

Special time : until May 31, 2015

Green tax incentive of owner tax（owner tax）

○Owner tax for Eco-Car is reduced.
○Owner tax of old vehicle is increased .

The target of requirement			Rate of tax reduction
	Fuel efficiency	Emission	
Electric vehicles, Plug-in hybrid vehicles, Natural gas vehicles,			50%-reduction
Gasoline Vehicles (including hybrid vehicles)	Surpass the 2015 fuel efficiency standard by 10%	Surpass the 2005 emission standard by 75%（☆☆☆☆）	50%-reduction
	Satisfy the 2015 fuel efficiency standard		25%-reduction

The tax of next year when you registered a new Eco-Car is reduced.

Diesel vehicle more than 11 years old Gasoline vehicle more than 13 years old (Except Electric vehicles and hybrid petrol vehicle)	10%-increased

Special time : until March 31, 2015

Tax incentive for environmentally friendly vehicles

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Eco-Car Tax Reduction（Weight Tax・Acquisition Tax）

○The case of Bus and Truck

The target of requirement	Emission		Fuel efficiency (the 2015 fuel efficiency standard)		
			Satisfy	Surpass by 5%	Surpass by 10%
Electric vehicles Plug-in hybrid vehicles Natural gas vehicles	Exemption				
Gasoline vehicle(1)	the 2005 emission standard	☆☆☆☆(2)	50%-reduction	75%-reduction	Exemption
		☆☆☆(3)		50%-reduction	75%-reduction
Diesel vehicle	the 2009 emission standard	Surpass by10%（NOx・PM）	50%-reduction	75%-reduction	Exemption
		Satisfy		50%-reduction	75%-reduction

※ The tax of when you registered a new Eco-Car is reduced.

(1) Gasoline vehicle： only GVW 2,500kg ～ 3,500kg（Middle size vehicle）
(2) ☆☆☆☆: surpass the 2005 emission standard by 75%
(3) ☆☆☆ : surpass the 2005 emission standard by 50%