

Reducing CO2 Emissions in the Global Road Transport Sector



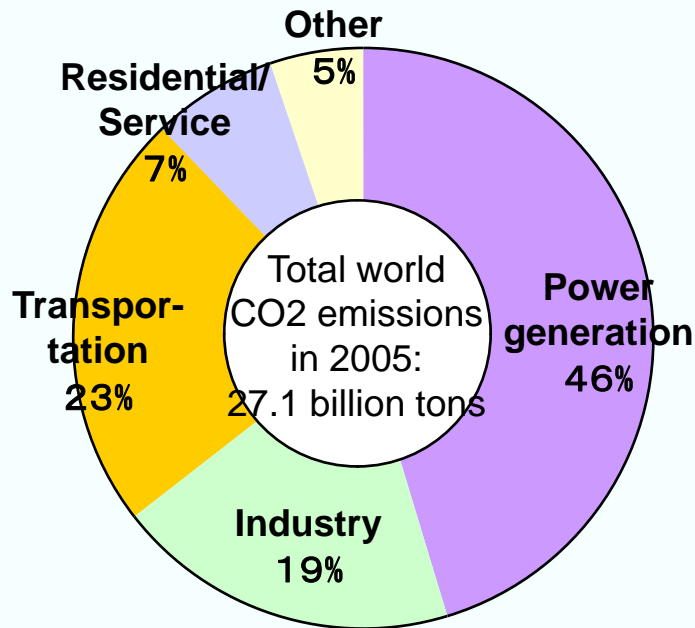
22 October 2008

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Japan Automobile Manufacturers Association, Inc.

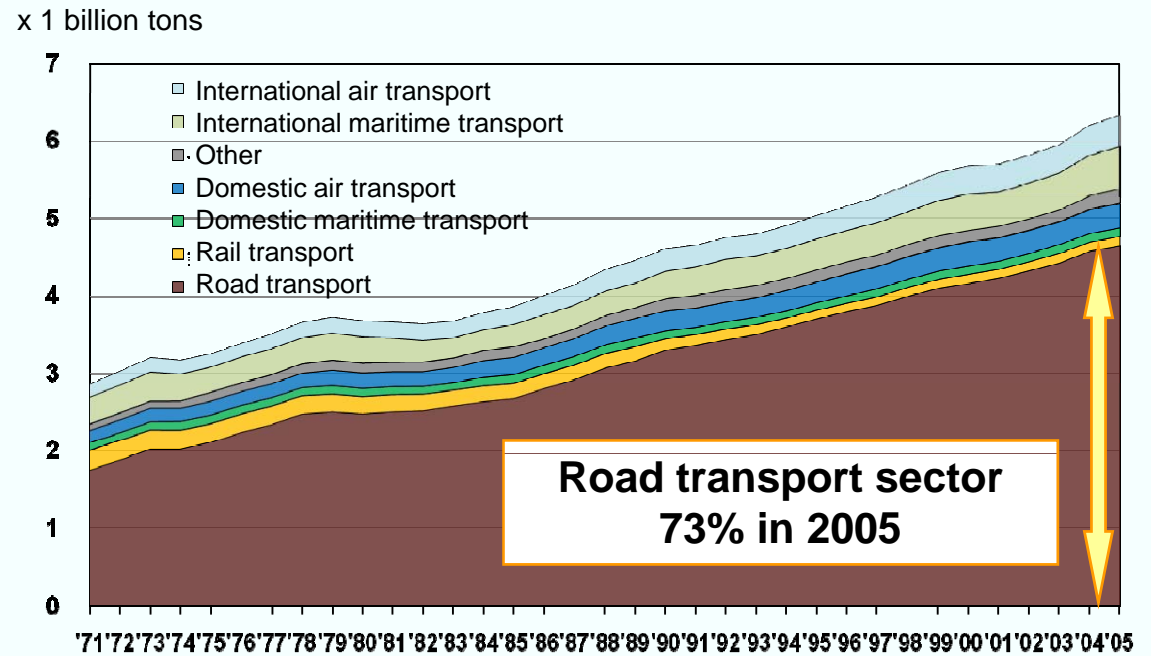
1. CO2 Emission in the Global Transport Sector

World CO2 Emissions by Sector



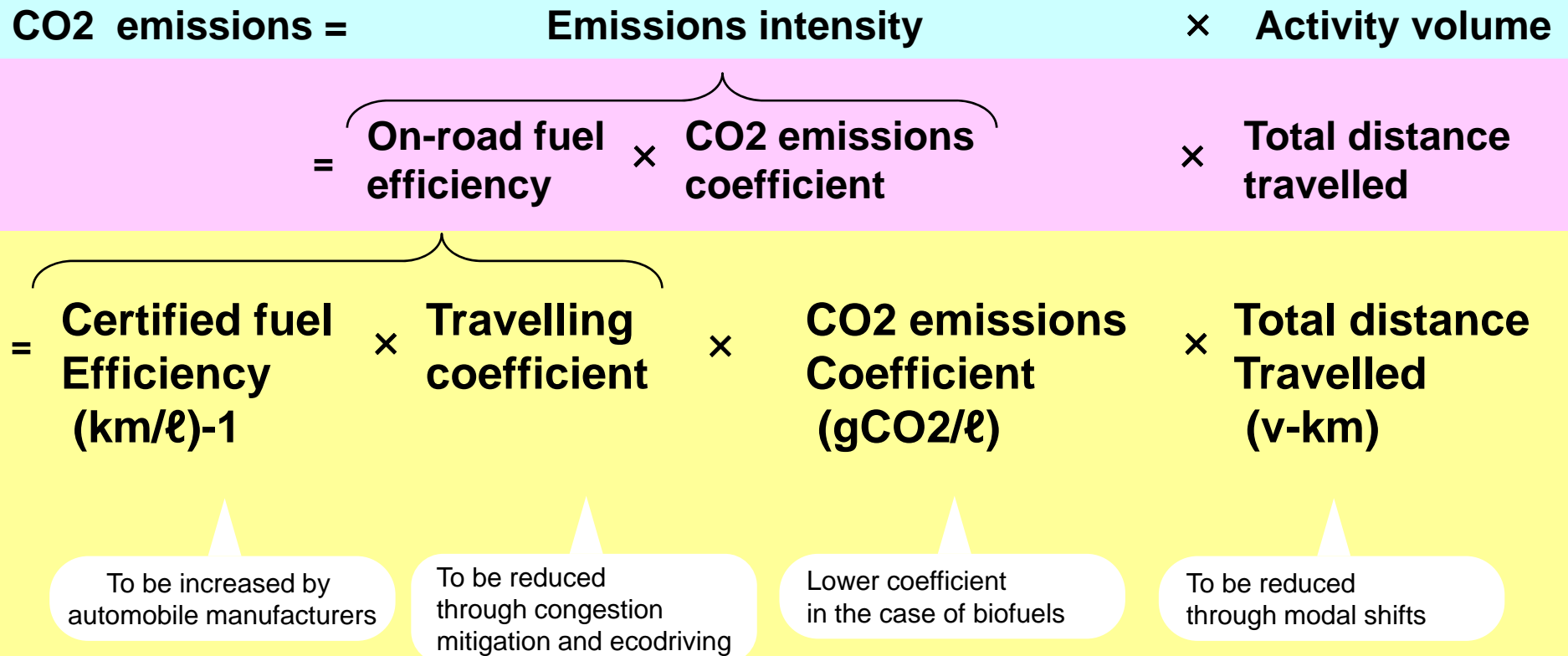
Source: World Energy Outlook 2007, International Energy Agency

CO2 Emissions in the Global Transport Sector



Source: CO2 Emissions from Fuel Combustion 1971-2005, International Energy Agency (2007)

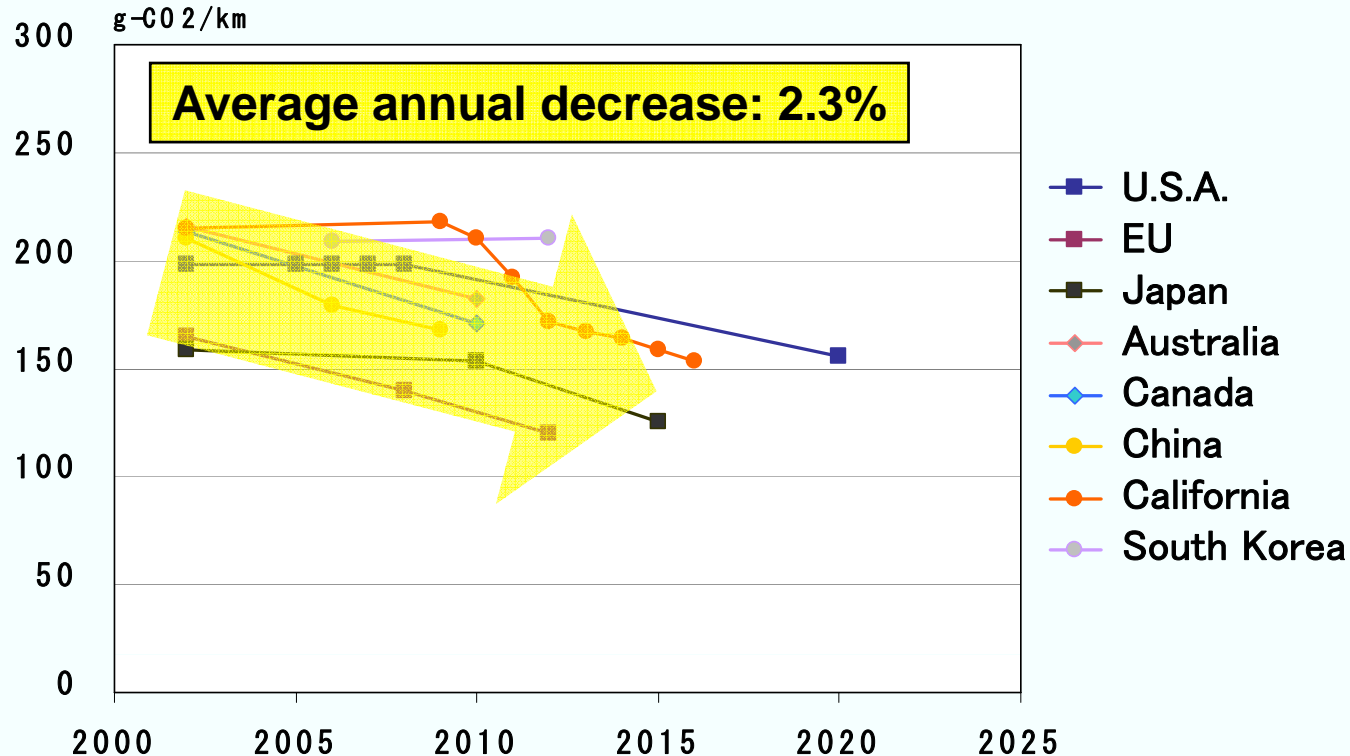
2. Calculating CO2 Emission Volumes in the Road Transport Sector



3. Improving the Certified Fuel Efficiency of Passenger Cars Projected

$$\text{Certified fuel Efficiency (km/ℓ)-1} \times \text{Travelling coefficient} \times \text{CO2 emissions Coefficient (gCO2/ℓ)} \times \text{Total distance Travelled (v-km)}$$

Projected CO2 Emissions for New Passenger Cars in Selected Countries/Regions



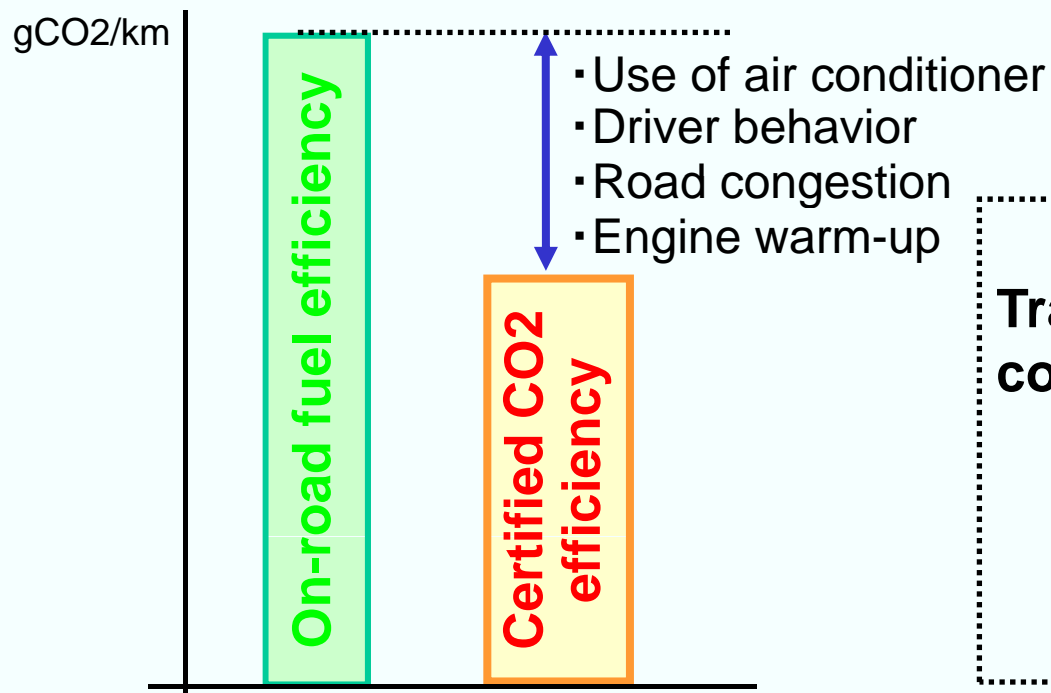
Source: Adapted from Comparison of Passenger Vehicle Fuel Economy and Greenhouse Gas Emission Standards Around the World by Feng An and A. Sauer, Pew Center on Global Climate Change (2004)

4-1. Reducing CO2 Emissions through Increased On-Road Fuel Efficiency

$$\text{Certified fuel Efficiency (km/ℓ)-1} \times \text{Travelling coefficient} \times \text{CO2 emissions Coefficient (gCO2/ℓ)} \times \text{Total distance Travelled (v-km)}$$

Travelling Coefficient

A discrepancy exists between Certified CO2 efficiency and on-road CO2 efficiency.

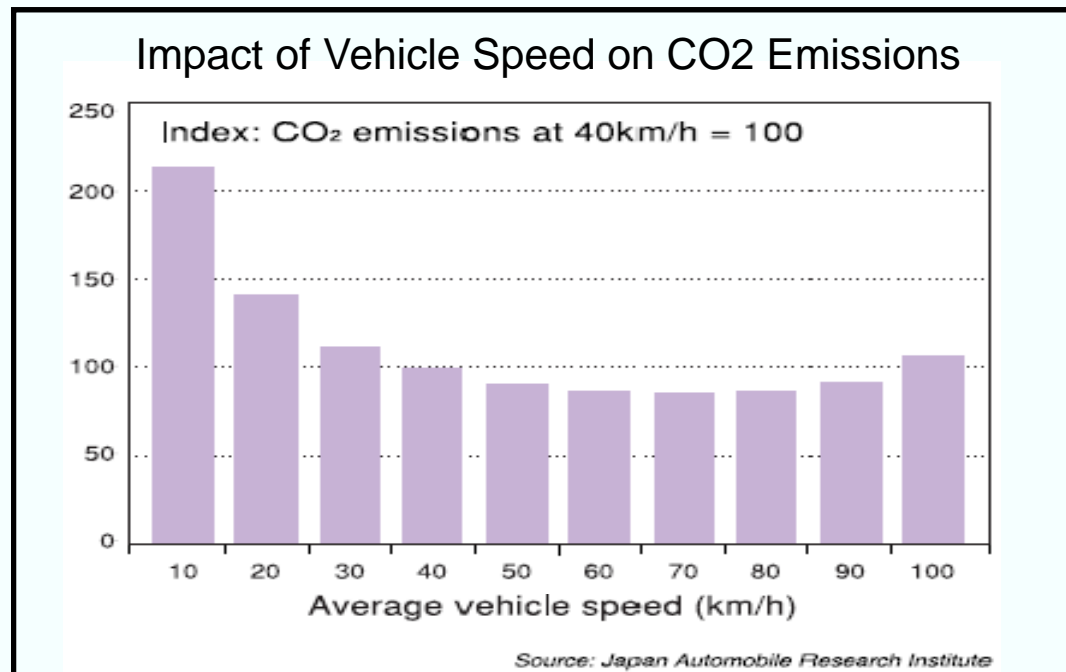
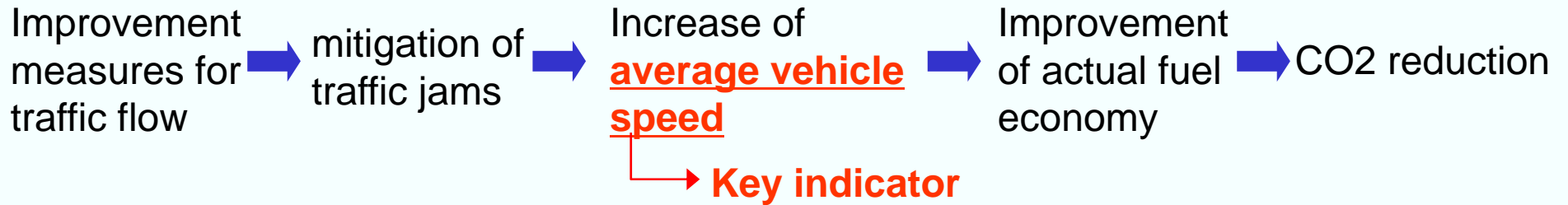


$$\text{Traveling coefficient} = \frac{\text{On-road CO2 efficiency}}{\text{Certified CO2 efficiency}}$$

The travelling coefficient increases in numerical value the greater the discrepancy between on-road fuel efficiency and certified fuel efficiency.

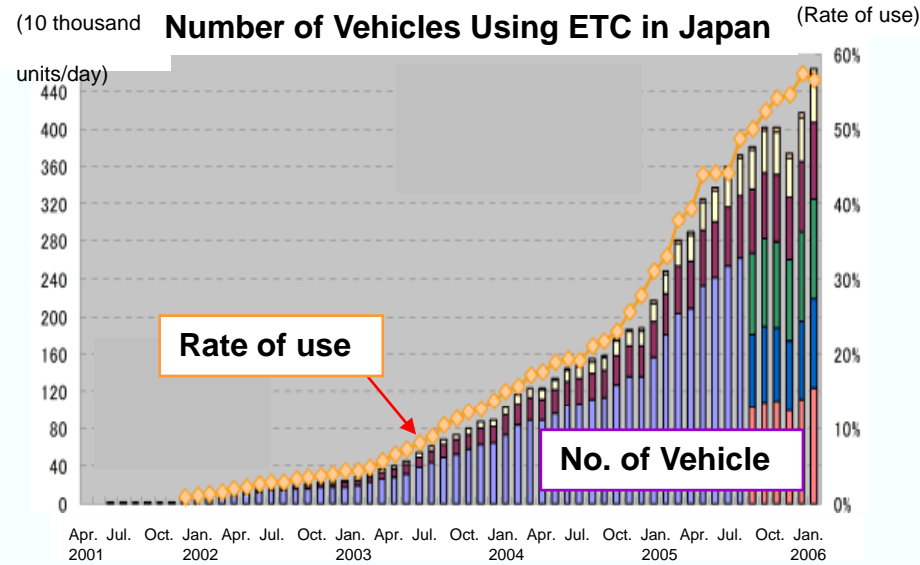
4-2. Upgrading Road Infrastructure

$$\text{Certified fuel Efficiency (km/ℓ)-1} \times \text{Travelling coefficient} \times \text{CO2 emissions Coefficient (gCO2/ℓ)} \times \text{Total distance Travelled (v-km)}$$

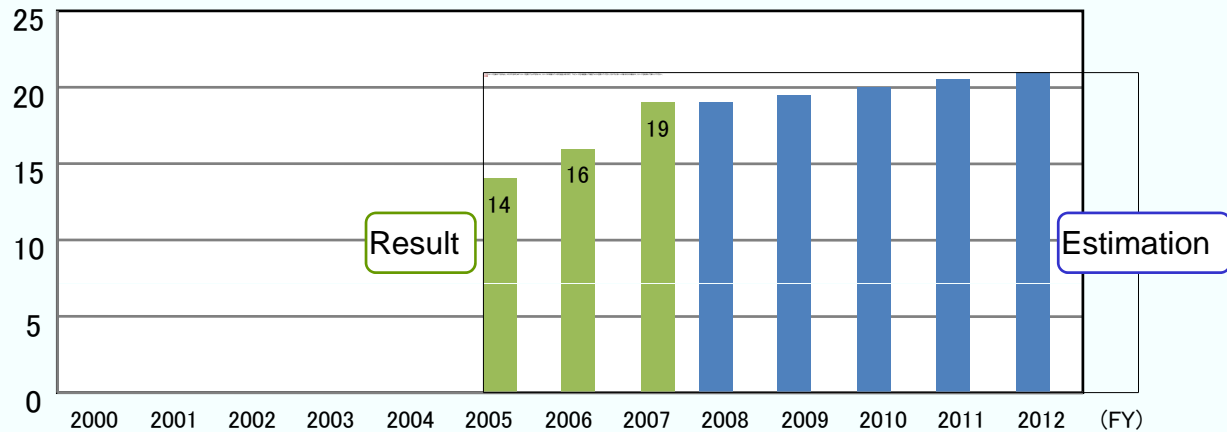


4-3. CO2 Reduction through ETC Promotion

ETC; Electric toll collection



Past results and estimation of emission reduction by ETC promotion



5. Automotive Fuels Have Different CO2 Coefficients

Certified fuel
Efficiency (km/ℓ)-1

×

Travelling
coefficient

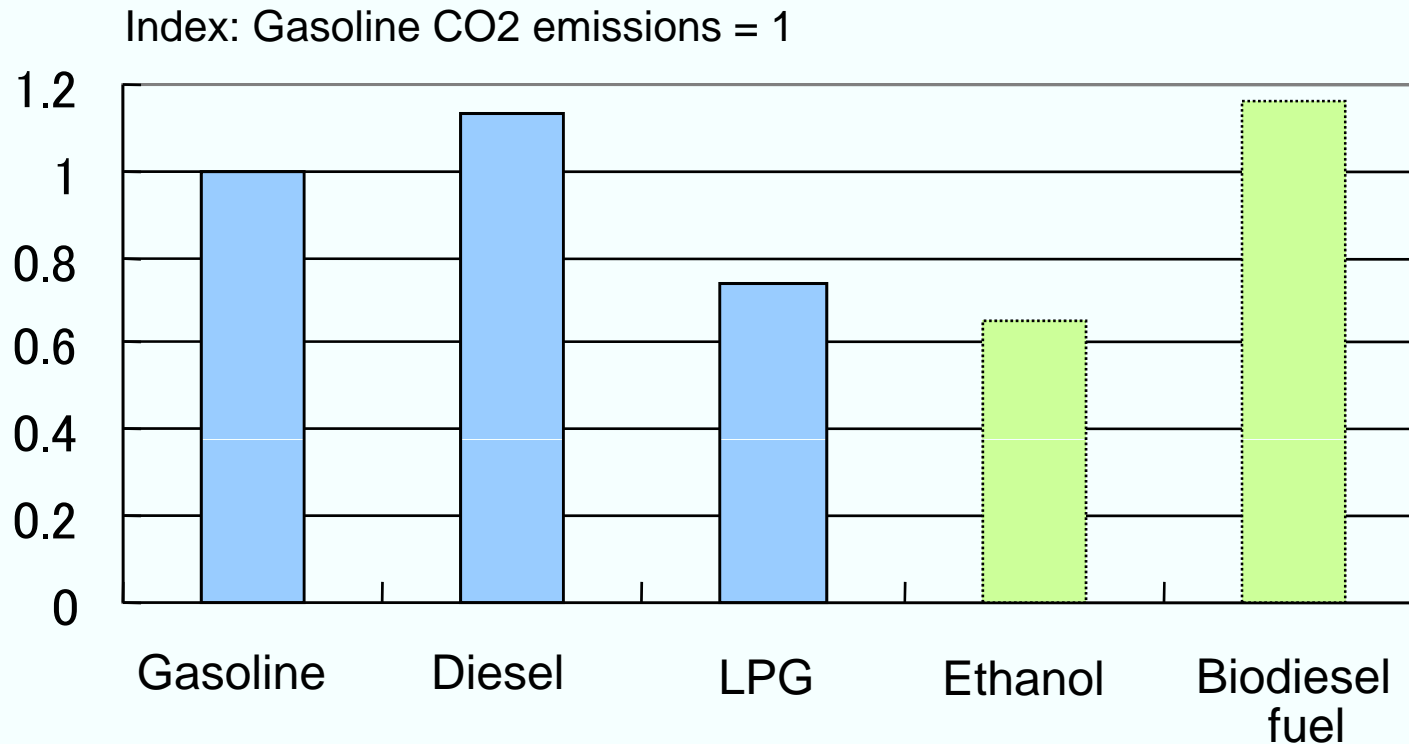
×

**CO2 emissions
Coefficient (gCO2/ℓ)**

×

Total distance
Travelled (v-km)

The CO2 Emission Coefficients of Automotive Fuels

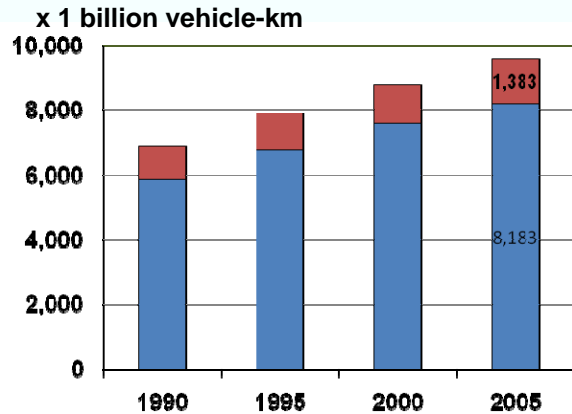


Source: JHFC Combined Efficiency Study Committee

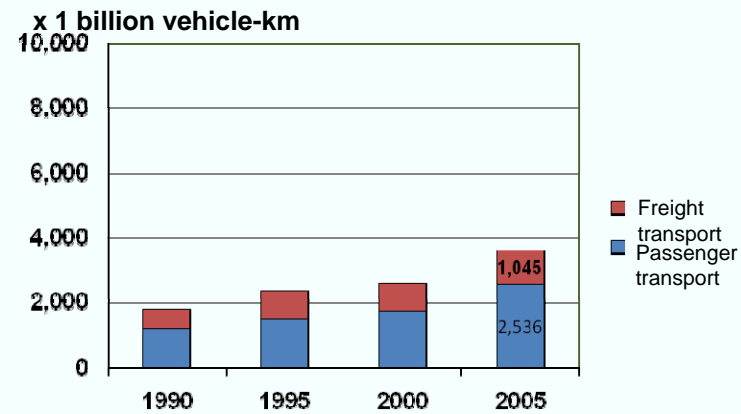
6. The Total Distance Travelled by Automobiles Worldwide

Certified fuel Efficiency (km/ℓ)-1 × Travelling coefficient × CO2 emissions Coefficient (gCO2/ℓ) × **Total distance Travelled (v-km)**

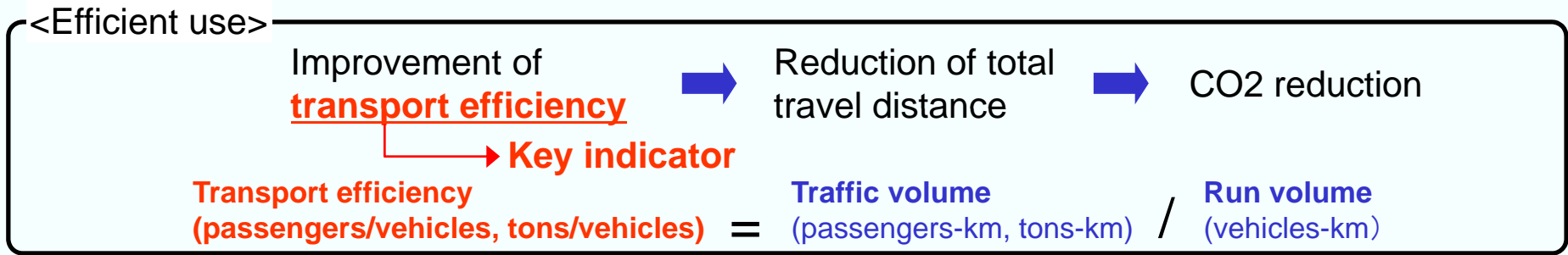
OECD Member Countries, 2005
(73% of global v-km)



OECD Non-Member Countries, 2005
(27% of global v-km)



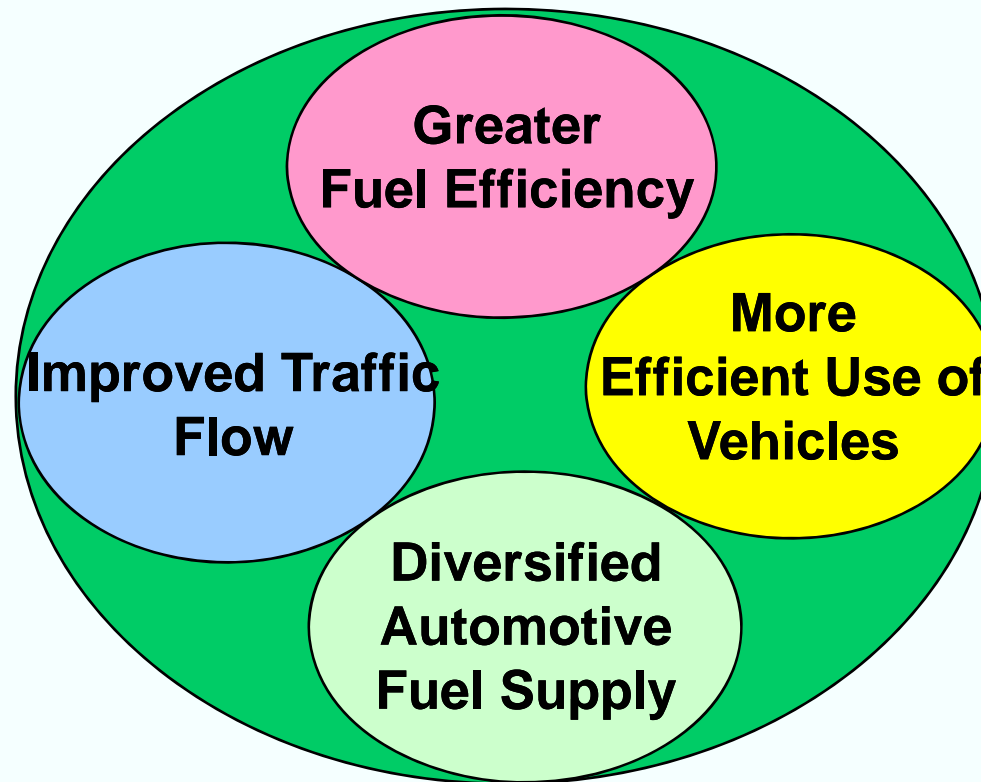
Note: Figures are JAMA estimates, based on the following sources: Environmental Data Compendium (for 2006-2007), OECD; Energy Balances of Non-OECD Countries (for 2004-2005), OECD-International Energy Agency; World Motor Vehicle Statistics (Vol. 7, 2008), JAMA; Yearbook of Survey on Motor Vehicle Transport (Vol. 44, No. 13, 2007), Ministry of Land, Infrastructure and Transport (Japan).



7. Integrated Measure for Reducing CO2 Emissions in the Global Road Transport Sector

Improved Engine Efficiency, Aerodynamics, Drive System
Reduced Vehicle Weight, Rolling Resistance
Next-Generation Vehicles (HV, PHV, EV, FC etc)

ITS technologies
VICS,
Electric toll collection,
Advanced signal
control system

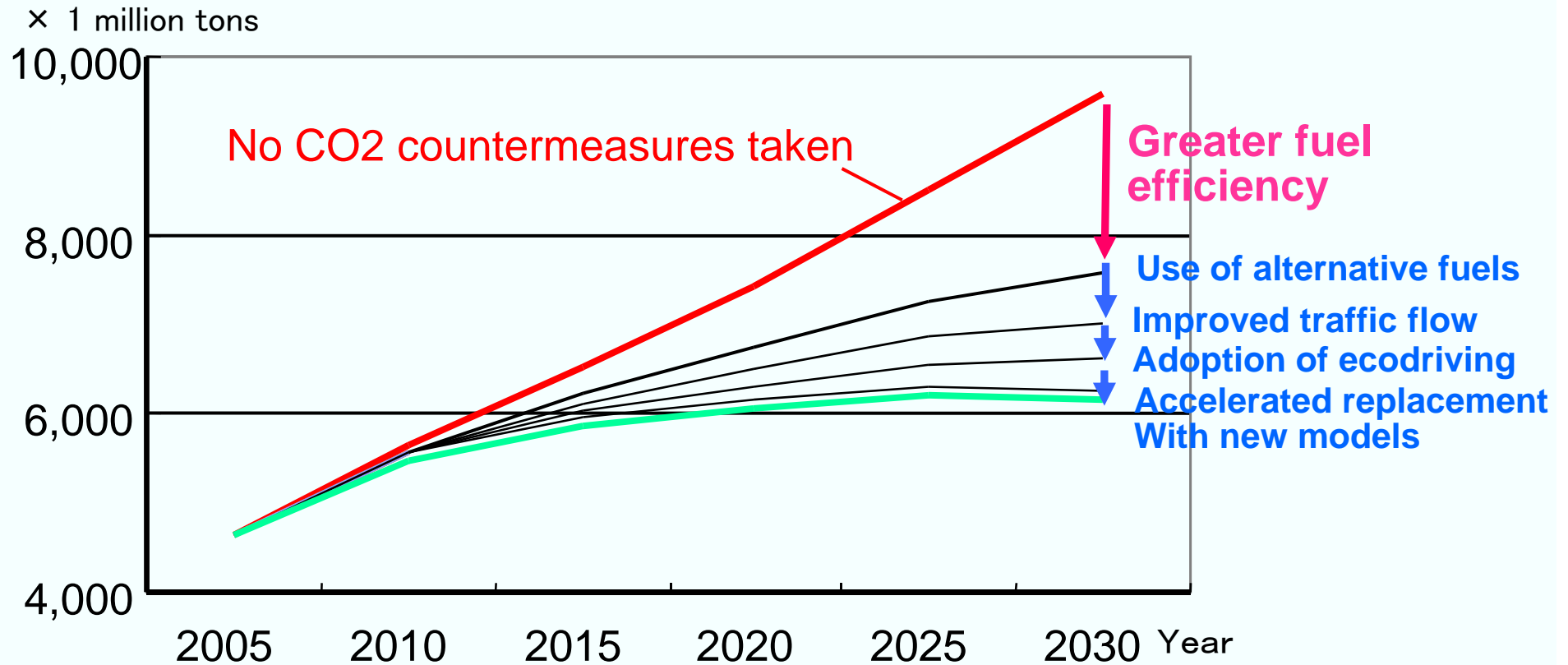


Eco driving
Modal shifts

High-Quality Fuels, Biofuels, Electric power

8. Greater reduction of CO2 emissions

CO2 Emissions in the Global Road Transport Sector
(assuming the implementation of recommended measures)



9. Data Compilation Statuses of Countries



			Japan	US	Europe	China	India
Fuel Economy (efficiency)	① New fleet fuel economy (efficiency)	km/L mpg gCO ₂ /km etc.	JAMA [10-15 test mode, JC08 test mode]	NHTSA [LA-4, Highway]	ACEA/JAMA [NEDC]	NDRC [NEDC]	ND (SIAM under investigation)
	② Stock fleet fuel economy (efficiency)	km/L mpg gCO ₂ /km etc.	JAMA	Computable	Computable	ND	ND
	③ Actual (on-road) fuel economy (efficiency)	km/L mpg gCO ₂ /km etc.	JAMA	Computable	Computable	ND	ND
Amount of Car	④ Sales amount of new car	vehicle unit	JAMA, JAIA, JMVA	JAMA <i>World Motor Vehicle Statistics</i>	JAMA <i>World Motor Vehicle Statistics</i>	NBSC <i>China Statistical Yearbook</i>	SIAM
	⑤ Stock amount of car	vehicle unit	MLIT <i>Survey on Motor Vehicle Transport</i>	JAMA <i>World Motor Vehicle Statistics</i>	JAMA <i>World Motor Vehicle Statistics</i>	NBSC <i>China Statistical Yearbook</i>	MSRTH <i>Motor Transport Statistics</i> JAMA <i>World Motor Vehicle Statistics</i>
	⑥ Scrappage (residual) rate of car	%	AIRIA, JAMA (estimated by JAMA for mini (K) vehicles)	ND	ND	ND	ND
Run volume	⑦ Run volume	vehicle-km	OECD <i>OECD Environmental Data Compendium</i> MLIT <i>Survey on Motor Vehicle Transport</i>	OECD <i>OECD Environmental Data Compendium</i> RITA <i>National Transportation Statistics</i>	OECD <i>OECD Environmental Data Compendium</i> EEA <i>Climate for a transport change. TERM 2007: indicators tracking transport and environment in the</i>	ND	ND
	⑧ Traffic volume	passenger-km ton-km				NBSC <i>China Statistical Yearbook</i>	ND
Fuel consumption	⑨ Amount of fuel consumption	L	ANRE/METI <i>Energy Balance Table</i> IEA/OECD <i>Energy Statistics of OECD countries</i>	IEA/OECD <i>Energy Statistics of OECD countries</i>	IEA/OECD <i>Energy Statistics of OECD countries</i>	IEA/OECD <i>Energy Statistics of non-OECD countries</i>	IEA/OECD <i>Energy Statistics of non-OECD countries</i>
Vehicle speed	⑩ Average travel velocity of vehicles on road	km/h	MLIT <i>Road Traffic Census</i>	ND	ND	ND	ND

10. Conclusions

- The quantification of energy saving and CO2 reduction in the road transport sector helps promote more effective measures.

Important Indicators for energy saving & CO2 reduction

1. Improvement of Fuel Economy ;Fuel Economy

(L/km,g/km)

2. Improvement of traffic flow;Vehicle speed(km/h)

- The road transport sector's energy conservation and CO2 reduction activities can be expanded on a world scale by sharing the methods of data investigation and calculation among countries.



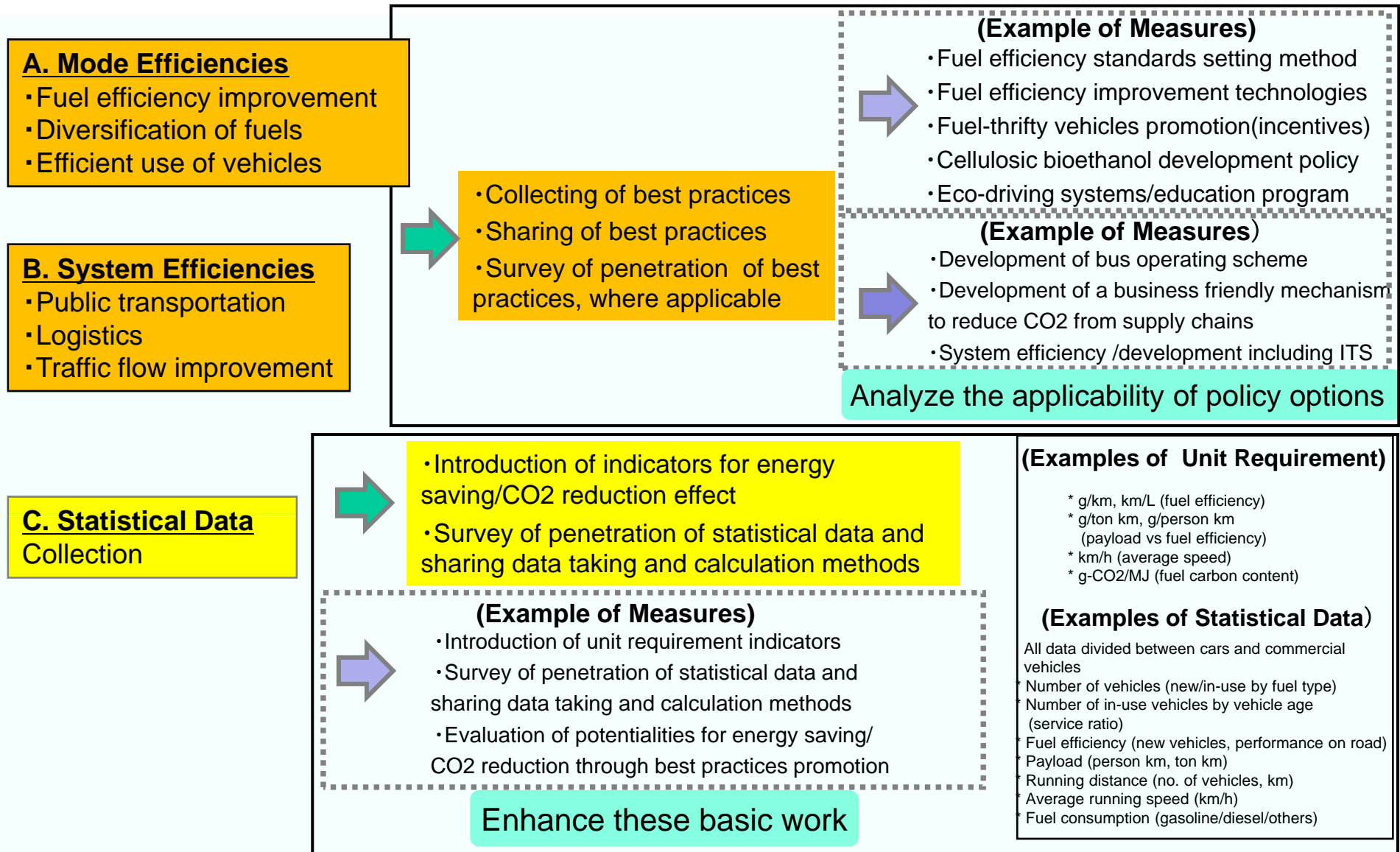
APP Asia-Pacific Partnership on Clean Development and Climate

Summary of the Road Transport Sector Workshop (provisional)

September 18-19, 2008

<APP Road Transport Sector Workshop Summary>

- Survey of penetration of statistical data/best practices, where applicable
- Sharing of best practices and picking up some items in which participants are interested.



Japan are planning the model project of statistical data investigation in India.