Energy Conservation Policies in Transport Sector in Japan

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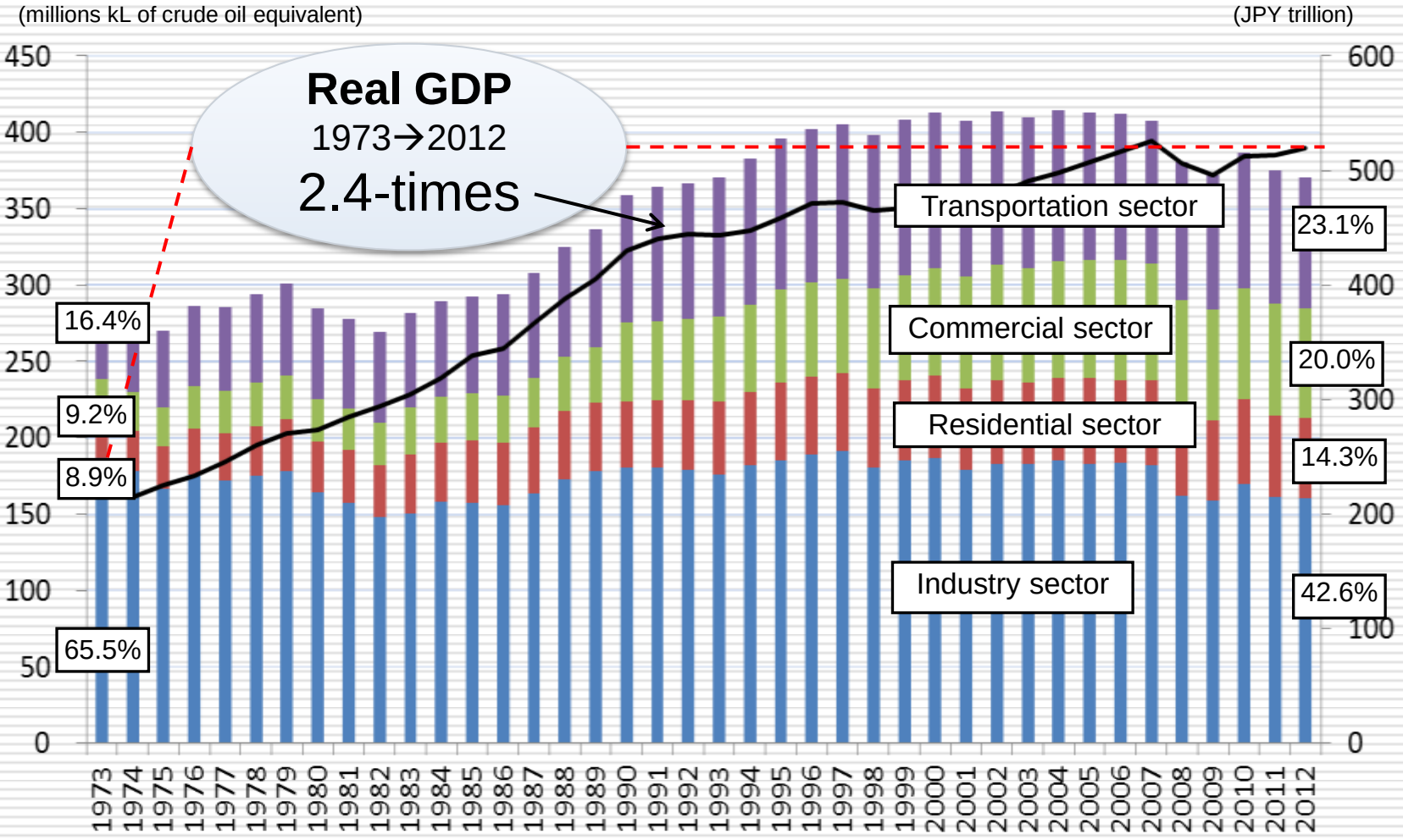
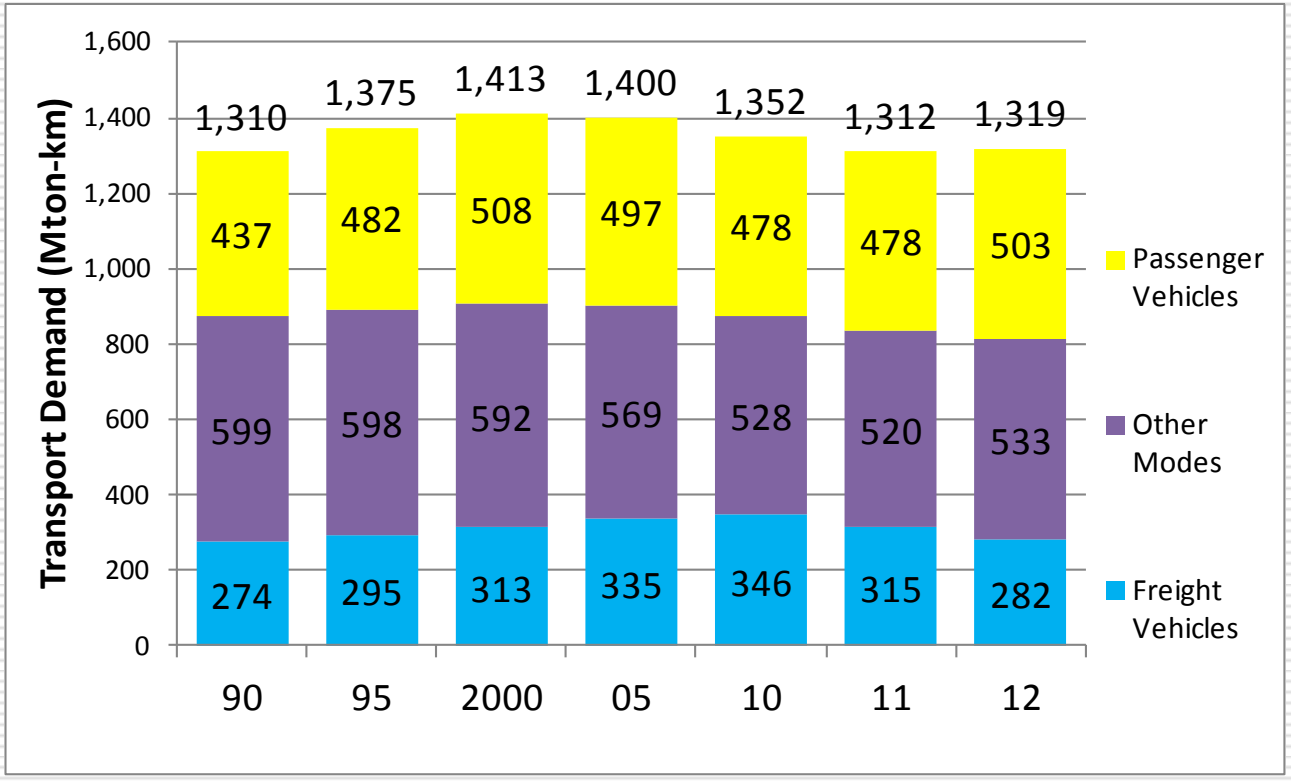
Final Energy Consumption



Sources: “Comprehensive Energy Statistics” and “Annual Report on National Accounts.” ※Value of 2012 are preliminary.

Transport increased to **about 1.8 times,** Industrial decreased to **about 0.8 times**.

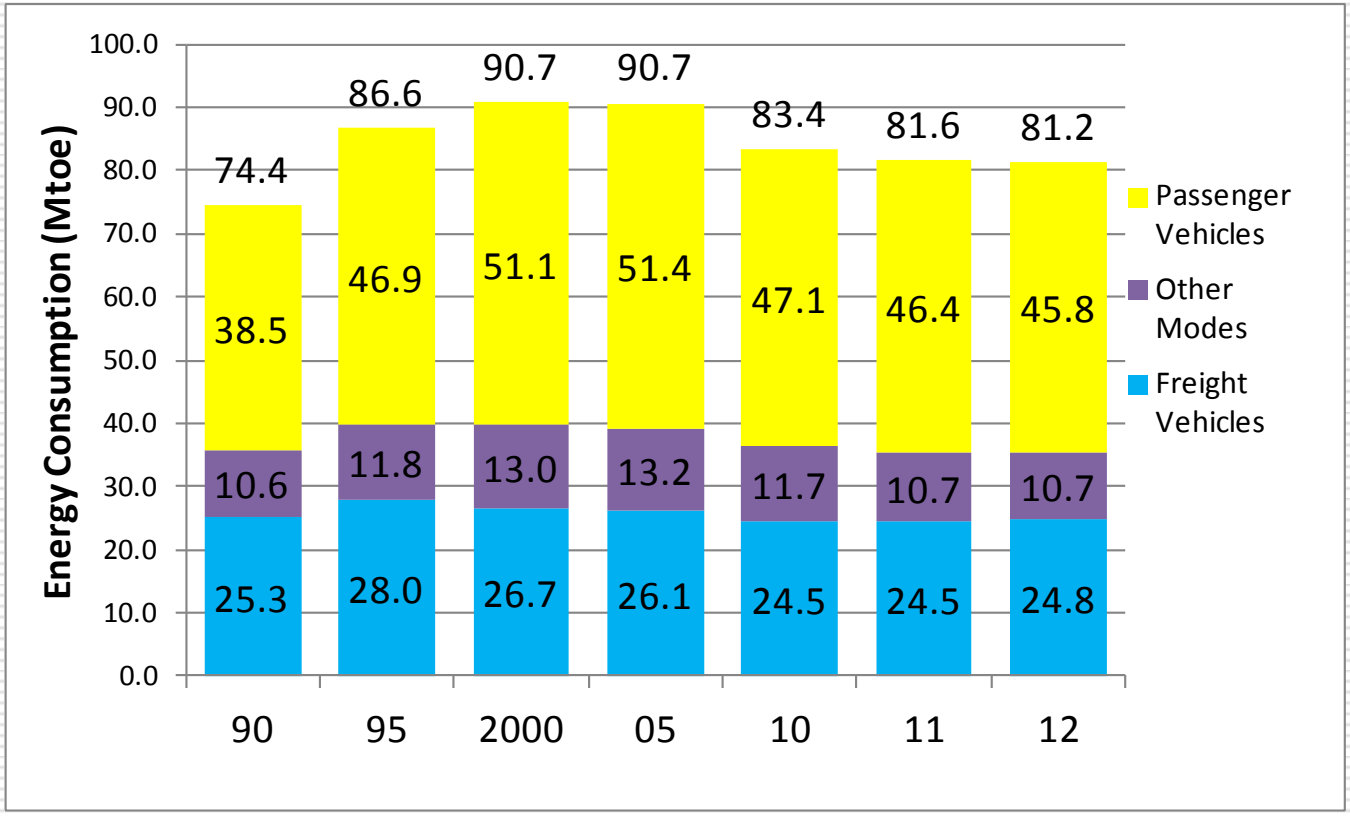
Transport demand by modes



Source: calculation based on Handbook of Energy & Economics Statistics, IEEJ/EDMC, 2014
Note1: Other modes includes bus, taxi, rail, ship and aviation.
Note2: Passenger-km is converted to ton-km by multiplying 0.588, which equalizes the energy intensity between passenger and freight transport.

-Road accounts for 59.5% in total demand in 2012.
-Total demand peaked off since 2001, and so did almost every mode.
-Only Passenger Railway, included in Other Modes, is slightly increasing.

Energy consumption by modes

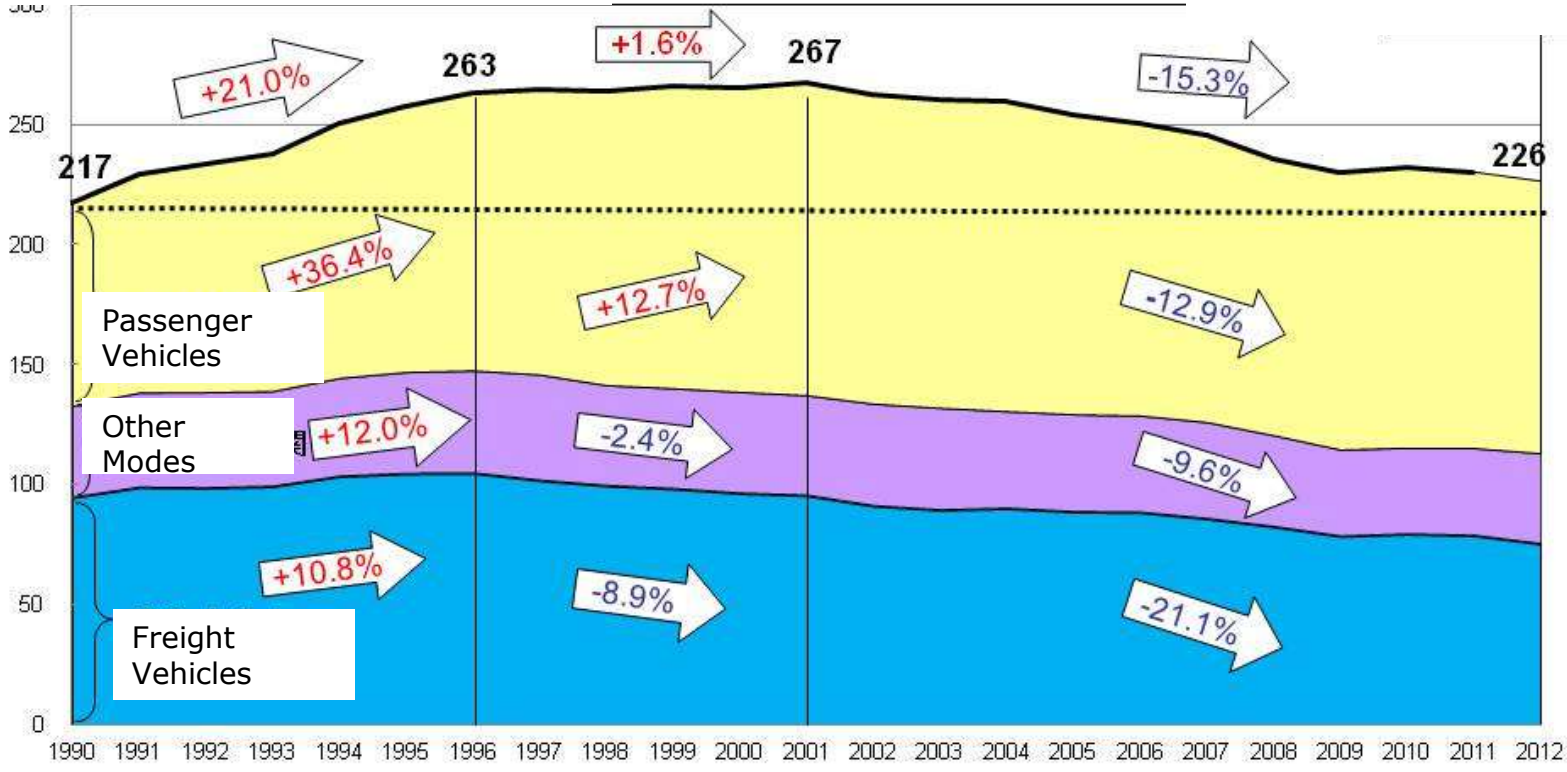


Source: Handbook of Energy & Economics Statistics, IEEJ/EDMC, 2014
Note1: Other modes includes bus, taxi, rail, ship and aviation.

-Road accounts for 86.9% in total energy consumption in 2012.
-Total energy consumption peaked off since 2001, and so did almost every mode.
-Only Bus, included in Other Modes, is slightly increasing.

CO2 Emissions by modes

CO2 emissions (Mt-CO2)



Other modes: bus, taxi, rail, ship, aviation

Source: MLIT, http://www.mlit.go.jp/sogoseisaku/environment/sosei_environment_tk_000007.html

-Total CO2 emissions peaked off since 2001, and are deceasing significantly.

Historical Development of Energy Conservation Act

Industry	Residential Commercial	Transportation
1979 Establishment Designated Energy Management Factories Guidance for Buildings and Appliances		
1983 Amendment Licensed energy manager system		
1992 Amendment Periodical reporting		
1998 Amendment Expand coverage of factories	**1998** Amendment Top Runner Program	
2005 Amendment Integration of Heat and Power Control	**2002** Amendment Energy Management of Office Buildings	**2005** Amendment Reporting System on Energy by Carriers
2008 Amendment Corporate Unit, Joint Conservation, Sector Benchmark	**2008** Amendment Provide Information, Chain shop, Efficiency Standards	
2013 Amendment Promotion of Equalization of electricity demand (Summer and Winter)	**2013** Amendment Expansion of coverage of Top Runner Program (Thermal insulation material, Three-phase induction motor, Bulb-shaped LED lamp)	

General regulation by Energy Conservation Law

➢Relationships between administration, business operator (factory) and Energy Manager

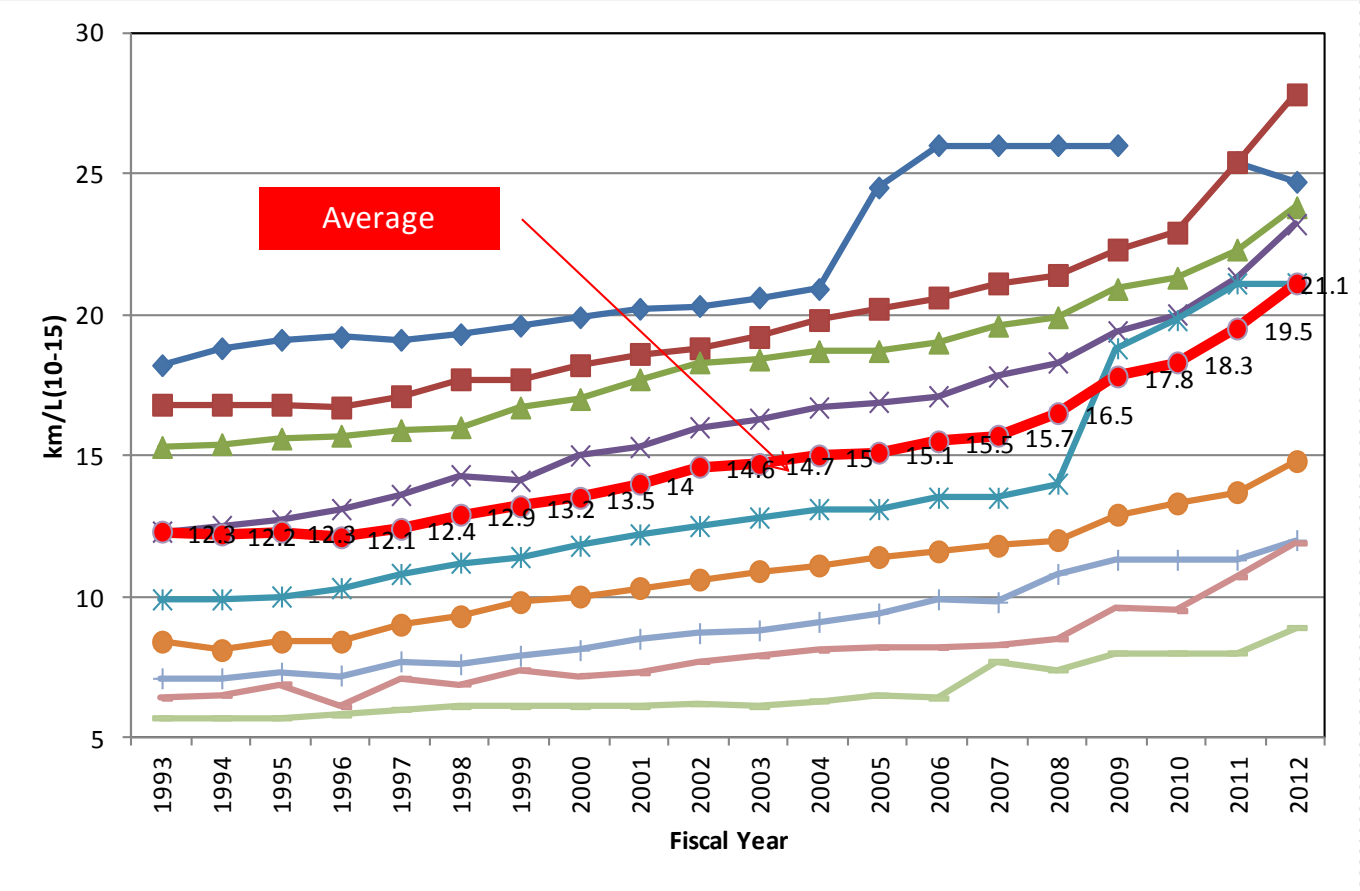
Energy used per year		Certain Amount of Limitation
Factory/Worksite		Designated Energy Management Factory
Business Operator		Specified Business Operator
Obligation of Business Operator	Person appointment	Energy Manager
	Document submission	Notification of appointment
		Periodic report
		Medium- to long term plan
	Obliged Items	Compliance with classification standards
Target for Business Operators		Improvement by more than 1% in a medium- to long term
Administrative Insspection		Guidance and advice, Collection of report & on-site inspection
		On-site factory inspection
		Instruction on rationalization plan/Announcement and orders

Equalization of electricity demand

Benchmark Target

ISO50001 Consideration

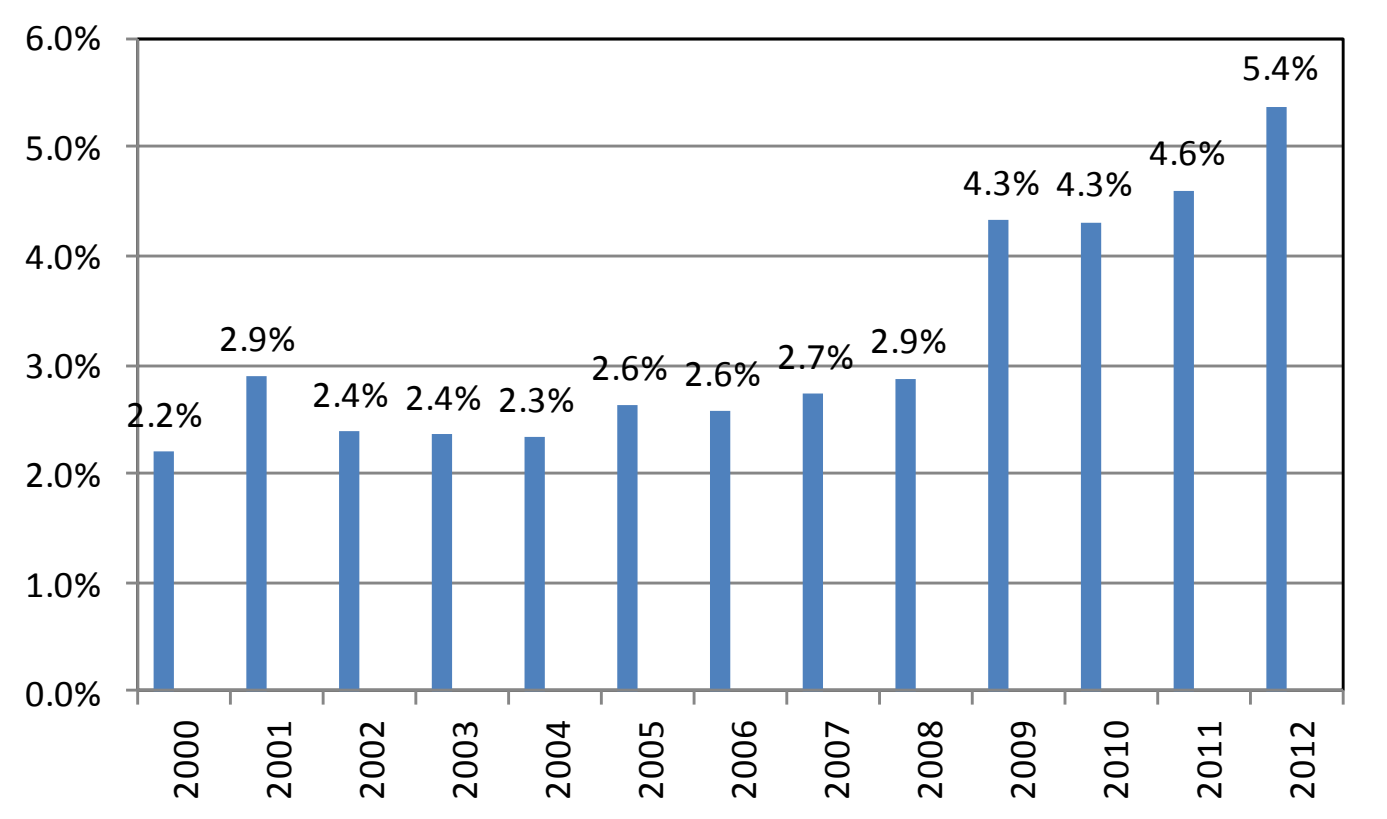
Fuel Economy Trend by Vehicle Class



Sources: MLIT

- Fuel economy is increasing in energy weight-category.
- Average fuel economy between 1993 and 2012 has increased from 12.3 to 21.1(l/100km), or 71.5% up.

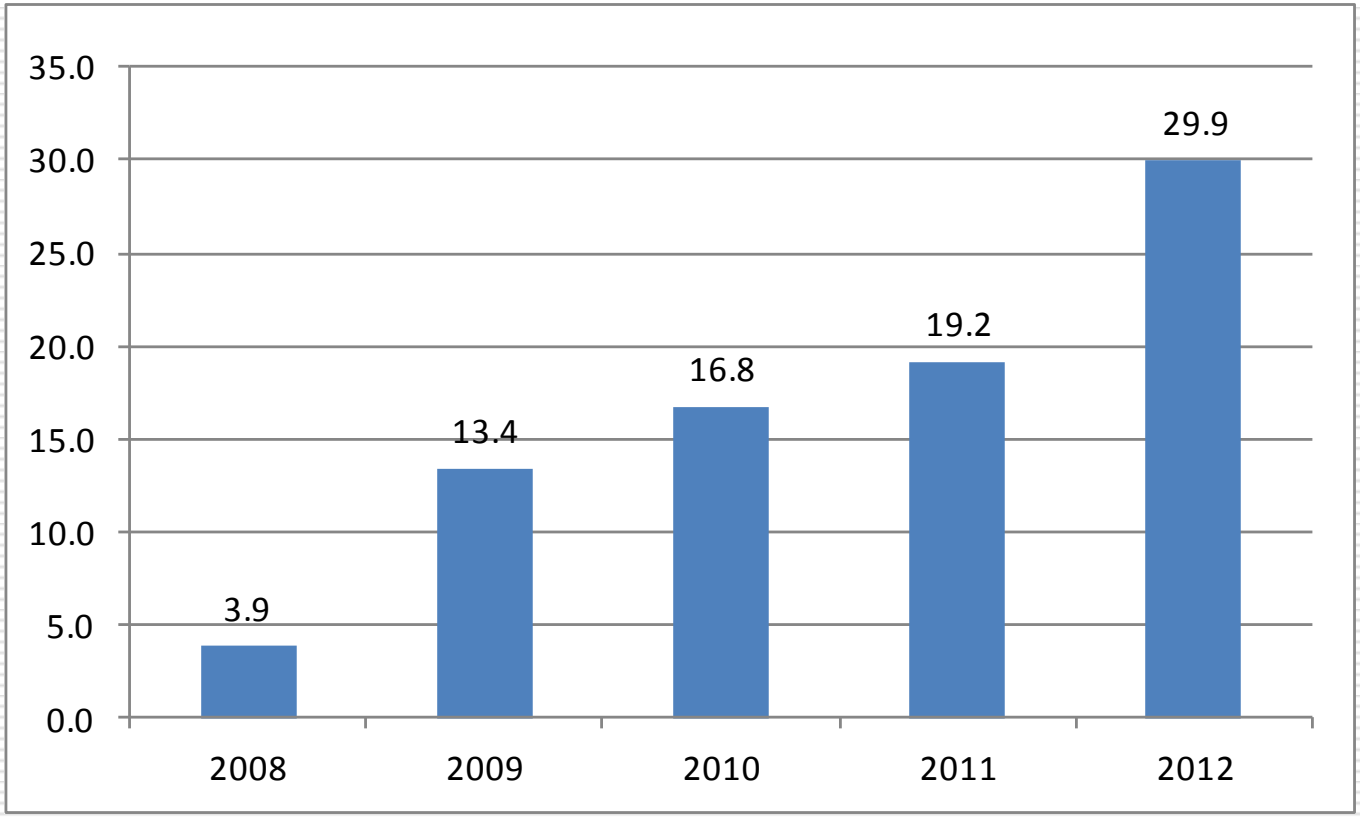
Fuel Economy Improvement Trend



Sources: MLIT

- Fuel economy was increasing at annual rate of about 2.5%.
- Recently, the increasing speed has been almost doubled, contributed by penetration of hybrid vehicles.

Hybrid Ratio for New Vehicles



Sources: calculated by various statistics

- Hybrid vehicles began to increase in 2009, stimulated the Eco-point program.
- Hybrid vehicles accounts for almost 30% in new vehicle sales in 2012.

Progresses of Energy Efficiency in Japan

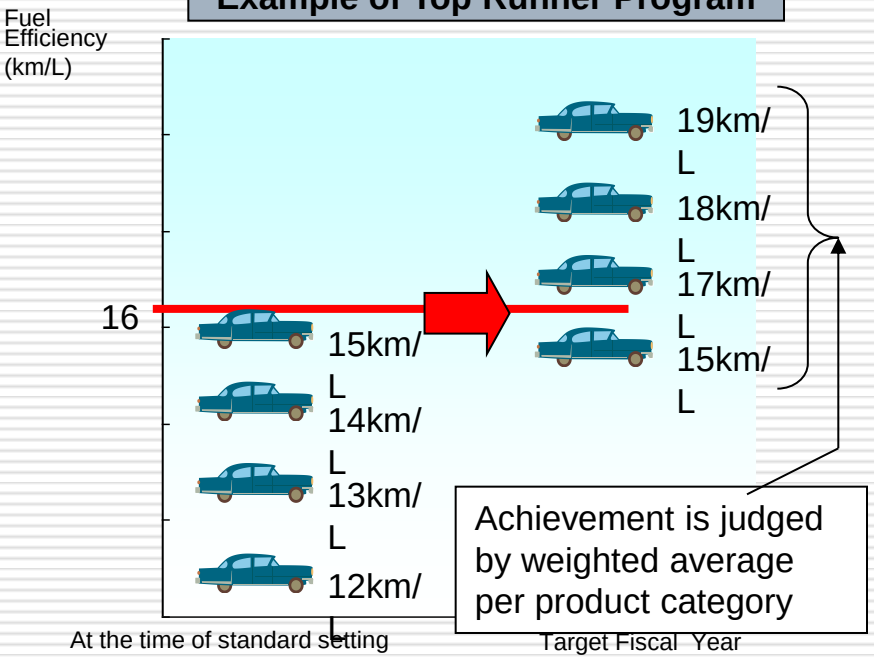
Energy consumption per GDP

- Due to permeation of energy-saving technologies and development in structural changes in industry and society.
- Japan aimed to increase energy efficiency by another 30 by 2030.
- Currently, new target of post-Fukushima is under discussion.

Top Runner Program

○The Energy Conservation Act stipulates the Top Runner method

Example of Top Runner Program



Target products（23 products）

1. Passenger vehicles
2. Freight vehicles
3. Air-conditioners
4. TV sets（※2）
5. Video-cassette recorders
6. Fluorescent lights
7. Copiers
8. Computers
9. Magnetic disc units
10. Electric refrigerators
11. Electric freezers
12. Space heaters
13. Gas cooking appliances
14. Gas water heaters
15. Oil water heaters
16. Electric toilet seats
17. Vending machines
18. Transformers
19. Electric rice cookers
20. Microwaves
21. DVD recorders

22－23. Rooters, Switcher.

24. Multifunction device　25. Printer

26. Heat pump water heater　27. Three-phase induction motor

28. Bulb-shaped LED lamp

*Top Runner Program:

The concept of the program is that fuel economy standards for vehicles and energy conservation standards for electric appliances, etc. shall be set exactly the same as or higher than the best standard value of each product item currently available in the market.

Top Runner Program for vehicles

	Passenger			Freight				Bus	
	Gasoline	Diesel	LPG	<2.5t		2.5t–3.5t	>3.5t Diesel	<3.5t	>3.5t Diesel
				Gasoline	Diesel				
79	78–>up by 12.3%								
93	90 –>up by 8.5%								
96				93 –>up by 5 %					
99	95 –>up by 22.8%	95 –>up by 14.9%		95 –>up by 13.2%	95 –>up by 6.5 %				
03			2001–>up by 11.4%						
06							02 –>up by 12.2%		02 –>up by 12.1%
07	04 –>up by 23.5%			04 –>up by 12.6%				04 –>up by 7.2%	

- Japan is the first country which began to regulated Freight vehicle.
- Japan periodically revised the standards as long as necessary.
- Target 2020, which is 19.6% up compared to target 2015, is also determined.

Judgment Standards

For factories:

Measures / Process	management standards	Measurement & record	Maintenance & inspection	Measures at initial installation
1.Combustion	a. Air combustion ratio for different equipment b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------
2. Heating, Cooling, etc.	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------
3. Waste heat recovery	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------
4. Power conversion of heat	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------
5.Loss in radiation, etc.	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------
6. Power conversion of electricity	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------	a. ---------- b. ---------- c. ----------

For Corporate, For Chain Shop, For Office

For constructer, For building owner, For transport

For machinery

Regulation in transport

Obligation for business operators to make an effort and public disclosure of judgment standards

○ Specified carriers (freight and passengers)

(Fleet of vehicles: At least 200 trucks or at least 300 railway cars for railroads, etc.)

- Obligation to submit medium and long term plans.
- Obligation to periodically report energy consumption status.

○ Specified consigners

(Annual transport volume of at least 30 million ton-km.)

- Obligation to submit plans.
- Obligation to periodically report consumption of energy related to consigned transportation.

Tax Reduction by Green Taxation Plan for Vehicles

50 % vehicle tax cut for EV, FCV, PHV, NGV (One example)

Fuel economy standard + 20% / +50% 	• Over 75% reduction from the 2005 exhaust gas regulation 

- Tax reduction was introduced in FY 2004 in accordance with fuel economy performance and gas emission performance.
- Later it was extended and covered more vehicles, and the latest revision is 2013.
- There are also Eco-car Taxation Cut program for vehicle weight taxation and acquisition tax.
- Eco-car Subsidy Program was from 2009-2013.

Traffic Management Measures

Promotion of TDM (Transportation demand management)

Serious traffic congestion in city areas

Road Manager

Local Police

Measures for managing traffic demand

Combination=TDM

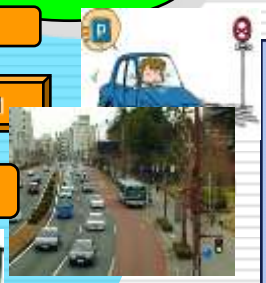
Measures for improving the convenience of public transport

Congestion alleviating measures in partnership between local governments, the police and transportation businesses

Park & Ride etc.

One-coin bus(\100),etc.

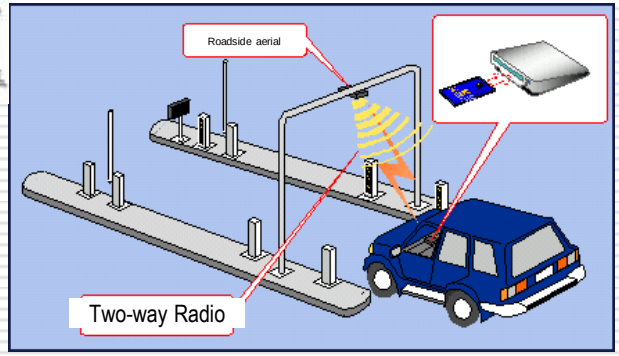
Transportation Business Operators



Only-bus priority lanes

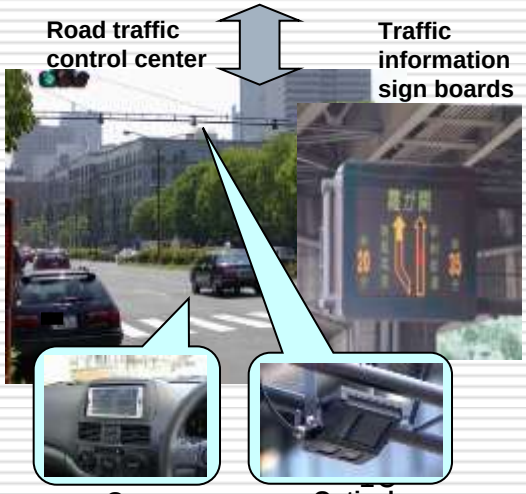
ETC Promotion Measures (Electronic Toll Collection)

Raise ETC usage rate to around 70% by the end of FY2007 to alleviate congestion at toll gates.



Source: Organization for Road System Enhancement (What is ETC?)

Development of Traffic Safety Infrastructures



Road traffic control center

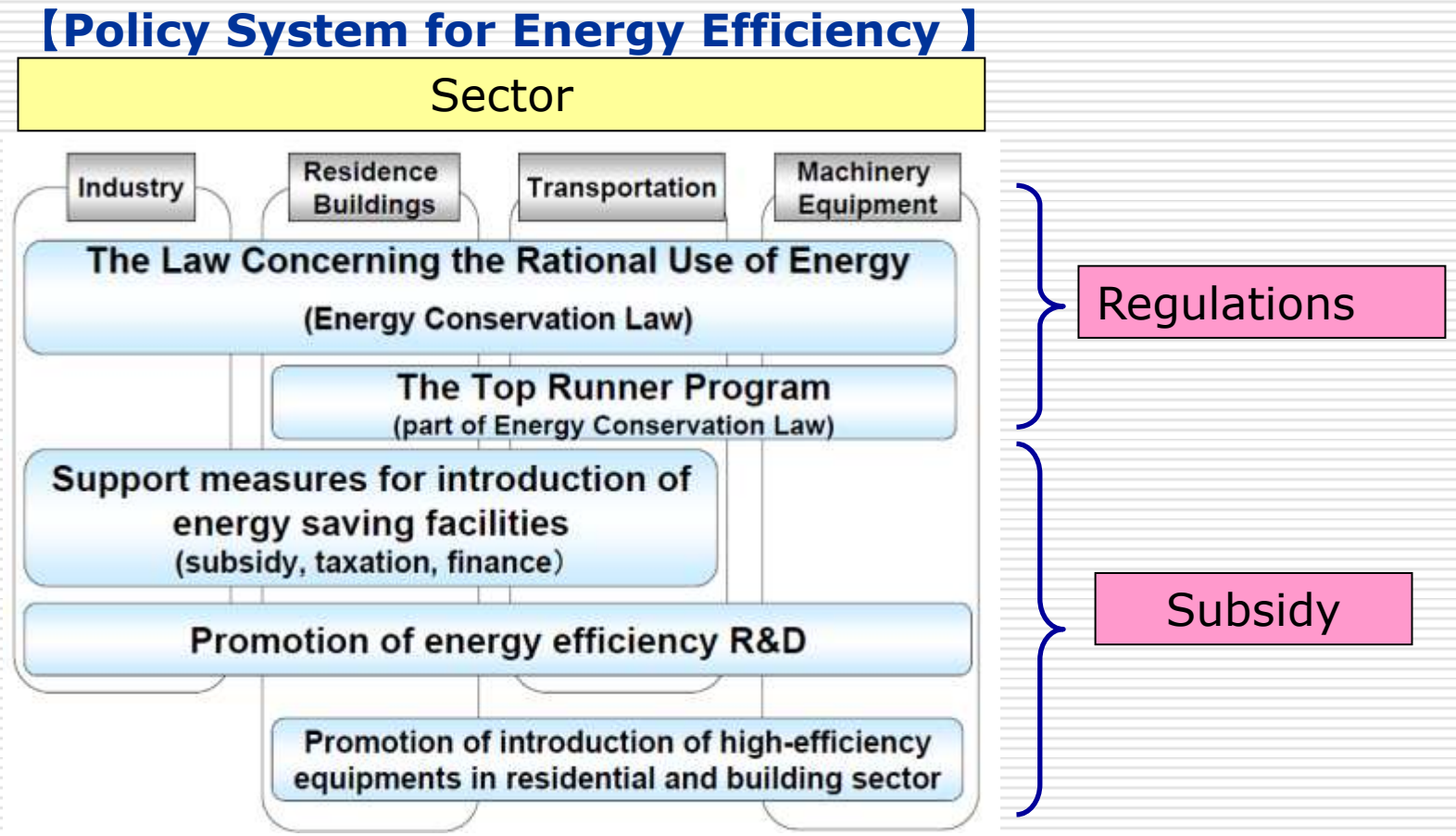
Traffic information sign boards

Car navigation systems

Optical beacons

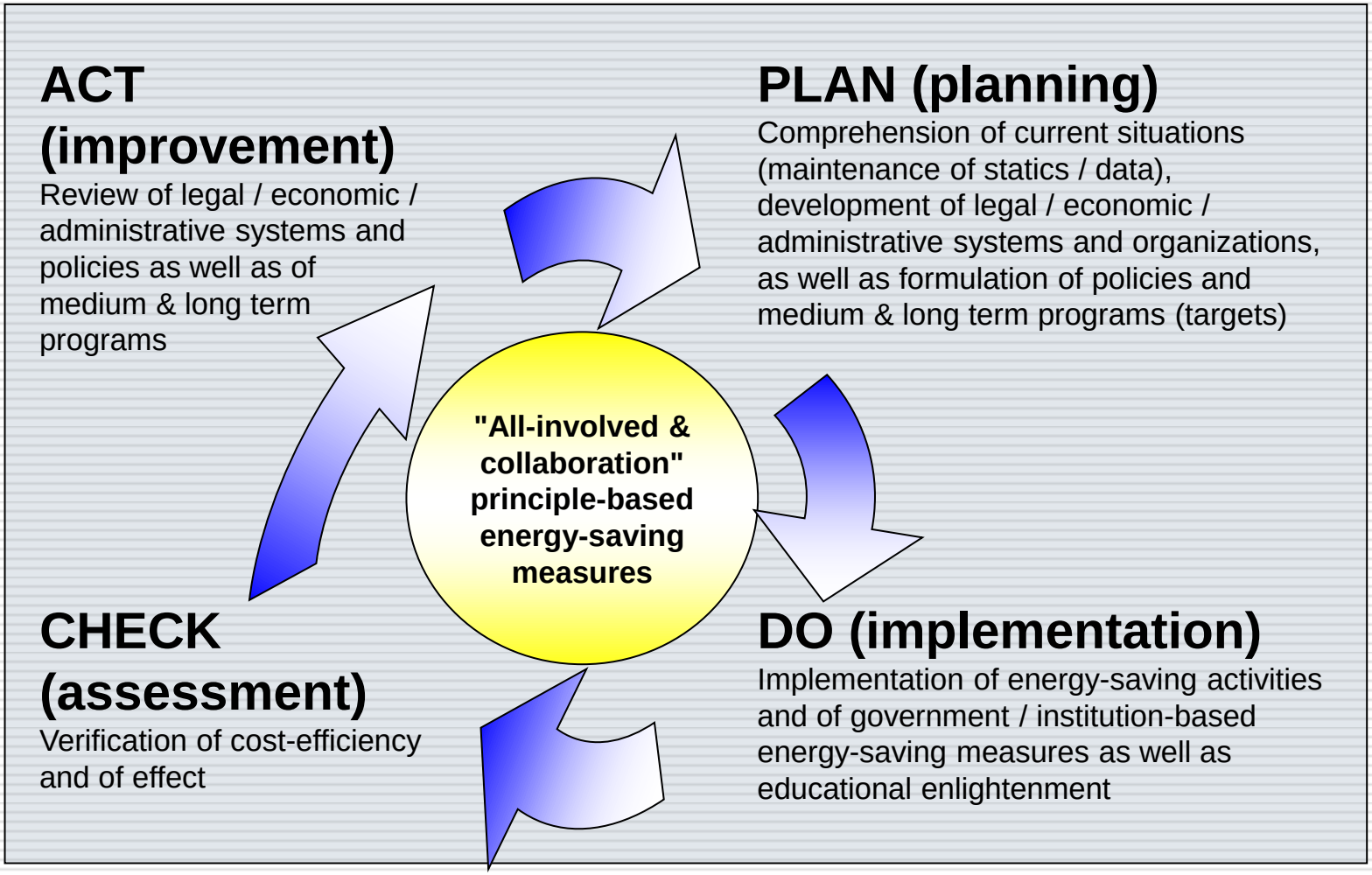
-Adjusting automotive traffic demands through the promotion of TDM measures.
-Promoting ITS by promoting ETC and VICS (Vehicle Information and Communication System)

Combination of Regulations and Effective Measures



- Regulations by Government (Energy Conservation Act)
- Support and subsidy system (finance, tax, subsidiary aid)
- Voluntary Action (Keidanren Voluntary Action Plan on Environment, Cost reduction efforts)

Rotate the PDCA Cycle: Plan-Do-Check-Act



- Rotation of the PDCA is an important policy tool to increasing energy efficiency.