

# Japanese EFV Diffusion Policy

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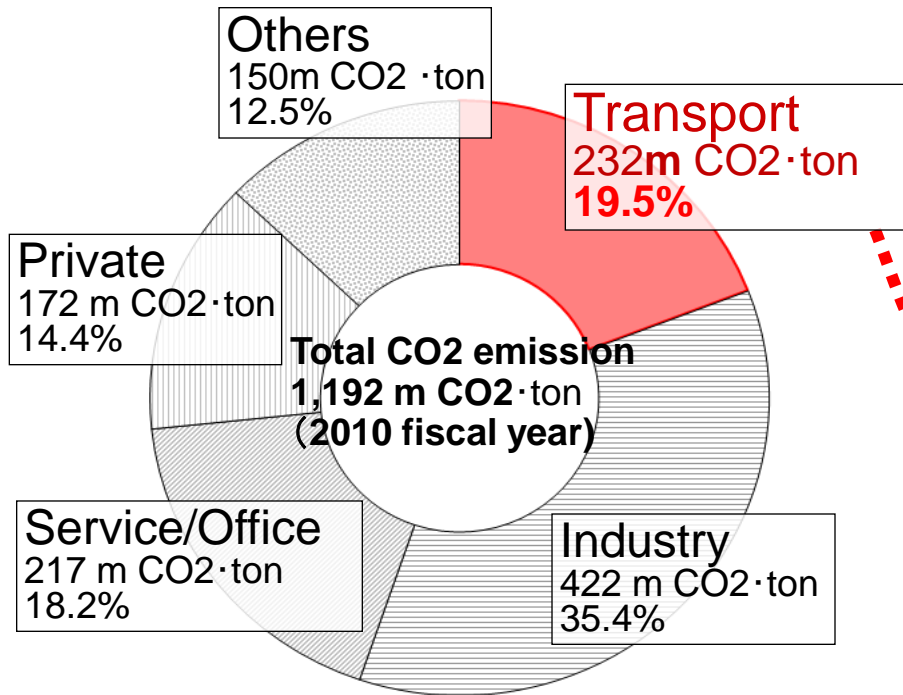
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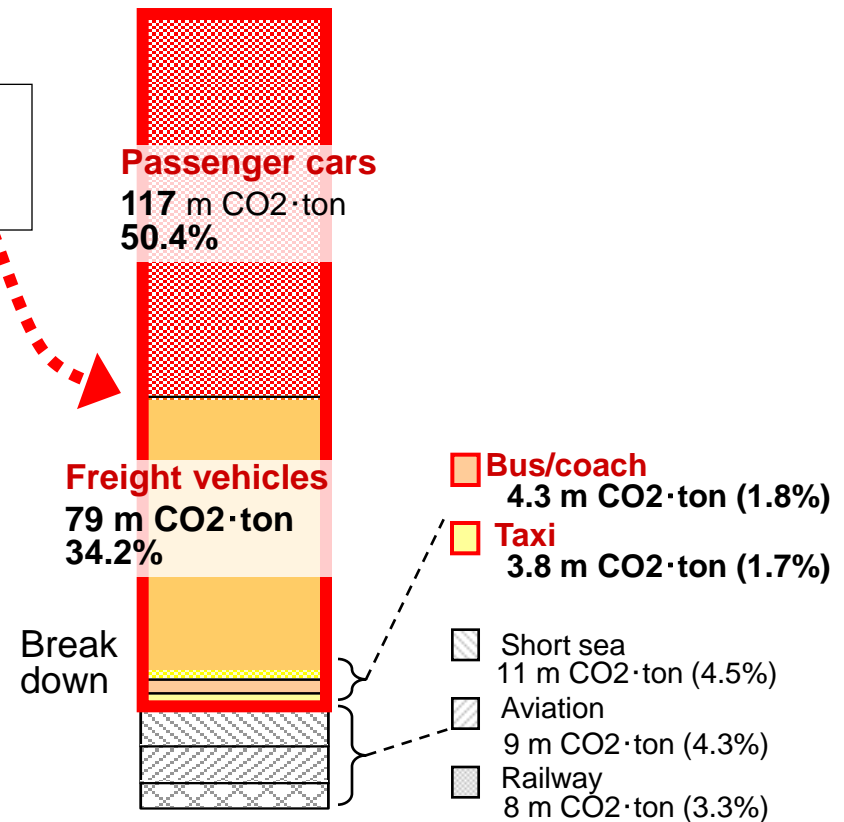
- Fuel Efficiency standard in Japan
- EFV incentive
- EFV market growth and environmental effect

CO2 Emission from transport sector is about 20% of total emission in Japan.  
Road transport emits 88% of transport emission.

CO2 Emission in Japan



Breakdown in Transport sector



※ Emission from electric generation and thermal generation are distributed to final demand sectors according to amount of consumption of each sector.

※ Developed by MLIT referring to "Japanese GHG Inventory report"

# Fuel Efficiency standard

- Based on “the Act on the Rational Use of Energy”, Japan establishes and publicizes the energy consumption efficiency standard for Passenger vehicles and commercial vehicles as well as other energy-consuming machinery and equipment .
- Japanese Fuel efficiency standards are established by the “Top Runner Program.”
- The Act on the Rational Use of Energy imposed on manufactures and importers of Type Approved Vehicles.




## 【Scope】





	Riding Capacity	Gross Vehicle Weight	Fuel			
			Gasoline	Diesel	LP Gas	other
PV	10 or fewer		○	○	○	
	11 or more	3.5 tons or less	○	○		
		exceeding 3.5 tons		○		
CV		3.5 tons or less	○	○		
		exceeding 3.5 tons		○		

※Manufactures or importers whose total shipment volume is fewer than 2,000 vehicles are exempted.

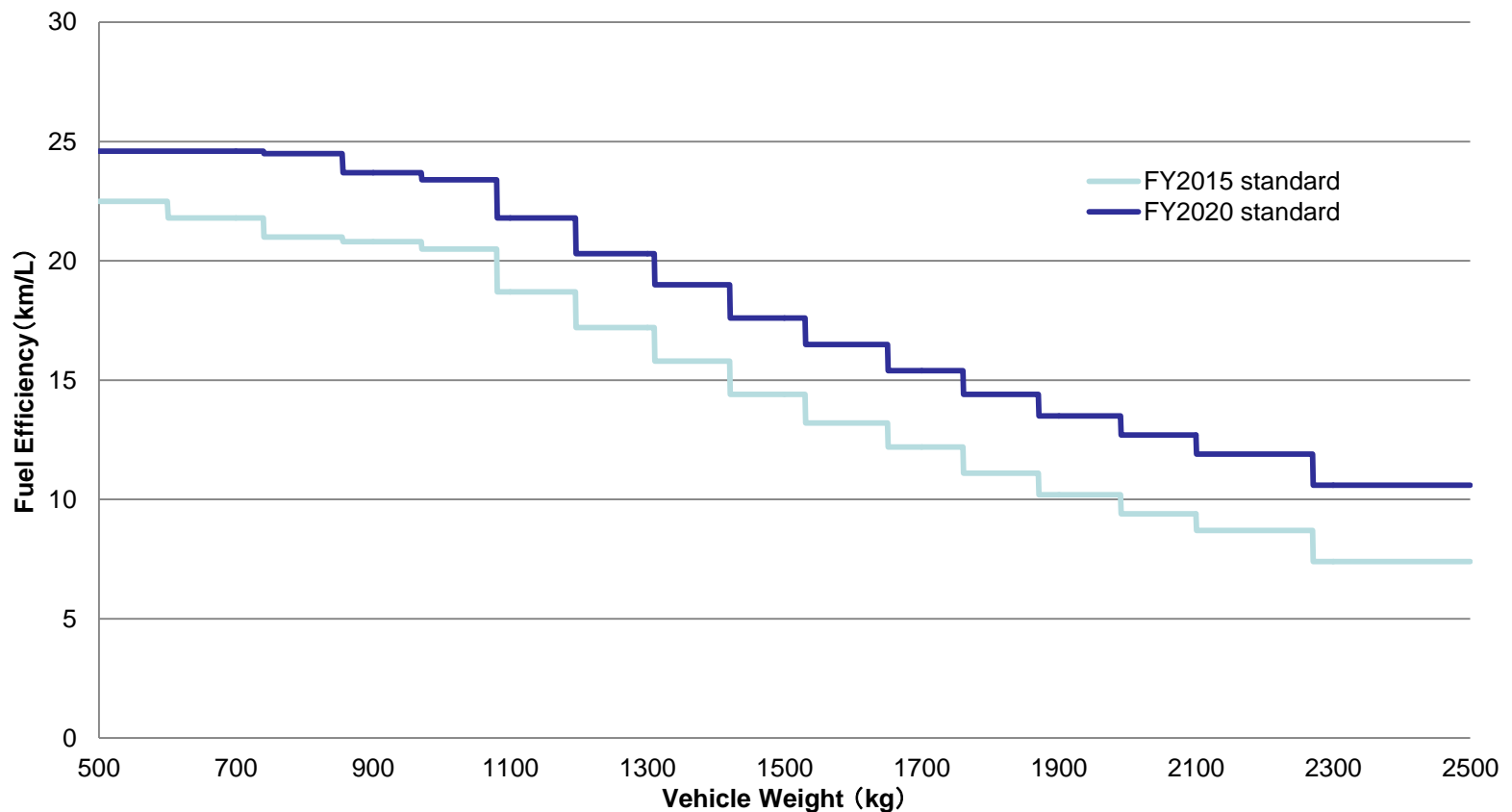
## PV and CV

## HDV

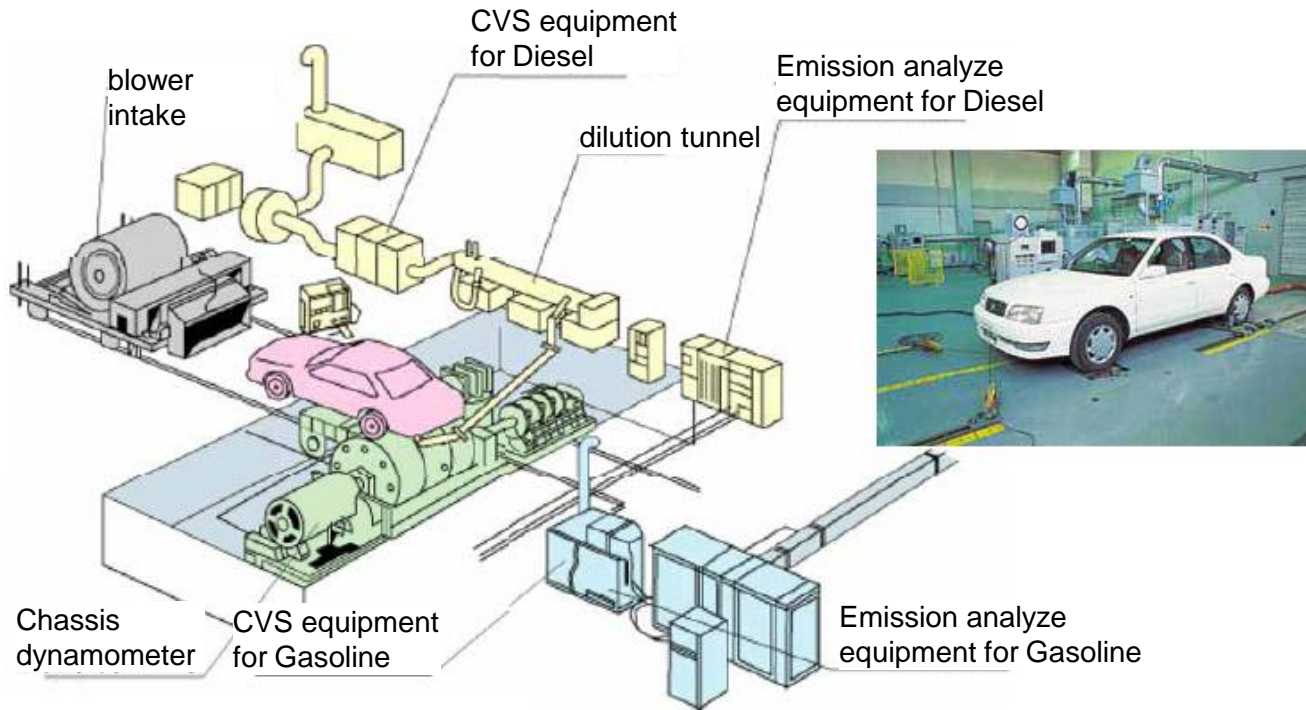
	Standards (km/L)	Average Energy Efficiency Improvement [FY2004 → FY2015]
Passenger Vehicles 	7.4 ~ 22.5	13.6 km/L → 16.8 km/L (23.5%)
Small Buses (3.5 tons or less) 	8.5 ~ 9.7	8.3 km/L → 8.9 km/L (7.2%)
Small Trucks (3.5 tons or less) 	8.6 ~ 14.5	13.0 km/L → 16.8 km/L (12.6%)

	Standards (km/L)	Average Energy Efficiency Improvement [FY2002 → FY2015]
Fixed Route Buses (exceeding 3.5 tons) 	4.23 ~ 6.97	4.51 km/L → 5.01 km/L (11.1%)
Other Buses (exceeding 3.5 tons) 	3.57 ~ 9.04	6.19 km/L → 6.98 km/L (12.8%)
Trucks (exceeding 3.5 tons) 	4.04 ~ 10.83	6.56 km/L → 7.36 km/L (12.2%)
Tractors (exceeding 3.5 tons) 	2.01 ~ 3.09	2.67 km/L → 2.93 km/L (9.7%)

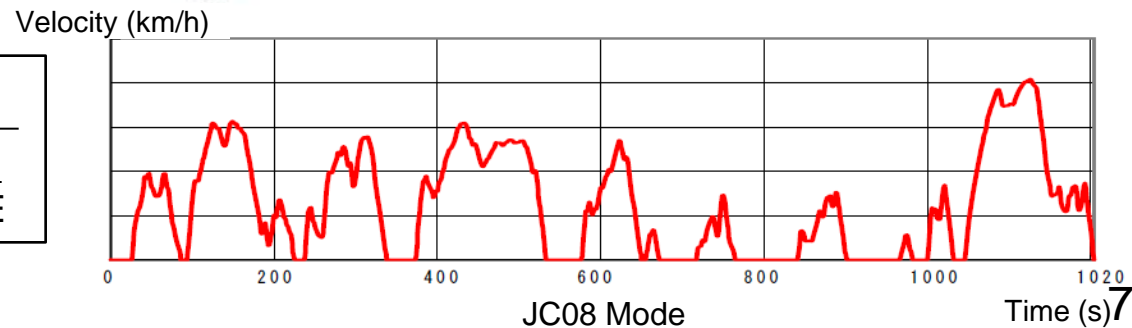
- On Oct 2011, the Joint committee under MLIT and METI concluded the new standard toward FY2020 for Passenger Vehicles.
- FY2020 Standard will require the automotive manufacturers to improve fuel efficiency at the highest level in the world.



○ “JC08 mode” are used in FY2020 standard, as is the case in FY 2015 standard.

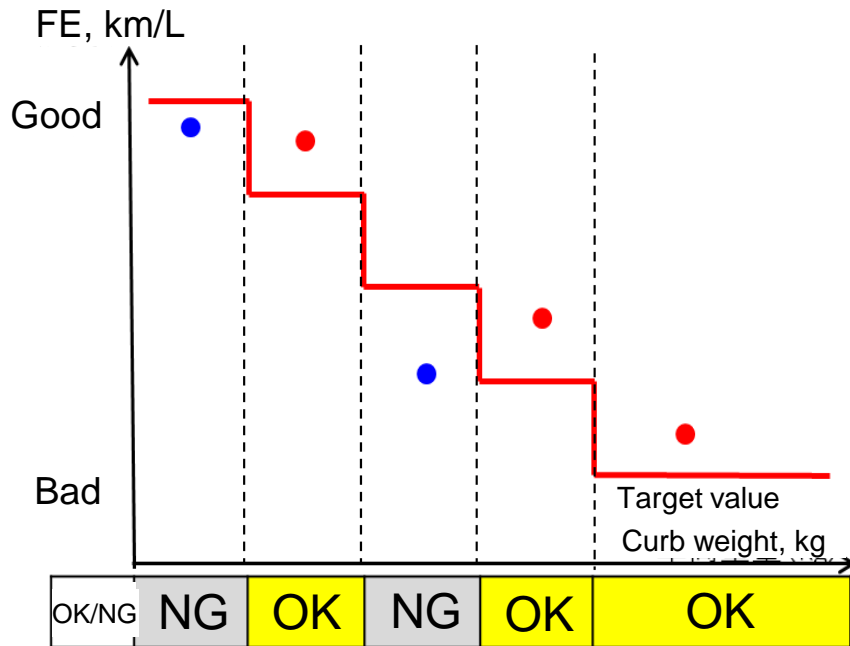


$$\text{JC08 mode} = \frac{1}{\frac{0.25}{\text{Cold start FE}} + \frac{0.75}{\text{Hot start FE}}}$$



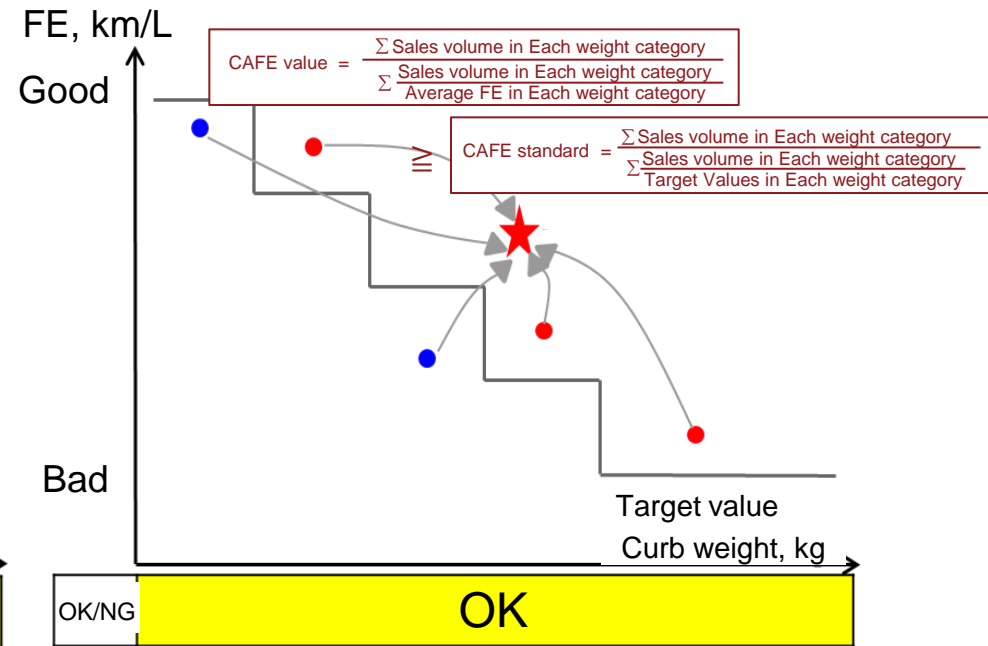
- Recently, technologies for improving fuel efficiency have been diversified, and those developing costs are increasing. In this context, it is difficult for manufacturers to achieve fuel efficiency target in all weight categories in weight category based standard, because manufacturers cannot focus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



- 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	8.06 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		
<b>Converted FE</b>	<b>83.1 km/L</b>	<b>73.7 km/L</b>	<b>44.6 km/L (combined)</b>

\* Electric drive distance

Requisite condition:

$$\text{CAFE value} \geq \text{CAFE standard} \times 0.9$$


Source: Manufacturer's HP

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



- Regulations in Japan
- **EFV incentive**
- EFV market growth and environmental effect

# The tax reduction for Eco-Cars

- The tax reduction for Eco-Cars, in vehicle weight tax and vehicle acquisition tax.
- It was introduced to stimulate of auto sales and promote Eco-Cars.

The target of requirement		Rate of tax reduction (Acquisition Tax and Weight Tax)	
	Fuel efficiency [The 2010 fuel efficiency Standard]		Emission [The 2005 emission standard]
Electric vehicles, Plug-in hybrid vehicles, Natural gas vehicles, Diesel passenger vehicles.		Exemption	
Hybrid vehicles	Surpass the 2010 FE standard by 25%		
Gasoline Vehicles	Surpass the 2010 FE standard by 25%		
	Surpass the 2010 FE standard by 15%		
		Surpass the 2005 emission standard by 75%	75%-reduction
			50%-reduction

## The Benefit for Consumers

	Rate of tax reduction	Tax Name	Price of tax reduction
Hybrid Vehicle 	Exemption	Automobile Acquisition Tax	\90,000
		Automobile Weight Tax	\56,700
		<b>Total Reduction</b>	<b>\146,700</b>
Gasoline Vehicle 	75%-reduction	Automobile Acquisition Tax	\67,500
		Automobile Weight Tax	\42,600
	<b>Total Reduction</b>	<b>\110,100</b>	
	50%-reduction	Automobile Acquisition Tax	\45,000
		Automobile Weight Tax	\28,400
		<b>Total Reduction</b>	<b>\73,400</b>

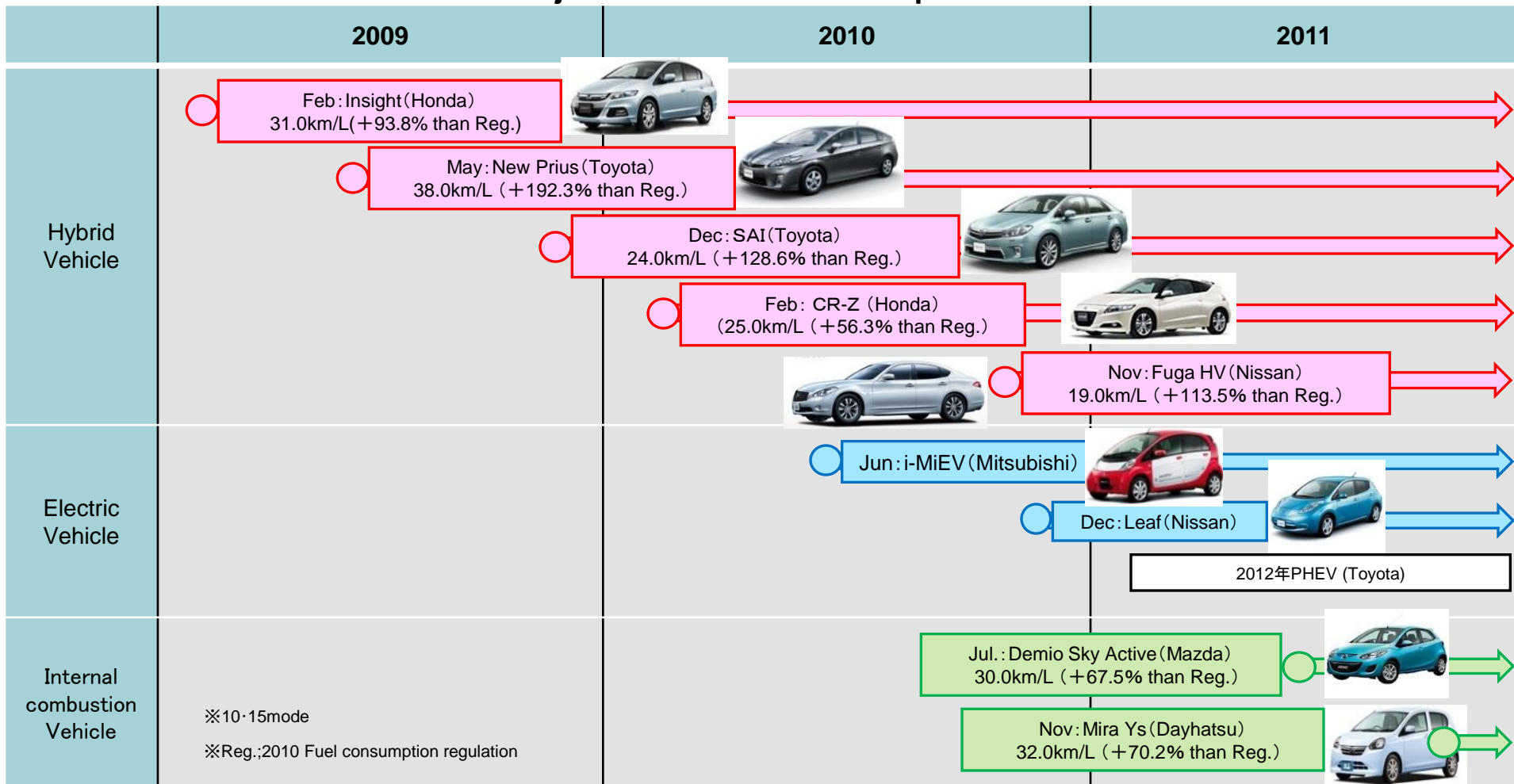
※The case of the price \1,800,000, less than 1.5 ton weight ,less than engine capacity1,500cc vehicle.

- Regulations in Japan
- EFV incentive
- **EFV market growth and environmental effect**

○After eco-cars tax reduction introduction, technology development is accelerating  
And New EFVs are introduced to Japanese market.

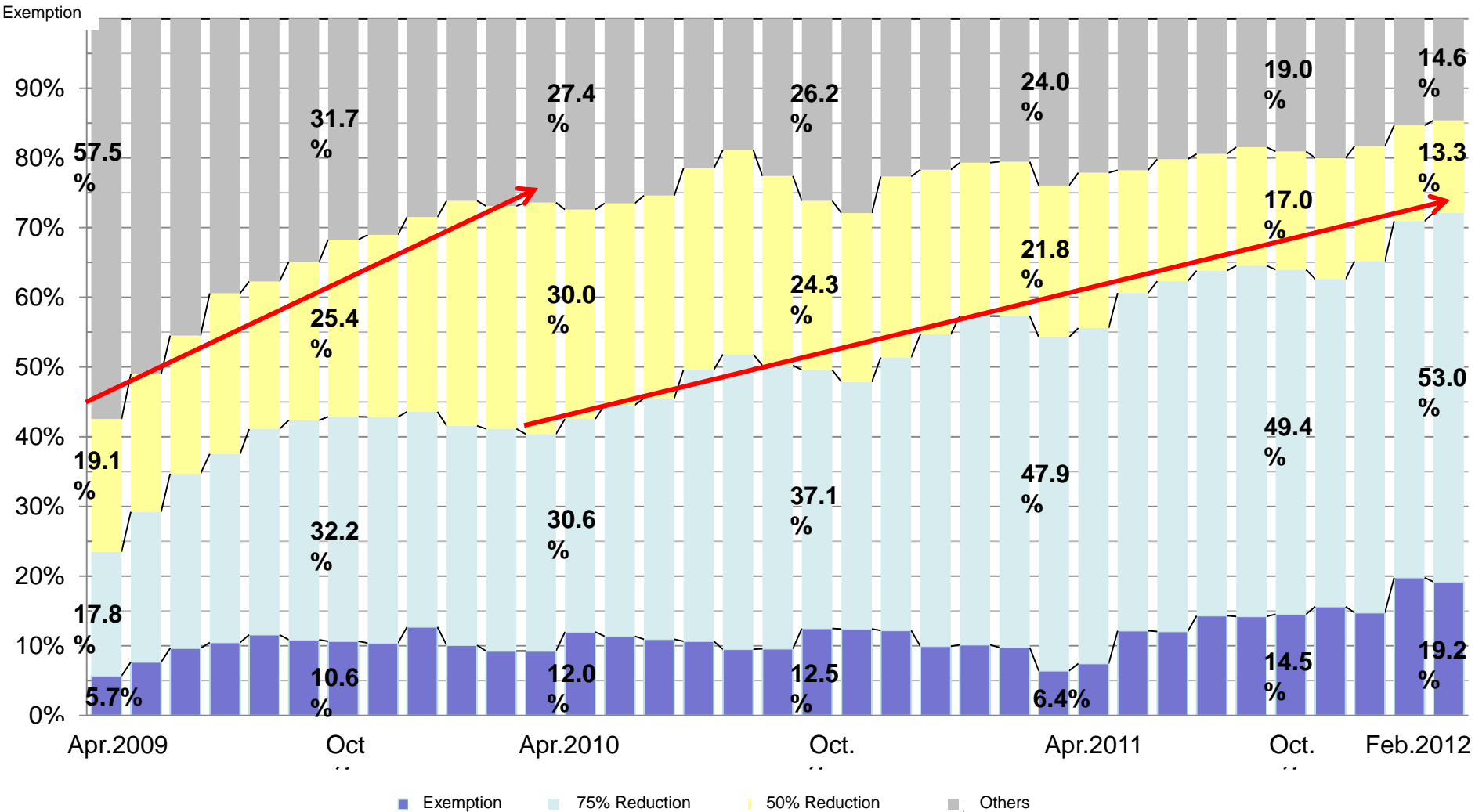
- Hybrid vehicles are introduced several segments and there are more model variations .
- Zero Emission vehicle like electric and the plug-in hybrid are come up.
- Some Internal combustion engine vehicle has equal to the mileage performance of the hybrid .

## Major EFV introduction to Japanese Market



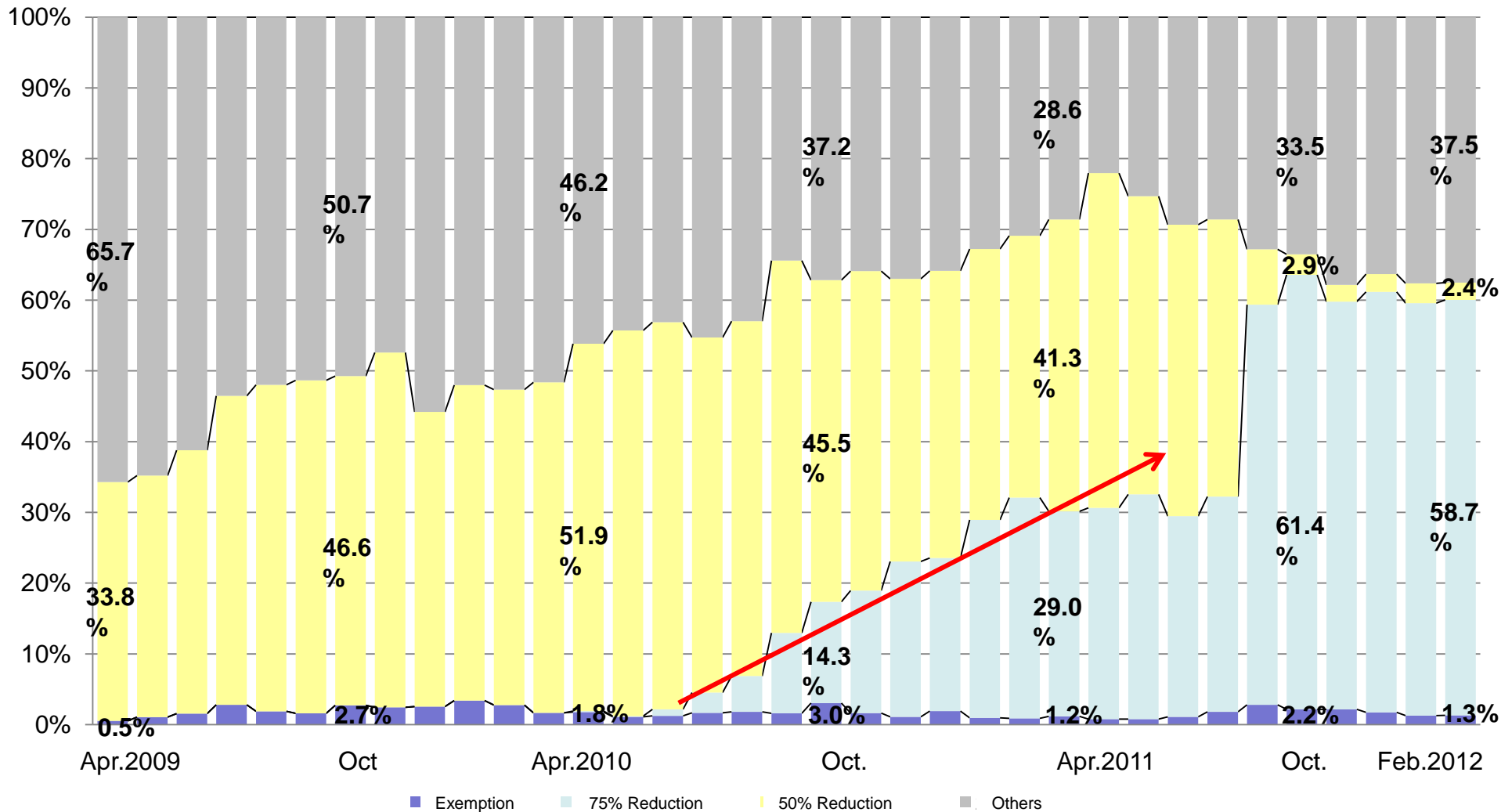
# Market shear of Eco-cars: passenger vehicle

- Just after eco-car reduction of taxes introduction, the eco-car sales ratio rises rapidly.  
(Apr. 2009 : 42.5% → 2010 Mar. 73.6%)
- Demand shifts to a more fuel-efficient (a reduction of taxes rate is high) car afterwards.



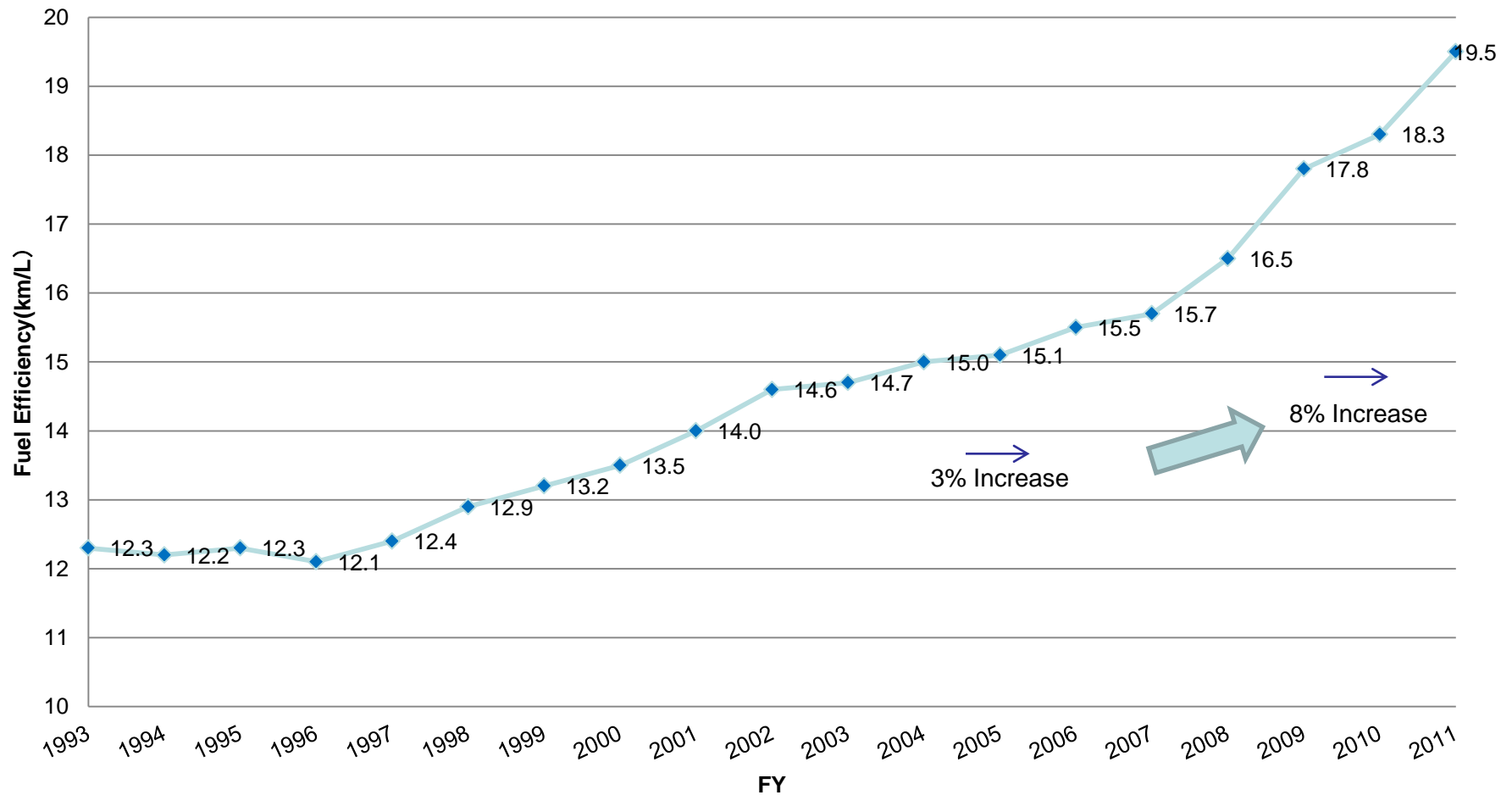
# Market share of Eco-cars: Truck/Bus

○After eco-car reduction of taxes introduction, better spec vehicle(75% off) development accelerates.





○ Average FE of PV in Japan has been improving steadily due to manufactures' activities and policy measures such as a tax reduction scheme for Eco-Cars.

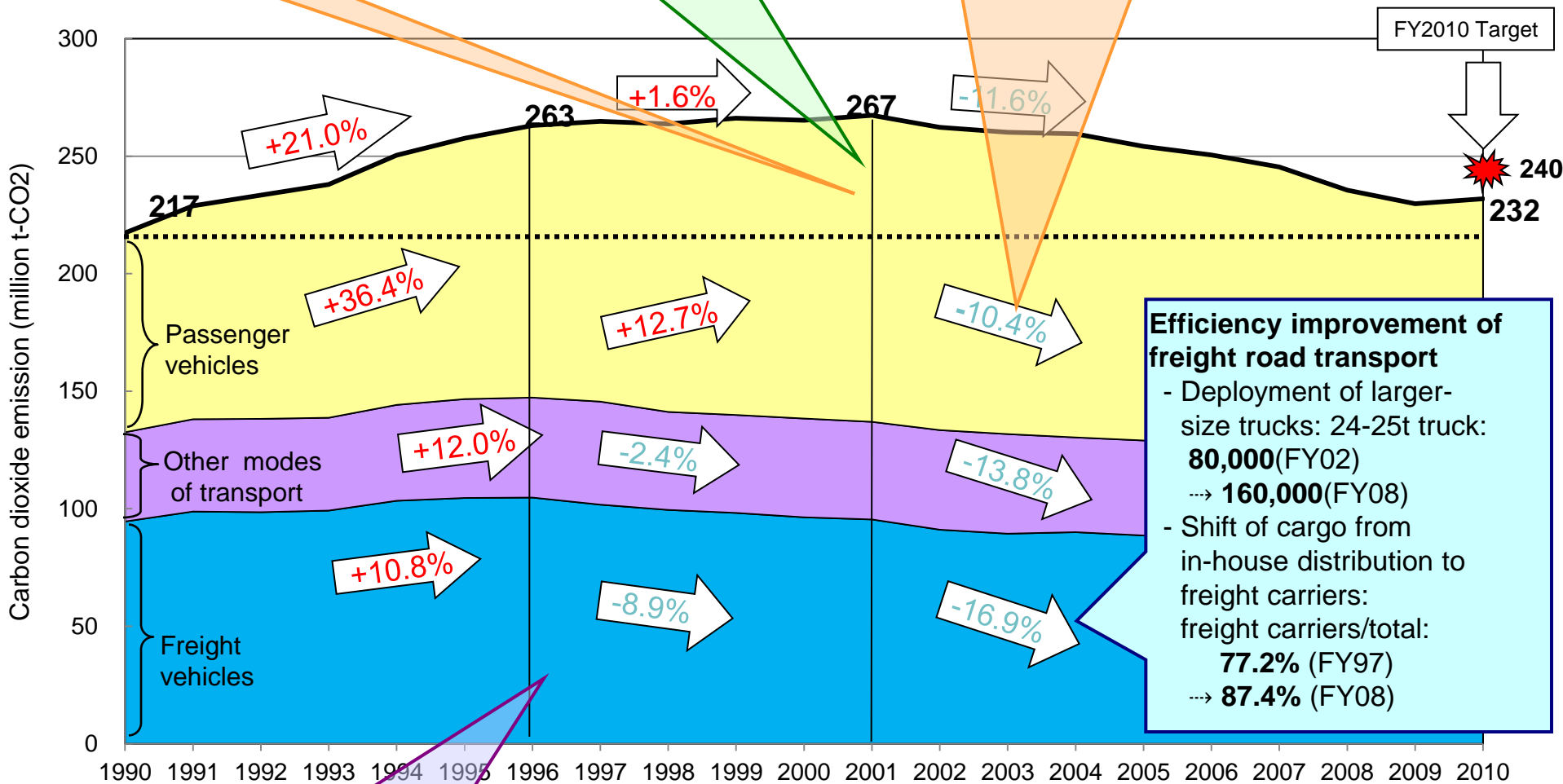


Emissions from passenger transport on road peaked in FY2001.

Since FY2001, emissions from the transportation sector have been on a downward trend.

### Improvement of mileage of passenger vehicles

- Fuel Efficiency regulation
- Green Tax (Since FY2001)
- 18.2mil./57.7mil. registered vehicles are GREEN



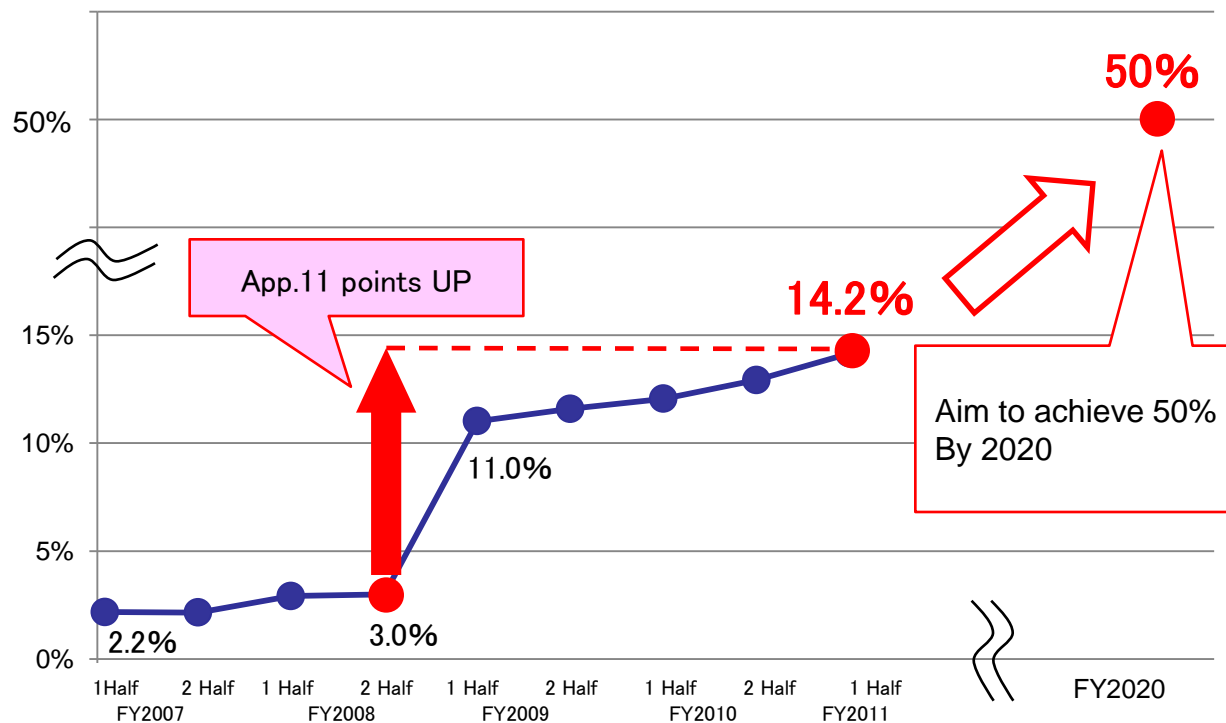
### Efficiency improvement of freight road transport

- Deployment of larger-size trucks: 24-25t truck: 80,000(FY02) → 160,000(FY08)
- Shift of cargo from in-house distribution to freight carriers: freight carriers/total: 77.2% (FY97) → 87.4% (FY08)

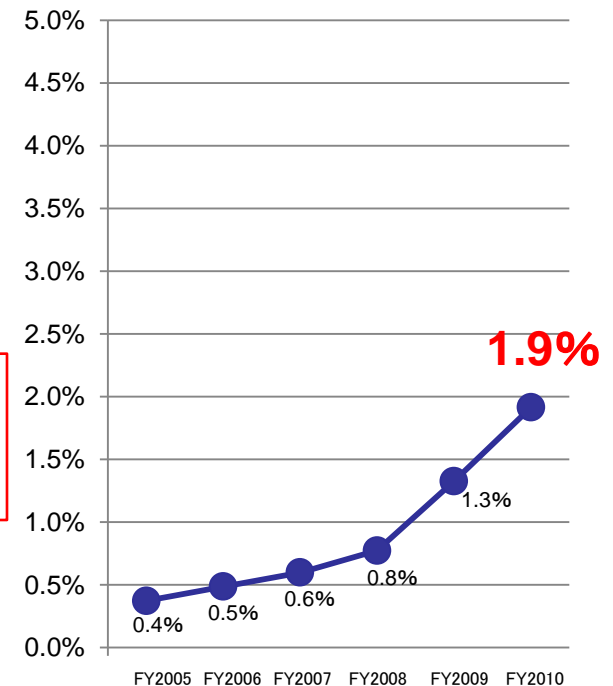
Emissions from freight transport on road peaked out in FY1996

- After Eco-cars Tax Reduction introduction, Sales Share of Next Gen. EFVs is jumping up: 3%⇒14%
- However, Stock share of Next Gen. EFVs is still around 2%

### Sales share of Next Gen. EFVs (Passenger vehicle)



### Stock share of Next Gen. EFVs



Next Gen. EFVs: Hybrid, Electric plug-in Hybrid, Fuel cell, Clean Diesel, CNG