A methodology for road transport sector;

How to identify the most effective actions and mitigation potentials for individual countries reflecting the domestic factors

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Wide range of diversity: a sector affected by domestic factors

Road Transport sector could be understood….
- A sector which is deeply affected by domestic and external factors,
- A sector which is regulated by varieties of regulatory policy tools
- A sector which is difficult to “directly” control with CO2 emission in a sense that in principally individuals (drivers) are responsible for the emission from their vehicles

<Examples of affecting factors>

<Economic/Technical factors>
1) Economic activities and growth
2) Model mix in the market
3) Fleet age
   (Average age and Portion of new car)
4) Car price, Fuel price
5) Desirable technical specifications and available technologies

<Social/Geographical factors>
1) Climate (Temp, Snow, Dry/Wet)
2) Geographical specifications (Residential density, etc)
3) Road and Public transport Infrastructure
4) Drivers’ behavior/awareness/favors
5) Political initiatives and existing regulations
   (air quality control, fuel efficiency, fuel quality…)

Travel mileage has a close linkage with GDP growth in general, however diversity with efficiency and necessary miles of travel is observed.

Mountainous area
(Pakistan)

Flat and low density
(San Diego, U.S.)

High density (Beijing, China)
- In the North American countries, New Zealand and Australia, people are largely dependent on cars in passenger transport.

- These data show that we can understand the background of dependence on cars and big share of SUVs that they could be due to residential density (spreading city planning) and their according life style.
Indian market: Smaller cars, available only among high class

- Almost 80%: Small cars
  : 800cc ~ 1500cc: even smaller than Chinese market

- Their consumer price is distinctively lower
  : between 2,500$ and 10,000$

- Even with lower market price, cars are affordable only among rich people
  : Only 6% of the citizens have annual Income more than 10,000$

- These factors limit applicable technologies in the country.

Car retail Price
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Philippine’s market: Dependent on imported second-hand cars

- In many developing countries, a large portion of the market is composed by imported used vehicles.

- In these countries, the effect of fuel efficiency regulation on new vehicles might be limited.

Source: Minato, JARI and IEA

Exports around the world (2002)
- Passenger vehicles: 504,284
- Cargo vehicles: 90,042
- Buses: 12,233

Total: 606,559

Source: Minato, JARI and IEA

Exports of Used cars from Japan to Asian countries (2002)
Asian market in general: Big portion of 2 or 3 wheelers in the markets

- In developing countries, 2 or 3 wheelers takes large share in the markets.

- Fuel efficiency regulations for these vehicles would be one of the most effective options.

Model Mix Balance in India

Model Mix Balance in China

Portion of 2-3 Wheelers in the world
1) Political Priority
“Air quality” or “Fuel efficiency (CO2) ?”
(trade-off relation)

2) Fuel quality
Low sulfur fuel is essential to improve air quality and fuel efficiency (CO2 emission)

3) Bio fuels
Policies and availability

4) Other factors on fuel

<table>
<thead>
<tr>
<th>Fuels</th>
<th>Japan</th>
<th>U.S.</th>
<th>Europe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>99%</td>
<td>97%</td>
<td>50%</td>
</tr>
<tr>
<td>Diesel</td>
<td>0.3%</td>
<td>3%</td>
<td>50%</td>
</tr>
<tr>
<td>Transmission</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automatic / CVT</td>
<td>93%</td>
<td>90%</td>
<td>11%</td>
</tr>
<tr>
<td>Manual</td>
<td>7%</td>
<td>10%</td>
<td>89%</td>
</tr>
</tbody>
</table>

(2005 Global Insight)

Diesel engine is more efficient than Gasoline engine by 20%. MT is more efficient than AT by 10%
Considering these diversities….

It does not make sense to compare the reduction potentials/efficiency of the transport sector in the individual countries with a simple index, like “fuel economy” (fuel consumption per transport volume).

How to tackle?

Individual countries should identify and develop all the effective policies and countermeasures in MRV (Measurable, Reportable, Verifiable) way, analyzing the markets in the individual countries in detail.

The best methodologies and common approach for this should be developed and shared by all the parties.

Japanese experience in Kyoto could be one of the best proposals on the methodologies and MRV actions.
Since FY2001, emissions from the transportation sector have been on a downward trend.


Improvement of mileage of passenger vehicles
- The Top-runner (Best-in-Class) Standard
- Vehicle Green Tax (Since FY2001)
14.4mil./57.5mil. registered vehicles are GREEN

Improvement of mileage of freight trucks
- Deployment of larger-size trucks: 24-25t truck: 80,000 (FY02) → 150,000 (FY07)
- Shift of cargo from in-house distribution to freight carriers: freight carriers/total:
  77.2% (FY97) → 87.2% (FY06)

Emissions from freight vehicles peaked in FY1996

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MRV actions for transport sector in Japan

**Vehicle traffic measures**

**Measures for vehicles and eco-friendly driving style**  
(▼27.6 – 29.6 mil. t-CO2)

- Top-runner fuel efficiency standards
- Promotion of energy-saving vehicles
- Promotion of eco-friendly driving styles
- Introduction of bio-fuel

**Improvement of traffic flow**  
(▼5.5 mil. t-CO2)

- Improvement of traffic speed by alleviating traffic jams

**Others**

- Technical Innovation of efficiency in railway/aviation sector
- Promotion of teleworking  
  (▼2.8 mil. t-CO2)

**Transition to more efficient transportation system**

**Improvement of cargo transportation efficiency**  
(▼17.5 – 18.6 mil. t-CO2)

- Green Distribution Partnership
- Modal shift to railroads and shipping
- Use of efficient vehicles (ex. larger trucks, co-use of a single truck)

**Promotion of use of public transportation**  
(▼2.7 – 3.8 mil. t-CO2)

- Build new commuter lines, subways, LRTs, etc.
- Promotion through IC cards
- Traffic demand management

**Total:**  
▼60 mil. t-CO2
Two good examples of MRV actions;

1) Top runner approach for fuel efficiency (CO2) regulation on vehicles

2) Traffic flow improvement by ITS (Intelligent Transport System) technologies
By target year, average fuel consumption must be higher than the best fuel efficiency in the base year.

Standard should be high but reachable because target values are already achieved by actual vehicles in the base year.

- Positive Factors: Technological Improvement
- Negative Factors: Exhaust Emission Regulations, etc. (trade-off relation with fuel economy)
Current Fuel Economy Performance and Level of 2015 Target Standard Values

* Example (passenger vehicle: 4 weight categories between 971kg and 1420kg)

* Fuel economy values on this table are measured by JC08 mode.
An example of MRV actions: Fuel efficiency regulations with “Top runner approach”

1979 June: Energy conservation law was established.
1998 June: Top runner concept was introduced in the law

< History of Top runner fuel efficiency regulation>

Published

- Passenger cars (Gasoline)
  - 1999
- Passenger cars (Diesel)
  - 1999
  - 2005
- Passenger cars (Gasoline and Diesel)
  - 2007
  - 2015

Target year

- 2010

50% improvement for 20 years

2010 target

2015 target

FE regulation for HDV
- 2006
- 2015
An example of MRV actions: Fuel efficiency regulations with “Top runner approach”

Trends in Average Fuel Efficiency of Gasoline Passenger Cars in Japan (including imported cars)
**VICS:** Provides road traffic information in real time, realizing smooth traffic & higher travel speed, resulting in the improvement of actual fuel efficiency:

→ Reduce 2.4 Mt-$\text{CO}_2$ in 2010.
**ETC**: Enables non-stop, cashless toll collection at expressway tollbooths, whose capacity shortage causes about a third of traffic jams on expressways:

→ Reduce 0.2 Mt-CO$_2$ in 2010.
1. To enhance MRV actions by all the parties, it should be essential for developed countries, as well as International organizations and institutions, to transfer their know-how of policy development and experience on the relevant area (Examples of areas; Statistics on Transport, Fuel Efficiency regulations, Fiscal Incentives, efficient logistics), developing common approach to identify the best policy options.

2. Internationally cooperative actions should be taken by all the relevant authorities and stakeholders in the world, developing global/regional actions plans toward global significant reduction in the most effective way.

<Examples of governmental or G/I actions in progress in road transport sector>
- MEET (Ministerial Conference on Global Environment and Energy in Transport)
- Japan-ASEAN Transport Ministers Meeting
  - An action plan on environment improvement measures in the transport sector will be developed
- Asian Pacific Partnership on Climate and Clean Development
  - Establishment of Road transport Task Force is being proposed.
- OECD/ITF (International Transport Forum)
- APEC workshops
- Regional programs by development banks, like Asian Development Banks
Overview:

Date & Venue: January 14-16, 2009; Tokyo, Japan
Invitees: 21 countries & 9 int’l/regional organizations
  - G8 members, Australia, India, Korea, ASEAN10; ASEAN Secretariat, EC, UNFCCC Secretariat, World Bank, ICAO, IMO, UNECE/WP.29, IEA & ITF

Highlights:

- Participated by major countries and organizations, covering around 70% of the world’s CO2 emissions from the transport sector;
- Adopted the Ministerial Declaration, a strong political message of transport ministers to combat climate change and air pollution, which emphasizes:
  - Sharing the global long-term vision of realizing low-carbon & low-pollution transport systems;
  - Strengthening domestic transport policies, esp. facilitating developing countries’ efforts with utilizing experiences and expertise of developed countries;
  - Boosting efforts for int’l aviation and maritime shipping; and
  - Continuing dialogue and enhancing int’l cooperation.
- Follow-up meeting for senior officials will be held in June 2009 in Japan;
- 2nd Ministerial Conference will be set around the end of 2009 in Italy.
• Based on the MEET Ministerial Declaration, Japan will enhance assistance to systematic and organized efforts of developing countries to address climate change and air pollution issues in the transport sector.

• Japan’s multifaceted assistance includes:

  - Formulation of action plans (e.g. ASEAN-Japan Environmental Action Plan);
  - Design & implementation of measures for: automobiles, low-carbon logistics systems, public transport etc.;
  - Development of statistical data.
Considerable studies on the effective policies, such as Fuel Efficiency regulations of vehicles, fiscal incentives for low carbon vehicles, traffic flow improvement, are in progress by several research institutions and international agencies.

It would be useful for Individual countries to refer the outcome of these studies where necessary.

<Examples of studies in Progress>

- ICCT
  A climate change roadmap for the transportation sector
  [http://www.theicct.org/](http://www.theicct.org/)
- IEA, UNEP, ITF, FIA Foundation
  Global Fuel Efficiency Initiative (GFEI)
- OECD/JTRC
  International Joint study on Climate Change and Transport Strategy
- Chinese Sustainable Energy Program
- TERI