Experiences in Measuring Transport CO$_2$ Emissions in Asia

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Clean Air Asia
Lee Schipper Scholar (2013)

Regional Capacity Building Workshop on Measurement of Inland Transport CO$_2$ Emissions and Mitigation Policies
26-27 September 2013
Bangkok
Developing Asian countries cannot adequately “measure carbon”
– Lee Schipper in 2008

Collected data are often not easily accessible, or are incomplete
– Accessing Asia in 2012
Annual Growth in 2000-2010

12% VEHICLES (ASIA)

10% CO2 ROAD TRANSPORT (ASIA)

8% GDP

10% FUEL (ASIA)
Limited data is the Biggest Barrier

<table>
<thead>
<tr>
<th>Indicator</th>
<th>IND</th>
<th>INO</th>
<th>NEP</th>
<th>PAK</th>
<th>PHI</th>
<th>PRC</th>
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<td>Vehicle Registration</td>
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<td>Vehicle Population (in-use vehicles)</td>
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<td>Vehicle Imports</td>
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<td>Ave. Veh. km Traveled Per Type</td>
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<td>Trip Mode Share</td>
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<td>Fuel Efficiency</td>
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<td>Emission factor (type, fuel, standard, age)</td>
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<td>Ridership/Occupancy</td>
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<td>Population, GDP</td>
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<td>%Biofuel Blend In Gasoline, Diesel</td>
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Legend:
- Available Data
- Limited Data
- Not Available
- No Answer
Policymakers/ Experts and Transport Emissions

Source: https://cee39d0c-a-62cb3a1a-s-sites.googlegroups.com/site/dinaanu/Home/other-intere
Billion Tons Problem in Transport

Nearly 30 studies reviewed, 2010 – India (3X) and China (5X).

The variation in 2020 for both China and India exceeds 1 billion tons of CO₂ which is same as emitted by Asia in 2009/2010.
Trucks and Buses have low fuel efficiency and they travel more, so the impact gets multiplied i.e. can be 10-12 times higher.
Main Issues in ASIF Quantifications

India

- Nearly 40% of studies in India assumed vehicles on road– 60-90% of registered vehicles (2010=Indonesia)

- Official Ministry disaggregates modes into 12 categories but nearly 50% of studies considered 6 or less number of modes (Aggregated Data)

China

- Term “Total Vehicles” means different things to different people

- In China - FE debate has helped in making very reasonable assumptions on Fuel efficiency but VKT and fuel split data is mainly sourced from 1-2 studies

In China and India occupancy/tonnage data is misleading.
Diesel Consumption in India

- Energy Statistics (2011 & previous) Transport (HSD) MTOE
- ACCESSING ASIA
- SIAM + Anil
- ADB-CAA
- ICCT
- WB-EFFECT
  - Baidya Salil Arora, Anant Vyas and Larry R. Johnson + Pundir + Rewat + Zhou El al.
- kadiyali + balciya
- Biofuel Committee
- PPAC

Energy statistics – 2012-2013

Hybrid Models

Energy statistics – 2011 and previous

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Energy statistics – 2012-2013

Hybrid Models

Energy statistics – 2011 and previous
## Top vs Bottom in India

<table>
<thead>
<tr>
<th>Year</th>
<th>No of estimates</th>
<th>CO2 Top down estimates (MT)</th>
<th>CO2 Total Bottom estimates (MT)</th>
<th>CO2 from Gasoline (MT)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
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<tr>
<td>2000</td>
<td>13</td>
<td>86</td>
<td>81</td>
<td>191</td>
</tr>
<tr>
<td>2005</td>
<td>16</td>
<td>90</td>
<td>120</td>
<td>254</td>
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<tr>
<td>2010</td>
<td>15</td>
<td>127</td>
<td>161</td>
<td>382</td>
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<tr>
<td>2020</td>
<td>15</td>
<td></td>
<td>286</td>
<td>790</td>
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<tr>
<td>2030</td>
<td>9</td>
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<td>365</td>
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</tbody>
</table>

Majority of variation in total CO₂ emissions can be explained by variations in diesel consumption.
Passenger Transport Efficiency

Without FE standards

With FE standards

India official data

India
China

GDP/Capita

CO2 grams/PKM
Road Freight Efficiency

International Researchers

National Researchers /Govt Estimates

CO2G/TKM vs. GDP/capita

Indicators for India and China

National Researchers /Govt Estimates
1. By 2050, **one billion vehicles** could be on road. Activity Projections suggest a range of 7,000 to 12,000 billion VKT

2. Using current road occupancy levels as a benchmark, additional lane kilometer requirement for China would be around **20-30 million lanekm**

3. If road construction is carried out at the same pace as done previously, additional Lanekm of 14 million could be physically built.

4. To build **30 Million lane kilometres**, 
   - Government needs to invest ? trillion USD and
   - land required would be ? million Ha.

**Growth in vehicle activity cannot be sustained**
Thanks Lee

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• Non-government organizations
• Academic and research institutions
• Private sector companies and associations

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• German International Cooperation (GIZ) • Institute for Global Environmental Strategies (IGES)
• Institute for Transport Policy Studies • Institute for Transportation and Development Policy •
• International Union for Conservation of Nature • L’Agence Française de Développement (AFD)
• MAHA • Pilipinas Shell • Rockefeller Brothers Fund • Shakti Foundation • Shell Foundation •
• United Nations Environment Program Partnership for Clean Fuels and Vehicles (UNEP PCFV)
• USAID CEnergy • Veolia • World Bank

For more information: www.cleanairasia.org