

Japanese Approach on CO₂ Reduction from Automobile

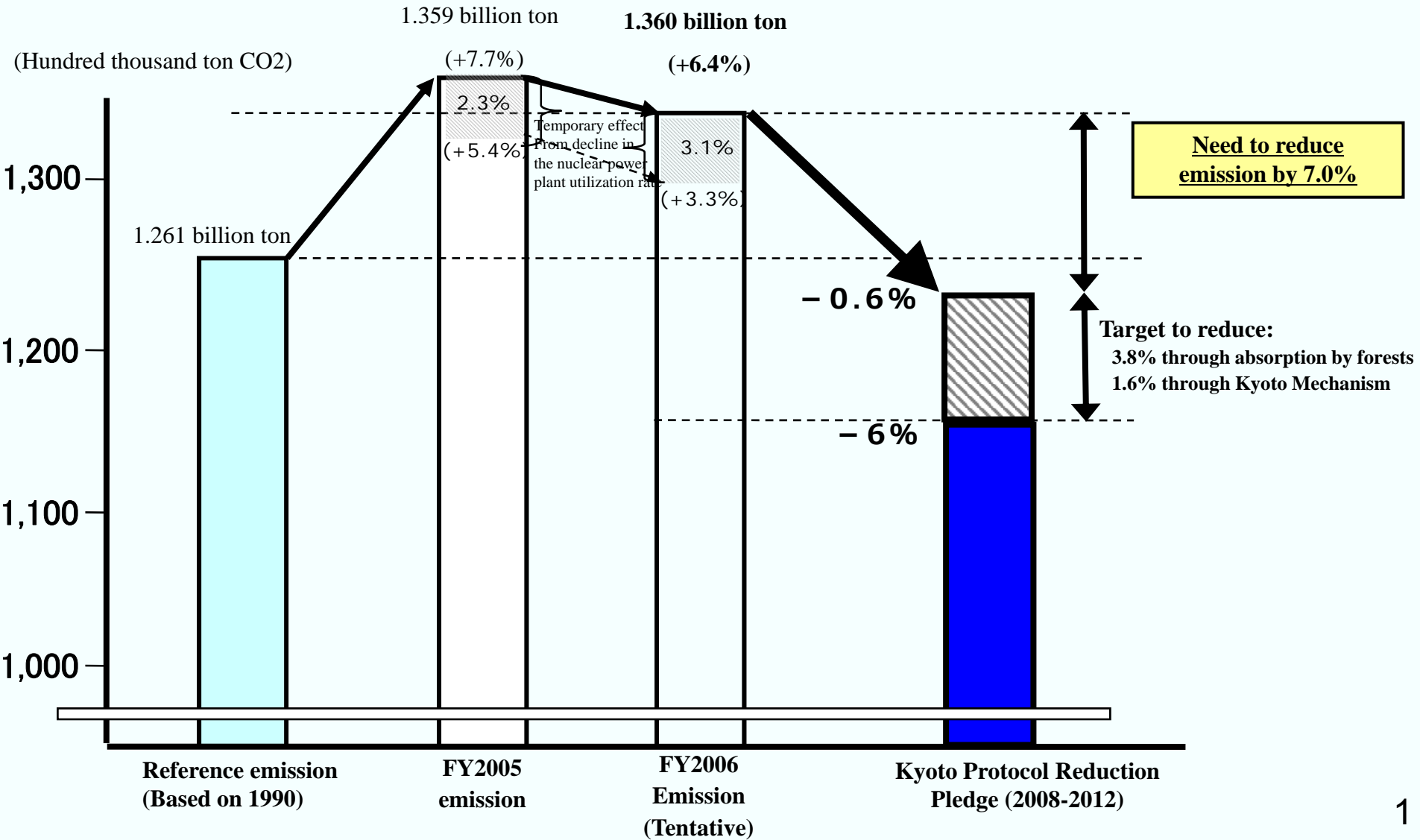
Japan Automobile Manufacturers Association , Inc
May 15, 2008

Discussion Points

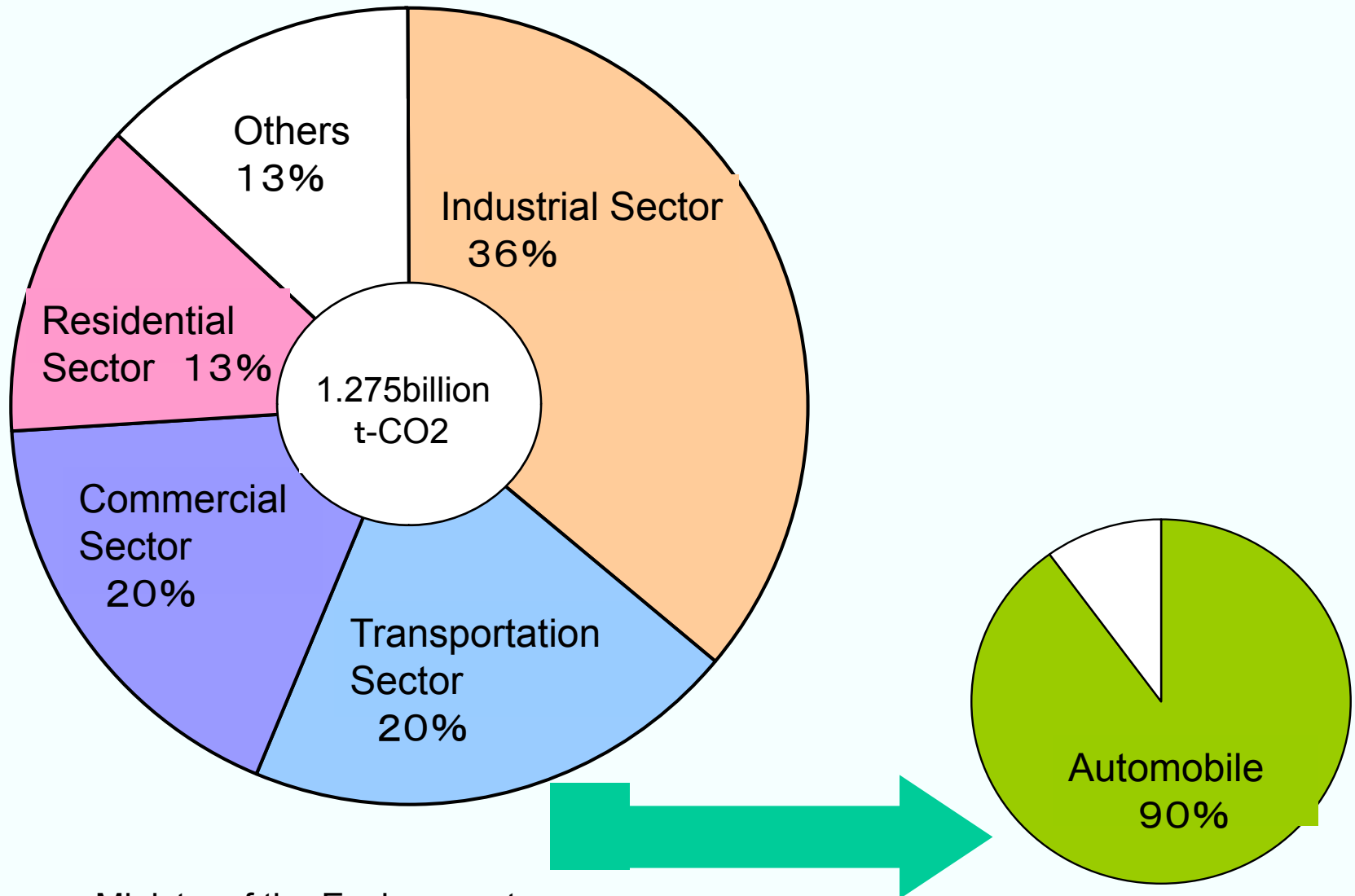
- GHG Reduction from road transport in Japan
- Integrated approach is efficient
- Fuel efficiency standard in Japan
 - 2010 Standard vs 2015 Standard
- Conclusion

Greenhouse Gas Emission in Japan

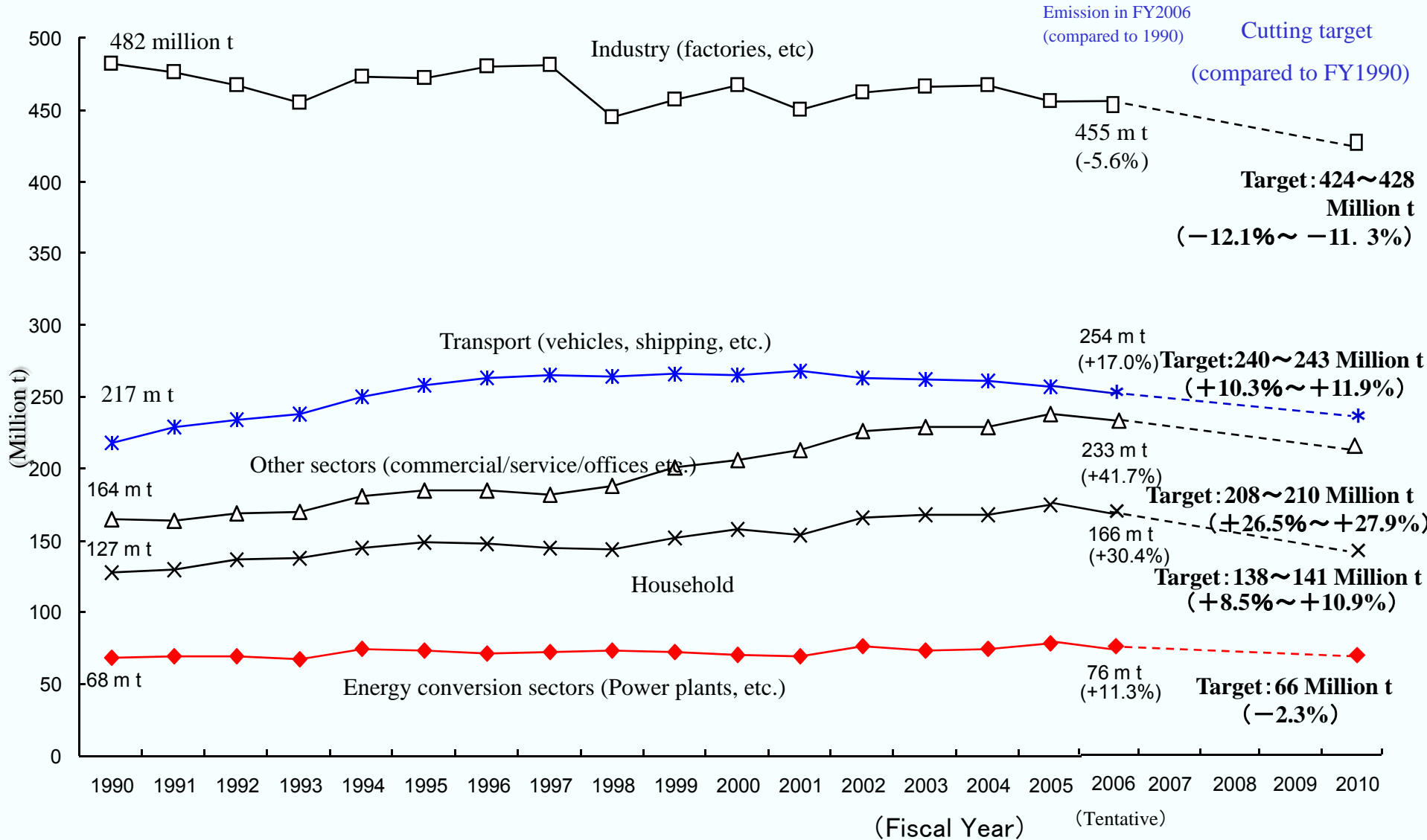
The emission in FY2005 surpassed the 1990 reference by 6.8%,
 Japan needs to curtail emission by 7.0% to achieve the 6% reduction committed to in the Protocol.



CO2 Emission in FY2006 in JAPAN

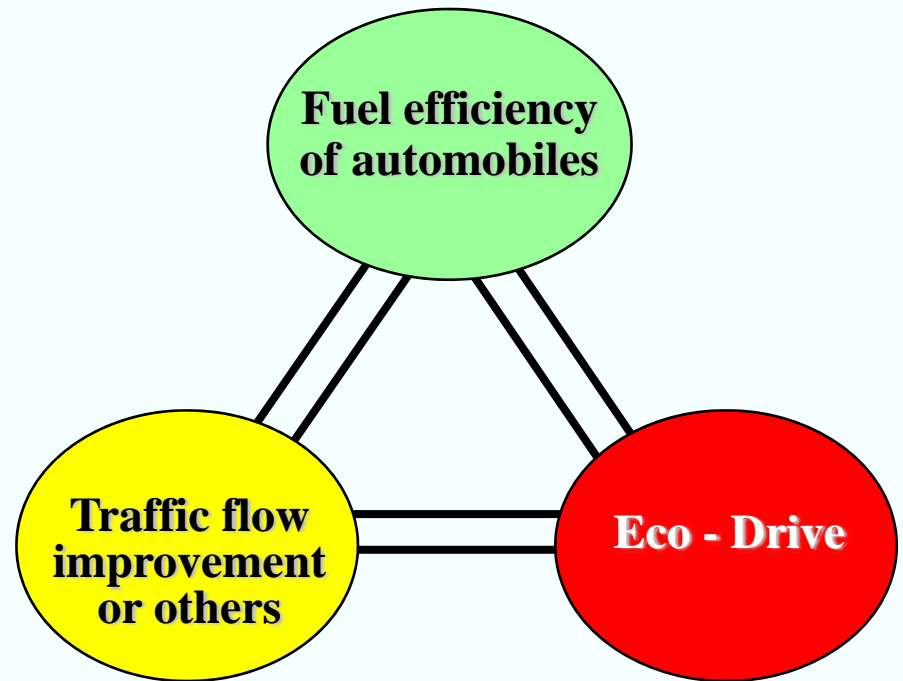
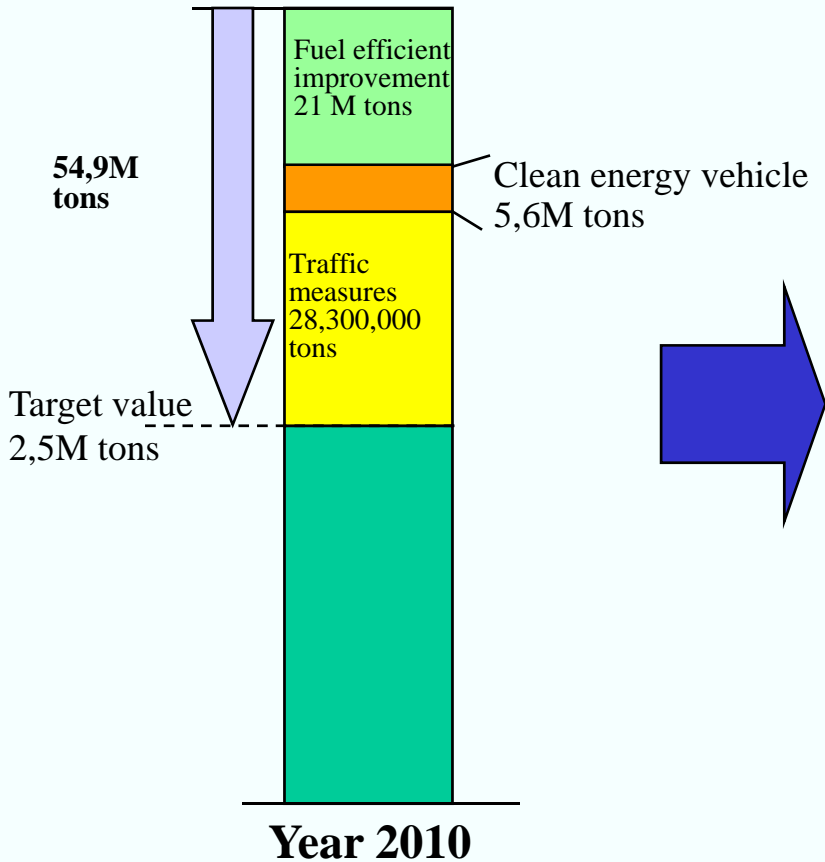


CO2 Emission Amount by Sector



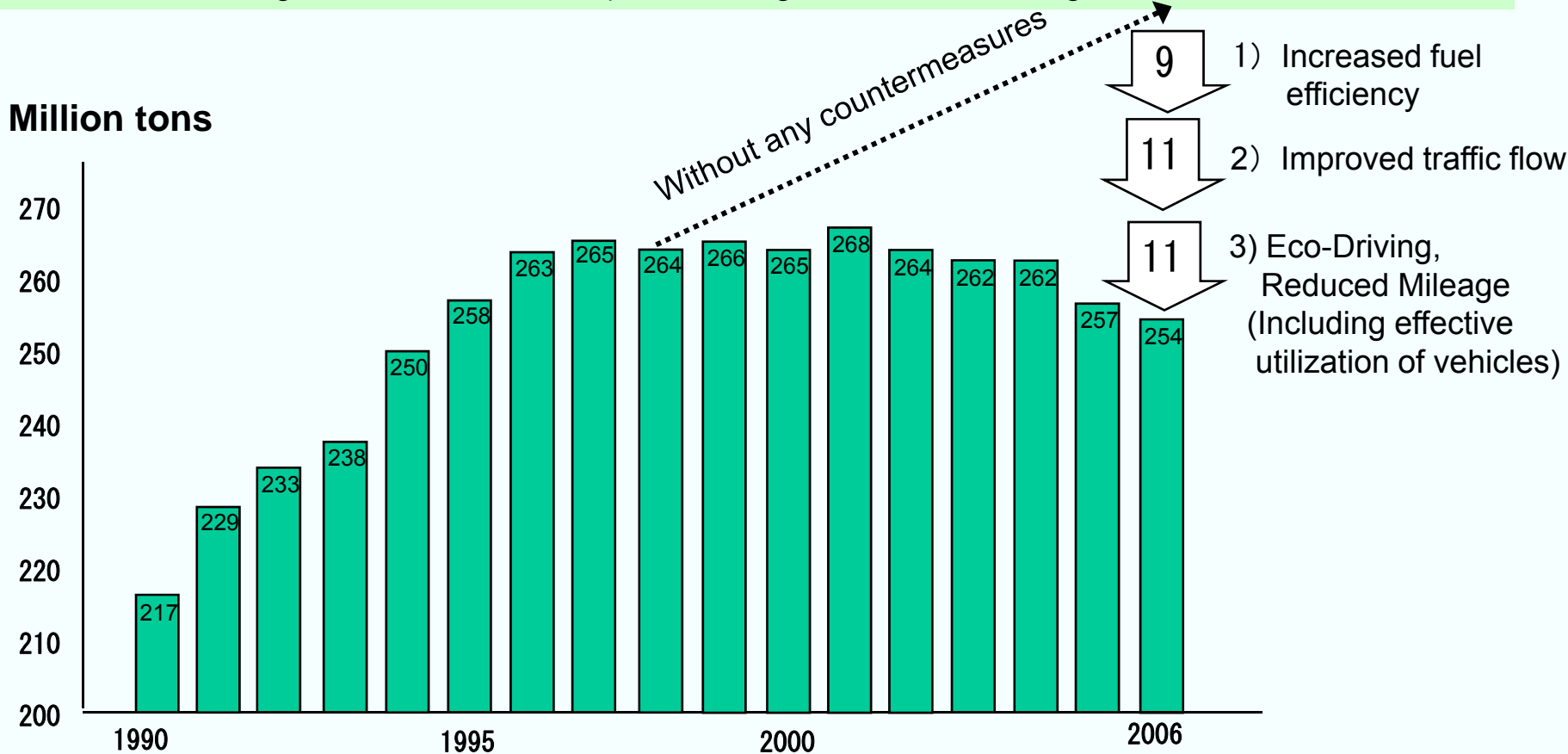
Comprehensive Efforts

Plan to Achieve Targets in the Transport Department



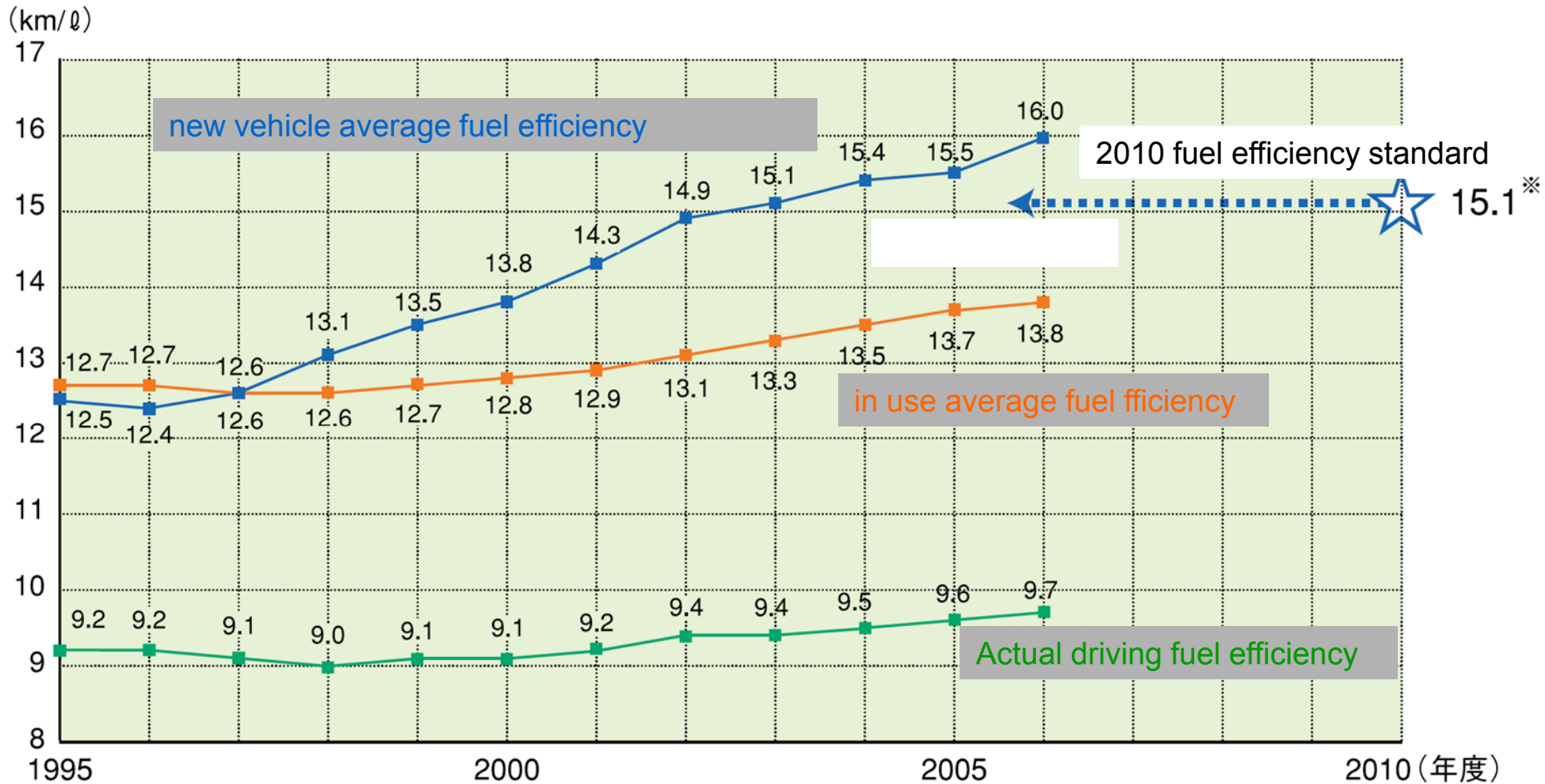
CO₂ Emissions in Japan's Transport Sector Continue to Decrease

After peaking in 2001, CO₂ emissions generated in the transport sector have been on the decrease. This is mainly attributable to 1) increased fuel efficiency by auto- technologies, 2) improved traffic flow by infrastructure and signal control, etc., and 3) Eco-Driving and reduced Mileage of vehicles.



Note: About 90% of CO₂ emissions generated by Japan's transport sector are caused by road transportation.

Trend of Average Fuel Efficiency of Gasoline-Powered Passenger Cars



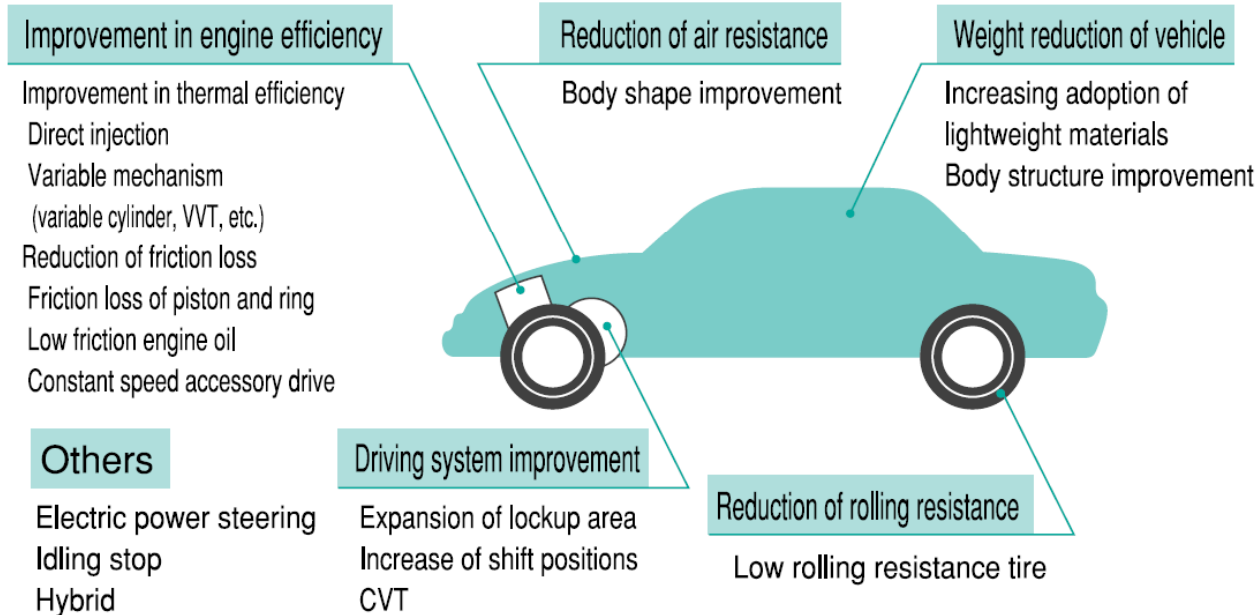
Fuel efficiency target for 2010 was calculated on the bases of weighted average values of fuel efficiency performance for the respective vehicle weight categories, assuming the same respective shipment volume ratios for 2010 as those recorded in 1995.

Source: JAMA

Fuel Efficiency Improvement

Fuel efficiency improvement is the fruit of slow but steady engineering efforts. JAMA member companies have aimed for the early achievement of 2010 fuel efficiency standard by mobilizing human and financial resources intensively.

Technology for fuel efficiency improvement is the fruit of slow and but steady engineering efforts. The efforts have been made not only for mode fuel efficiency but for improving fuel efficiency for the actual driving.



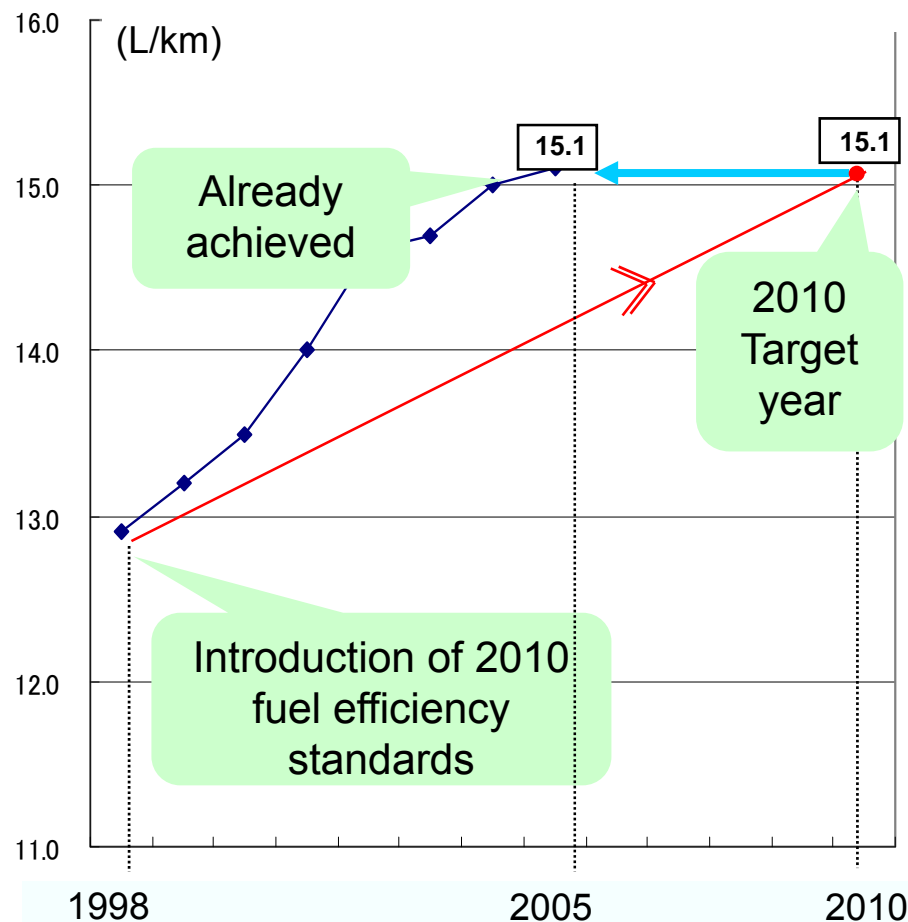
Source: JAMA

Green Taxation Plan

The green taxation plan, coupled with the pursuit of top level fuel efficiency, has served improvement .

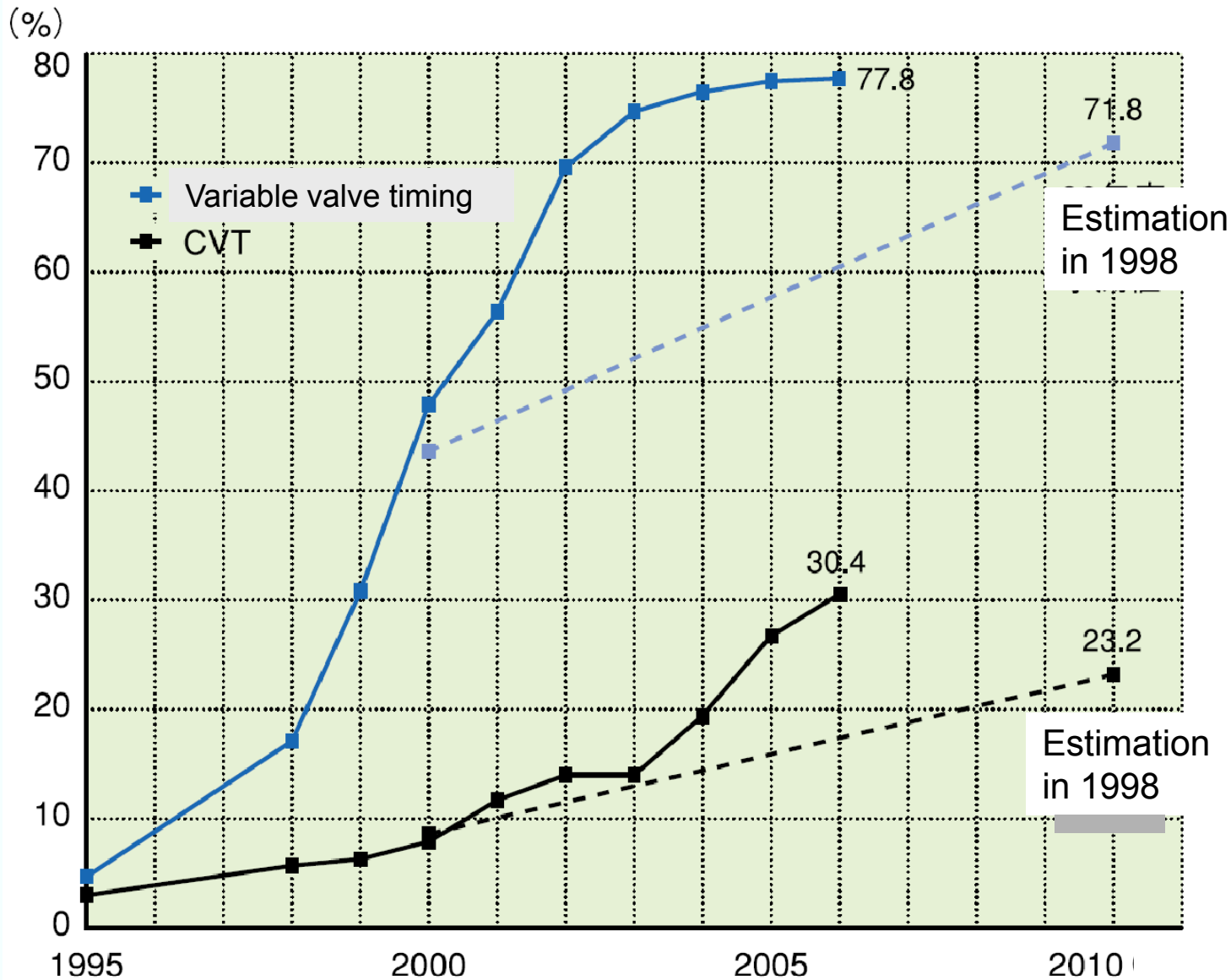
	Exhaust gas	Fuel efficiency standard	Tax reduction	
			Automobile tax	Automobile acquisition tax
Passenger vehicles	<p>(75 % lower than the 2005 emission standard)</p>	Surpassed 2010 fuel efficiency standard by 20 % or more 	50 % reduction	300,000 yen deduction from acquisition value
		Surpassed 2010 fuel efficiency standard by 10 % or more 	25 % reduction	150,000 yen deduction from acquisition value
Heavy-duty vehicles	10 % lower NOx or PM than new long-term requirement	Heavy-duty vehicles surpassing 2015 fuel efficiency standard 	—	2 % reduction
	Coupled with new long-term regulation		—	1 % reduction

Change of fuel efficiency in passenger cars

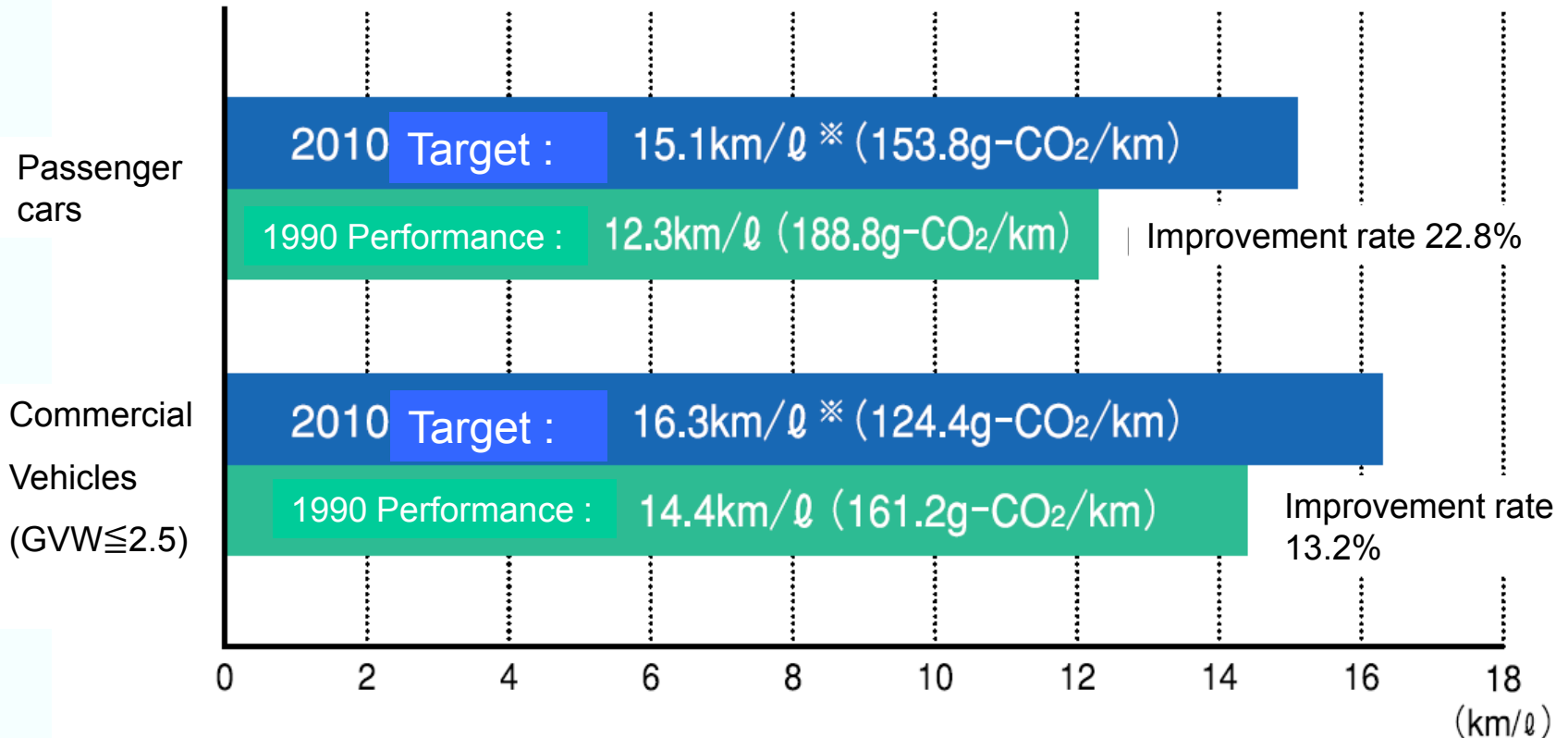


Implementation period: 2 years (To the vehicles that will be registered in 2006 and 2007)

Adoption Rates of Major Improvement Technologies



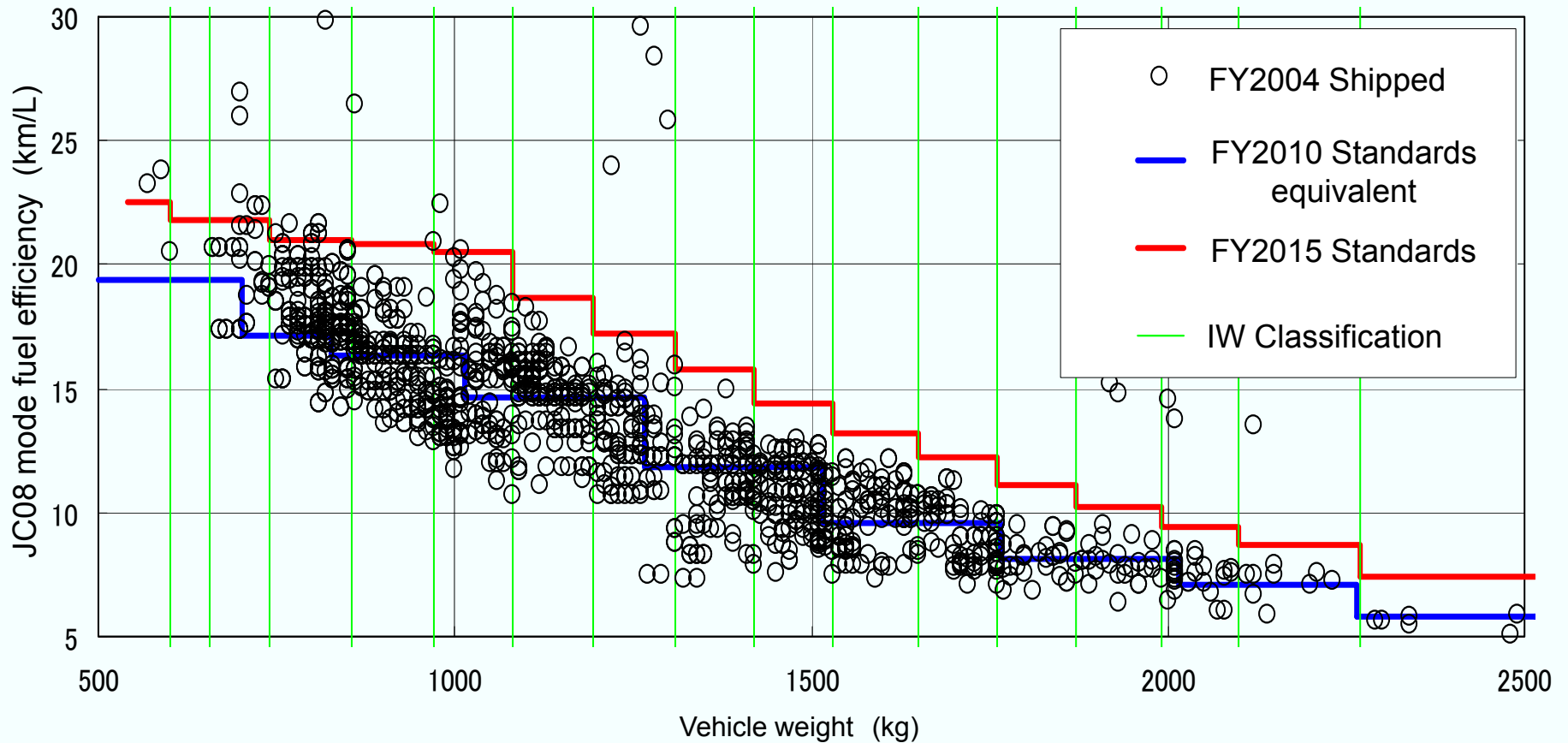
Average Fuel Efficiency 2010 Targets for Gasoline Vehicles



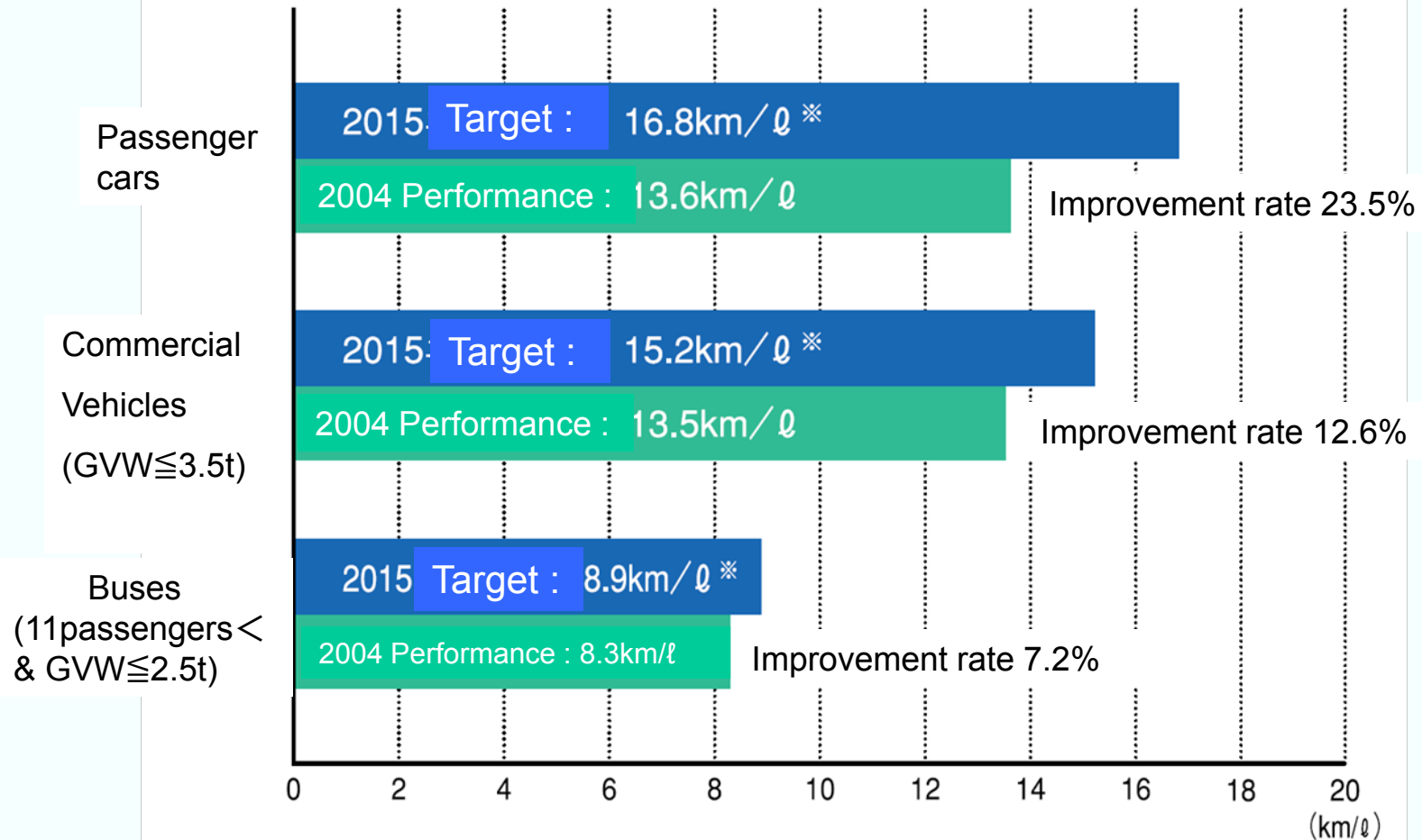
Calculated on the basis of weighted average values of fuel economy performance for the respective vehicle weight categories, assuming the same respective shipment volume ratios for 2010 as those recorded in 1995.

Source: METI, MLIT

Gasoline Passenger Cars Fuel Efficiency Distribution of Shipped in FY2004



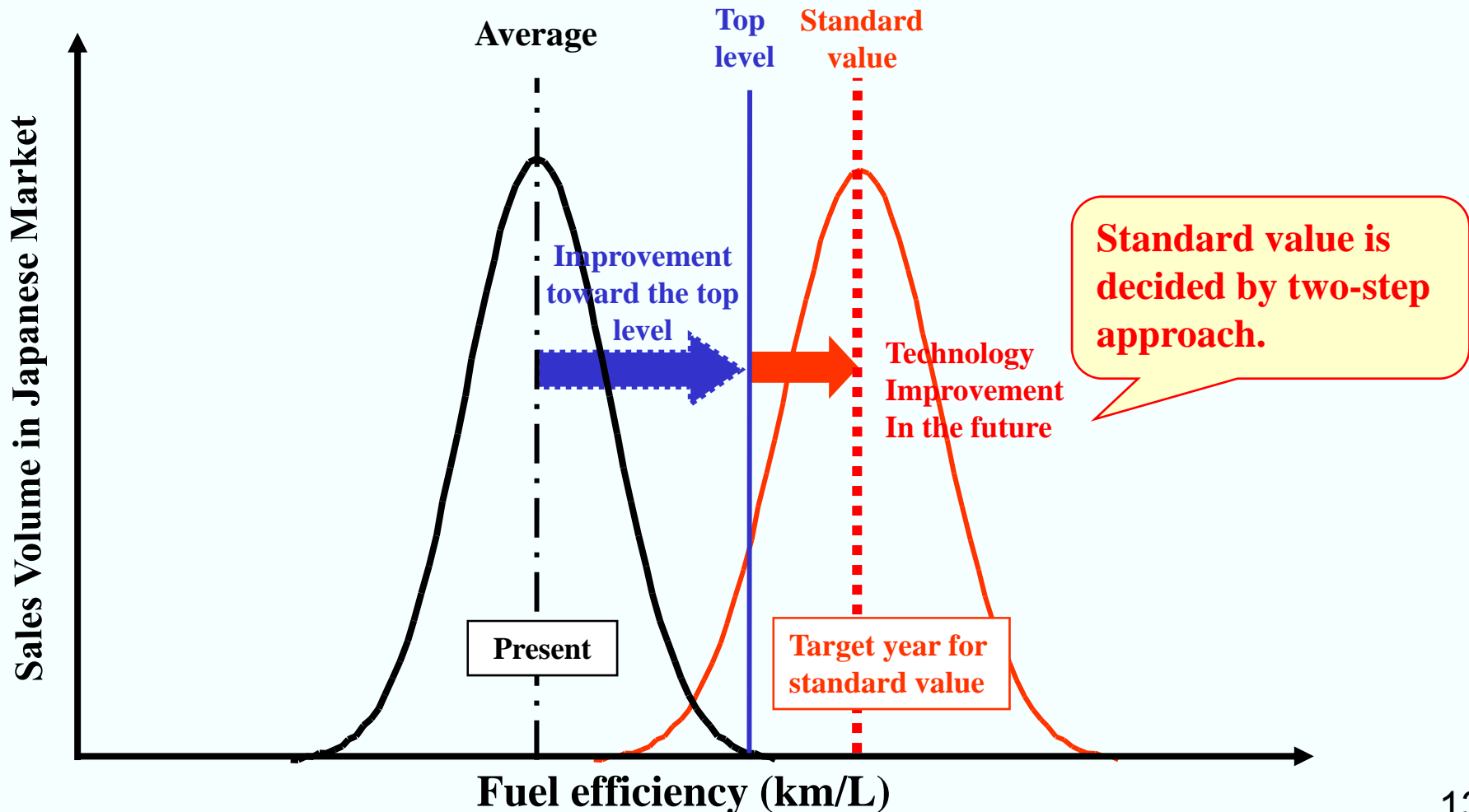
Average Fuel Efficiency 2015 Targets for Vehicles



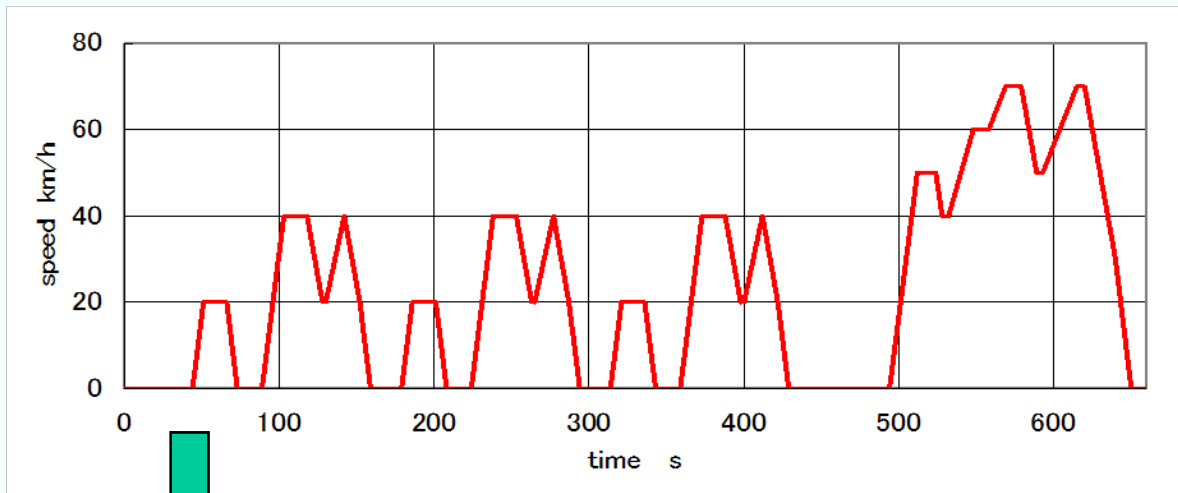
Calculated on the basis of weighted average values of fuel economy performance for the respective vehicle weight categories, assuming the same respective shipment volume ratios for 2015 as those recorded in 2004.

Source: METI, MLIT

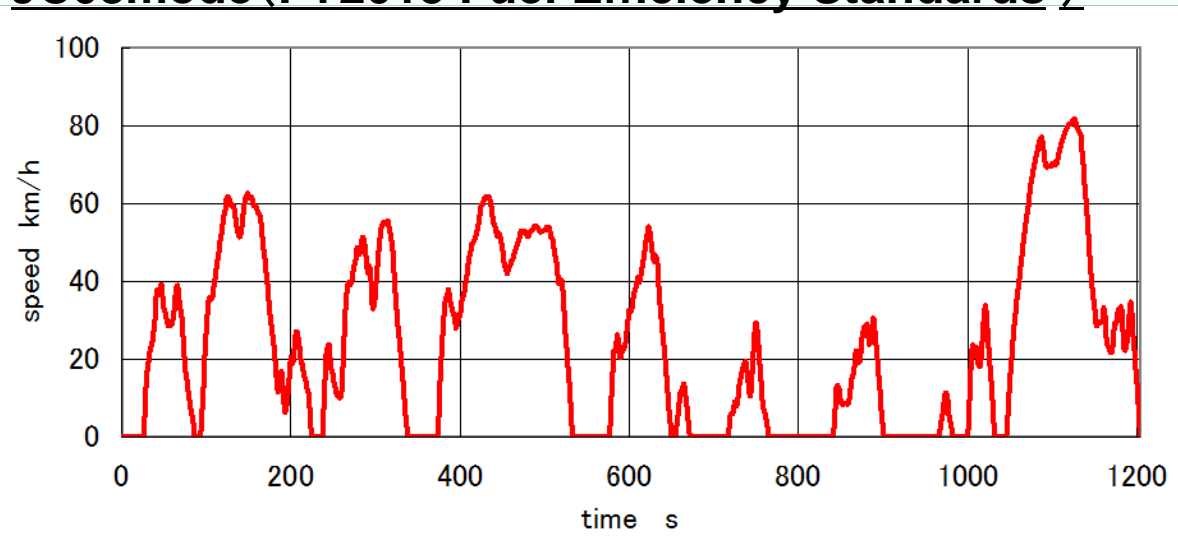
How to decide the top-runner fuel efficiency standard (Example in a weight class)



10·15mode (FY2010 Fuel Efficiency Standards)



JC08mode (FY2015 Fuel Efficiency Standards)



<10·15mode>

Mileage : 4.165km
 Time : 660s
 AV. Speed : 22.7km/h
 Top Speed : 70km/h
 Idling Time Ratio : 32.4%
 Hot Start

<JC08mode>

Mileage : 8.159km
 Time : 1204s
 AV. Speed : 24.4km/h
 Top Speed : 81.5km/h
 Idling Time Ratio : 29.7%
 Hot & Cold Start

Weighted harmonic average of hot start and cold start

$$E = \frac{1}{\left(\frac{0.25}{E_{JC08C}} + \frac{0.75}{E_{JC08H}} \right)}$$

	New(FY2015)	Now(FY2010)	FE Impact
Driving mode	JCO8 mode	10・15 mode	Approximately 10% down (Average)
Start Driving	Cold start & Hot start	Hot start	
Weight Classification	Every 110 kg	Every 250 kg	

Three Main Features of 2015 Fuel Efficiency Standard

2010 Fuel Efficiency Standard

2015 Fuel Efficiency Standard

Combining gasoline and diesel passenger cars into the same category (Fuel neutral)

- Sales of HEVs have given manufacturers advantage to meet the PV standard.
- Sales of diesel PV did not give advantage because diesel and gasoline were separated into different categories.

- Sales of either HEVs or diesel will give manufacturers advantage to meet the PV standard.

Introducing credit system

- Standard values had to be reached in all category in order to meet the standard. Therefore, over achievement in certain category was not considered.
- Gave disadvantage to manufacturers who had very fuel efficient cars in certain categories.

- With the introduction of credit system, over achievement in certain category can be compensated for under achieved categories.
- Gives manufacturers various ways to reach the standard.

Clarifying the criterion for the judgment before admonition

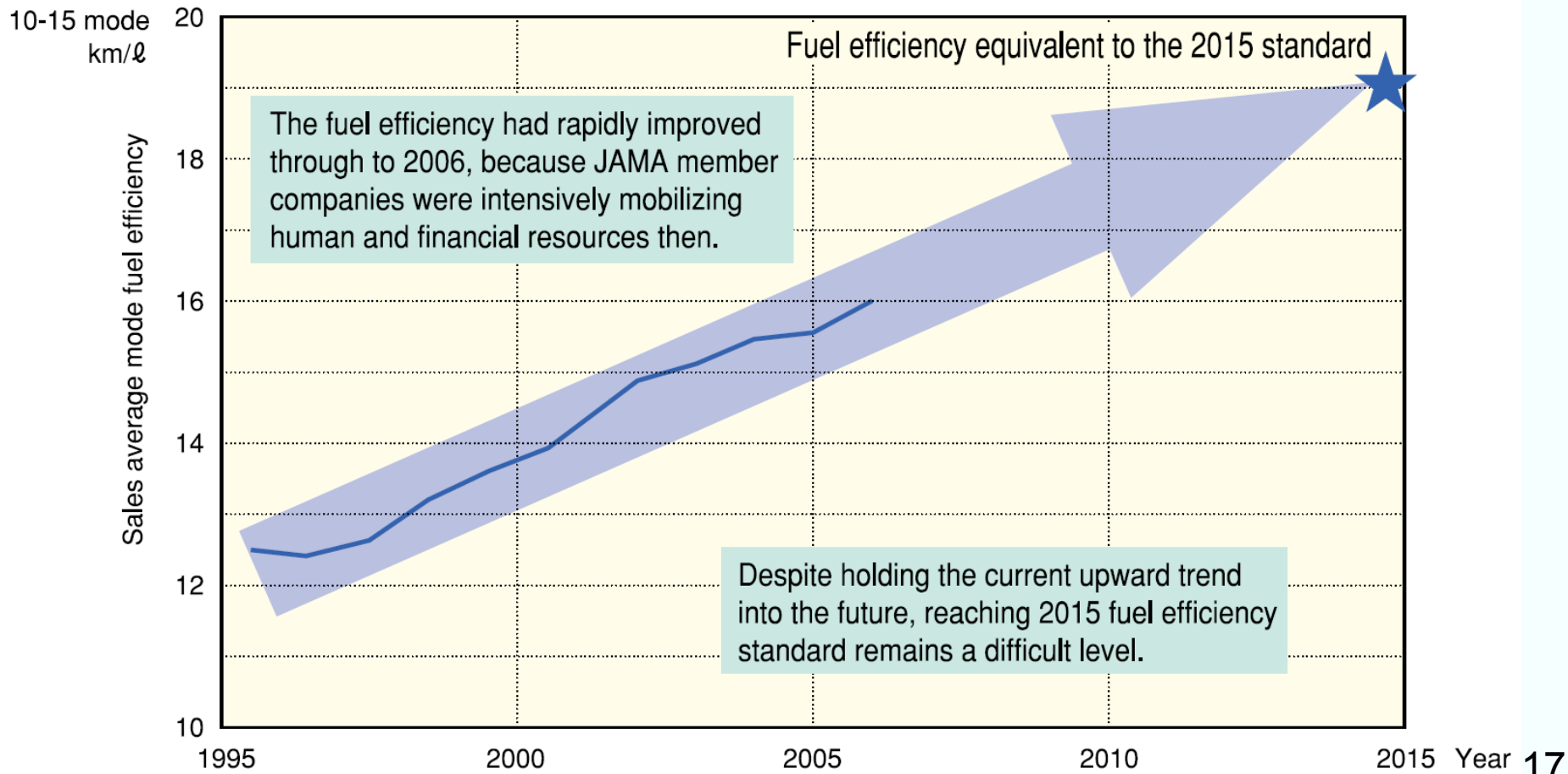
- When the standard was not met, manufacturers had a high risk of receiving admonition from the government.

- Clarifying the criterion will reduce the risk of receiving admonition from the government, when the standard was not met.

Fuel Efficiency Improvement

The 2015 fuel efficiency standard is very stringent.
JAMA makes efforts towards the achievement of this standard.

Average Trend of Fuel Efficiency of Gasoline-Powered Passenger Cars



Summary

1. After peaking in 2001, **CO2 emissions in Japan's transport sector have been steadily declining.** Therefore the 2010 target for the transport sector of the Kyoto Protocol action plan is expected to be achieved.
2. CO2 reduction is mainly attributable to **integrated approach**, not only vehicle fuel efficiency, but also improved traffic flow , efficient utilization of vehicles and other measures.
3. With **combination of the green taxation system**, in 2005, JAMA member manufacturers have achieved the 2010 target five years in advance.

Summary (Cont'd)

4. Under the 2015 standards, **IW classification was almost harmonized with the ECE Regulation.**
5. As for the standards according to the weight classification, severe competition between the car makers in the same segment occurs, and **there is an advantage that technology development progresses.**
6. Fuel efficiency standards are decided by the **Top Runner Method, which is technical bottom up approach based** on technical proof. The standards are achievable because they were not decided by non-technical top-down approach.