



# **International comparison of fuel efficiency**

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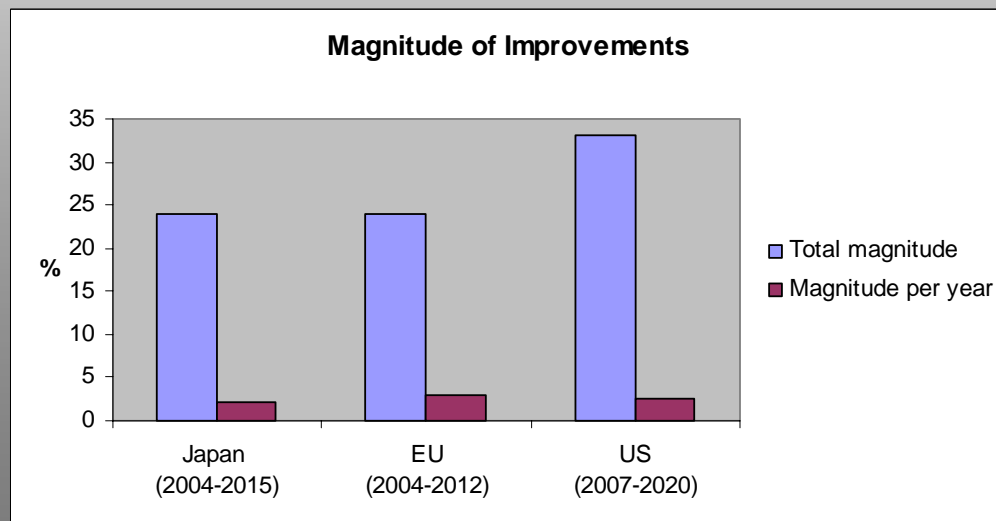
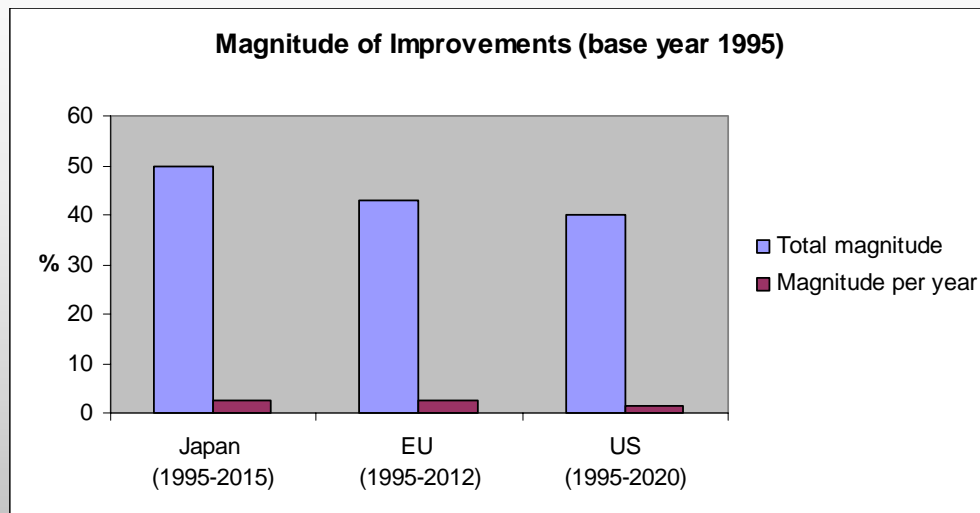


## International comparison of fuel efficiency using absolute values

- There are many studies to compare various regions' fuel efficiency and their policies
- Many of them use absolute values of fuel efficiency
- Using absolute values, however, accompanies following issues
  - *Different policy objective*
  - *Different test procedures*
  - *Different safety, pollutant emission and fuel regulations*
  - *Different compliance methods*
  - *Different size mix*



# Example of International comparison of fuel efficiency

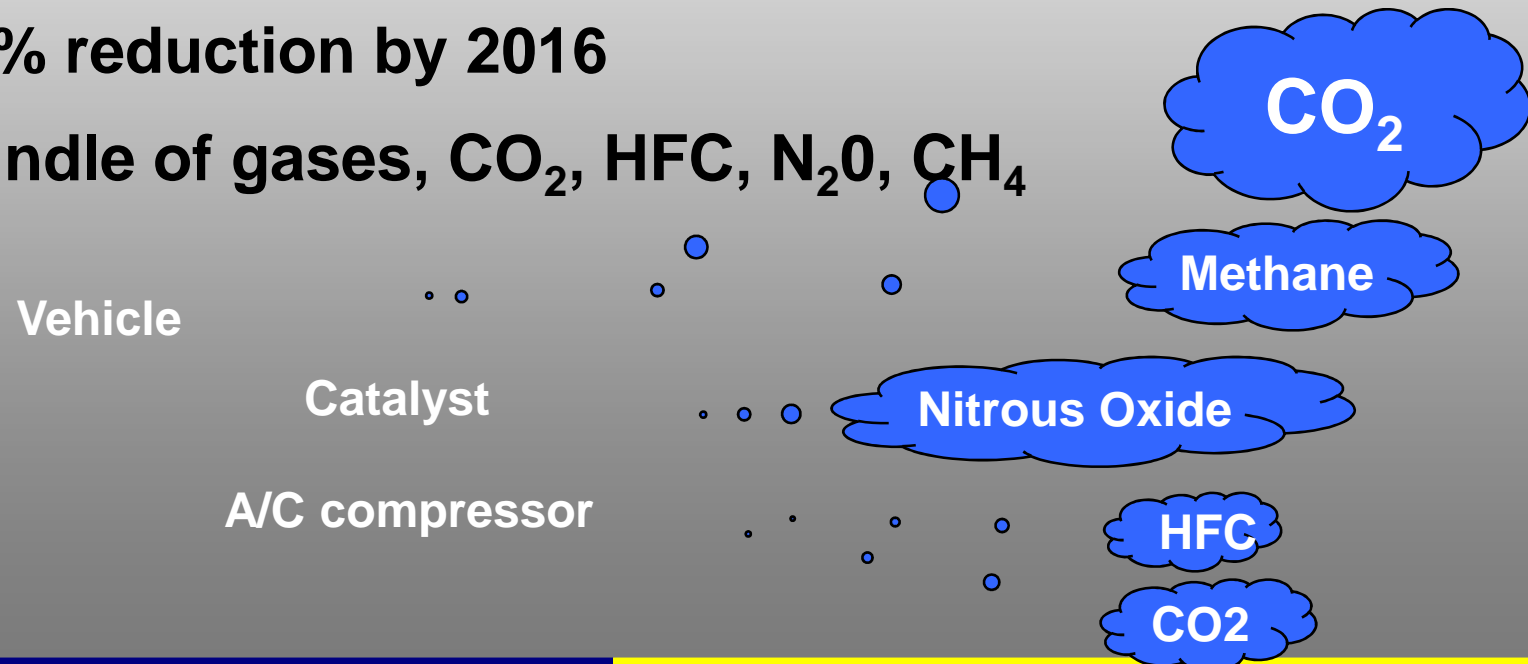




# Issues of comparison of absolute values.

## *Different policy objective*

- 120gCO<sub>2</sub>/km, for example, is equivalent to 20km/l for gasoline cars and 22km/l for diesel cars
- In California...
  - 30% reduction by 2016
  - Bundle of gases, CO<sub>2</sub>, HFC, N<sub>2</sub>O, CH<sub>4</sub>





## Issues of comparison of absolute values: *Different test procedures*

- Test procedures are different in EU, US and Japan
- Examples of effect of different test procedures
  - US: Compared to today's estimates, the city mpg estimates for the manufacturers of most vehicles will drop by about **12 percent on average**, and by as much as **30 percent for some vehicles** (USEPA).
  - Japan: 15.1 km/l (old test procedure) equals 13.6 km/l (new test procedure)



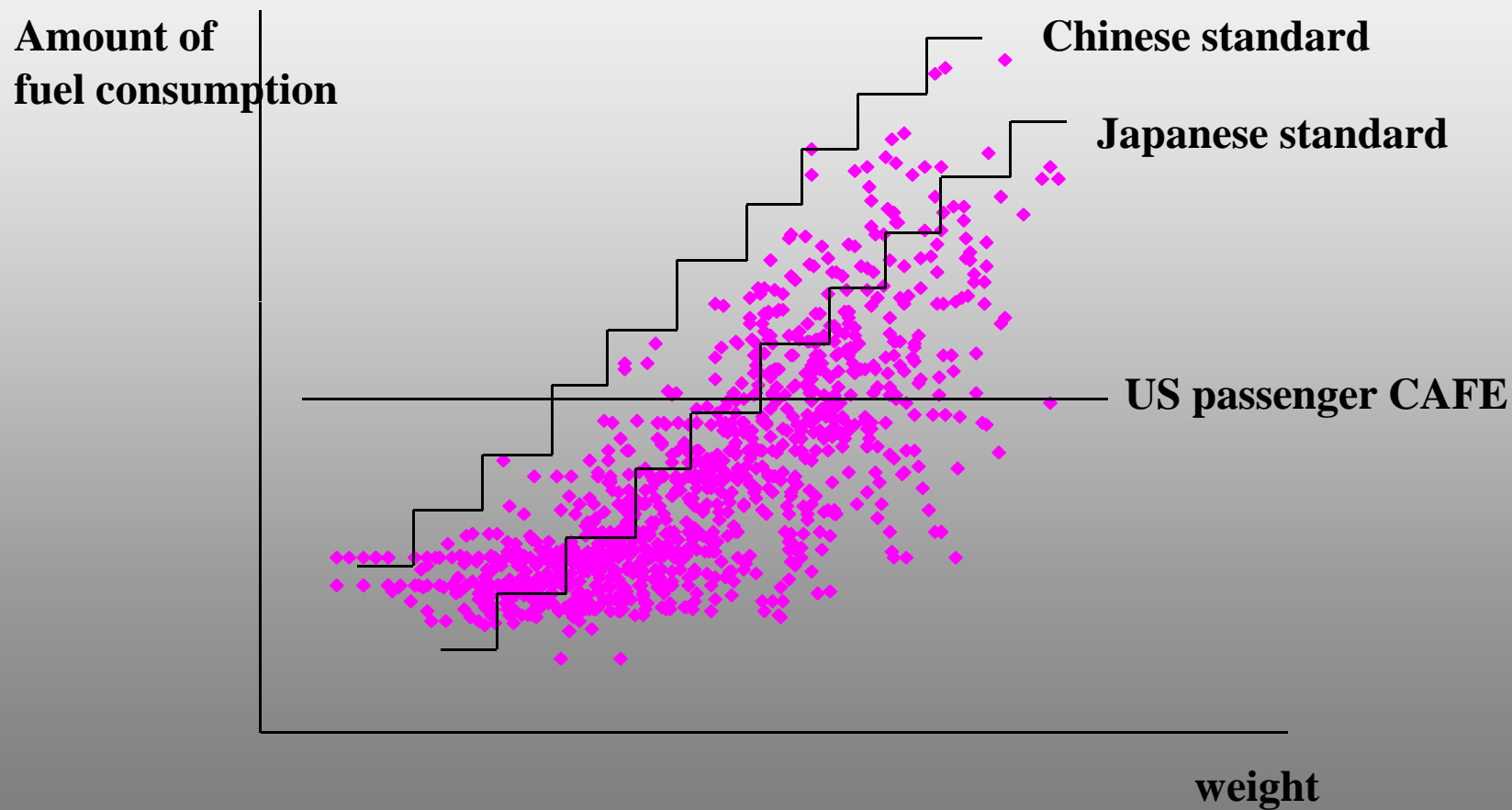
## **Issues of comparison of absolute values: *Different safety, pollutant emission and fuel regulations***

- In US and Japan, emission regulation is more stringent than that in Europe, resulting in almost no diesel vehicles which are said to be more fuel efficient than gasoline vehicles by about 30%
- In developing countries, future strengthening of safety regulations could deter improvement of fuel efficiency and better fuel regulation could promote it



# Issues of comparison of absolute values: *Different compliance methods*

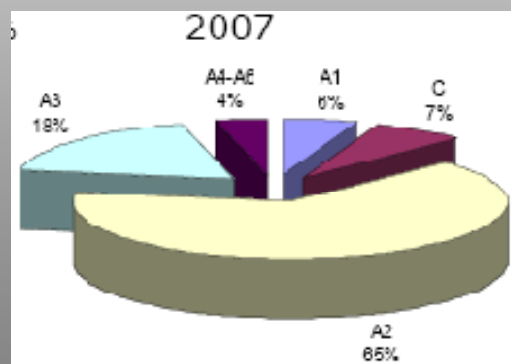
Same vehicle fleet would comply with different level of standards





## Issues of comparison of absolute values: *Different size mix*

- In US, half of vehicles are big SUVs etc.
- In India, more than 90% falls in A segment



Source: Maruti Suzuki



## **Benefit of comparison of magnitude of Improvements**

- **Could solve most of the above mentioned issues**

New car fuel economy tests do not translate well into on-road (real world) figures. Worse, the EU, Japan, and U.S. test cycles are difficult to compare. However, within each region, the changes in fuel economy as measured by each region's test cycle is a good measure of the relative improvement that has occurred.

- World Resources Institute (2007) :Vehicle Efficiency and CO2 Emissions: Troubling Trends -



## **Base year for the comparison**

- **1995: Until then, basically no government intervention**
- **Base year of each policy: Could be appropriate if the ambitions of the policies are to be considered**



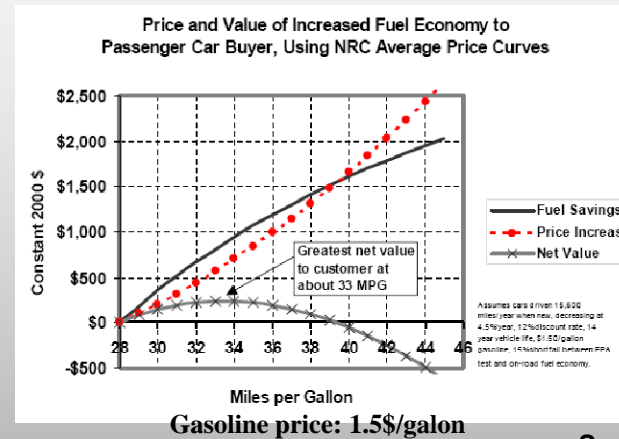
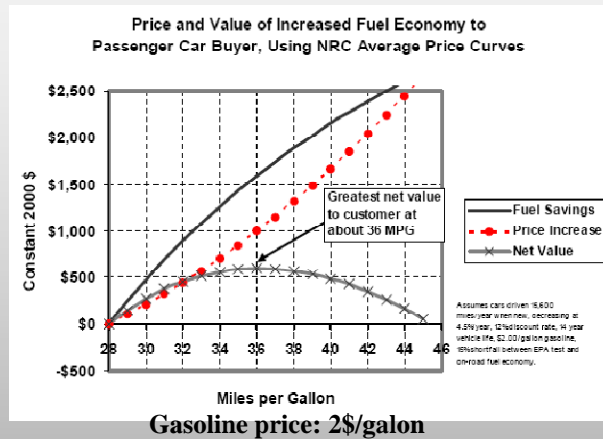
## **Magnitude of improvement is only the base for analysis**

- **Factors that should also be considered include:**
  - **Deployment rate and availability of fuel efficient technologies**
  - **Level of consumers' interest in fuel efficiency**
    - **India: #1!**
    - **Japan: said to be high**
    - **Europe: same as whether cup-holders are equipped**
    - **US:???**



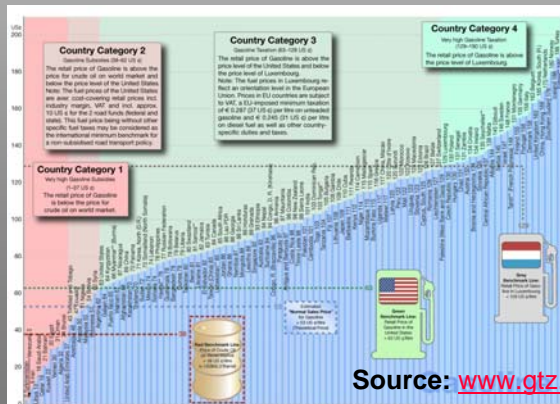
# Technologies that should be introduced from a view point of LCC

- Different depending on price of gasoline, vehicle distance traveled, size mix

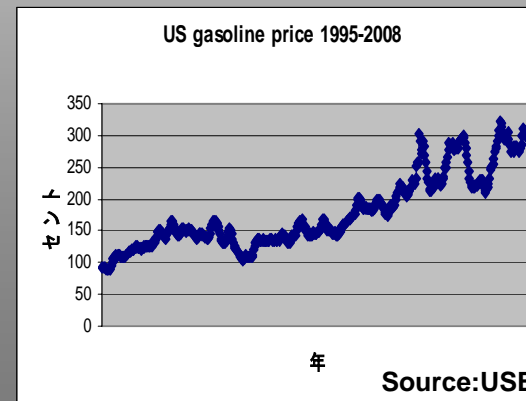


Source: David L. Greene

- Gasoline price, for example, differs countries to countries and time to time



Source: [www.gtz.de/fuelprices](http://www.gtz.de/fuelprices)



Source: USEIA



## Conclusion

- **Magnitude of improvement of fuel efficiency with the base year or 1995 and with the base year of each policy could be a good indicator to illustrate situations regarding fuel efficiency around the world**
- **Detailed country-by country analysis should be followed to understand the situation better**