Climate and Transport:

An Introduction

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MRV Training Class
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Outline

1. Sustainable Low Carbon Transport

2. Climate Finance and Transport

3. MRVing Transport NAMAs
1. Sustainable Low Carbon Transport
Transport: an important piece of the climate puzzle...

- Transport: 13%
- Agriculture: 14%
- Energy: 26%
- Forests: 17%
- Industry: 19%
- Buildings: 11%

Greenhouse Gas (GHG) emissions, 2004
Transport: a very important piece

Source: Pacala and Socolow, 2005
A puzzle that has been difficult to solve

Changes (%) in greenhouse gas emissions by source category in the EU, 1990-2007

Source: European Environment Agency, 2011
Asia: an important piece of the transport puzzle...

Source: Adapted from WBCSD/IEA 2004, IEA 2009
Note: The BAU scenario is based on data from the World Business Council on Sustainable Development’s (WBCSD) Sustainable Mobility Project. The LCT scenario is indicative of what may be technically and economically feasible for developing Asia with a well-integrated suite of land use planning, public transport, clean fuels and advanced vehicle technologies. The reduction in the LCT scenario parallels the global 70% reduction (from 14 GT to 4 GT) in transport CO₂ emissions recently forecast by the International Energy Agency in its MAP Blue/Shifts (IEA 2009).
Asia is rapidly motorizing

Vehicle fleets often double in 5 to 7 years
Time lost in traffic can cost upwards of 5% of national GDP

Longer commutes can cost less than air pollution
Homegrown solutions can be unsafe...
Government solutions often promote motorization.
Many drivers are behind this trend
Much of Asia is growing out—not up

Source: Perera and Permani, 2012
Energy subsidies help lock in these trends.
Motorization is as much a development problem as a climate problem.
Co-benefits

Mitigate Greenhouse Gas

- License Plate Schemes
- Public Transport Upgrades

Climate Concerns  Development Needs

Co-benefits

<table>
<thead>
<tr>
<th>Economic</th>
<th>Social</th>
<th>Environmental</th>
</tr>
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<tbody>
<tr>
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</tbody>
</table>
Mitigate Greenhouse Gas

Co-benefits
Four Options

• Do nothing: business as usual

• Invest in roads and infrastructure

• Control transport demand (road pricing, license plate schemes)

• Improve public transport (buses, metros, and subways)
Improve
Standardized Comparison of International Fuel Economy and GHG Standards

MILES PER GALLON

(All countries converted to CAFE test)

Avoid

Toyama: the first compact city in Japan

Source: Visit Toyama (Toyama City)
Sticky Rice Ball Planning

Leisure
Shopping

Station

Home
School

Hospital

Home

Station

Work

Stick: Public transport system
Rice dumplings: Pedestrian areas around transport system

Source: Visit Toyama (Toyama City)
# Co-benefits!

<table>
<thead>
<tr>
<th>Co-benefits</th>
<th>Congestion</th>
<th>Air Pollution</th>
<th>CO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve – reduce emissions per km</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology / vehicle change</td>
<td>?</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Improved driving skills</td>
<td>+</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>Fuel-switch (CNG, LPG, biofuels)</td>
<td>?</td>
<td>++</td>
<td>?</td>
</tr>
<tr>
<td>Shift – reduce emissions per unit transported</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passenger transport:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mode switch</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Usage of larger units</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Improved occupancy rates</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Freight transport</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Avoid – reduce number of trips</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land use – Behavioral change</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>TDM / TOD</td>
<td>++</td>
<td>++</td>
<td>+++</td>
</tr>
</tbody>
</table>

Source: CAI-Asia 2010
In Asia: Potential to Shift

Source: UITP
Key Messages

- Transport will have a big impact on climate change
- But transport is first and foremost about development
- There is a reason sustainability comes before low carbon
- This is the same reason we need to turn over the approach to co-benefits
- ASI nicely summarizes key elements of a sustainable low carbon transport strategy
- Many parts of Asia are in a good position to introduce these elements
- There is a potential to get support from the international climate regime
2. Climate Finance and Transport
In 1994, would begin a series of COP meetings
What does a meeting in Warsaw have to do with transportation in your city?
The Kyoto Protocol (1997)

- Commits Annex I parties to targets and timetables
- Average 5% off 1990 levels by 2008-2012
- Basket of six GHGs
The Kyoto Surprise (1997)
The CDM in Theory

Before & after project

Original Baseline

Difference between with & with-out project
The CDM in Results

Percentage of Projects by Sector

- Transport: 0.04%

- Supply side EE: 11%
- CH4 reduction and coal mine/bed: 15%
- Afforestation and reforestation: 1%
- HFCs, PFCs, and N2O reduction: 2%
- Renewables: 63%
- Demand-side EE: 5%
- Fuel switch: 3%
CDM Barriers

- Low revenue relative to investment
- Investment often led by public sector
- Multiple small sources
- Transaction costs
Key messages

• The Kyoto protocol was developed out of the UNFCCC
• It employed a top down approach with targets and timetables for Annex 1 countries
• Though the CDM was more bottom-up in orientation
• It did not fit well with the transport sector
3. MRVing Transport NAMAs
2007: Welcome to Bali
The Bali Action Plan

1(b)(ii): Nationally appropriate mitigation actions (NAMAs)

in a measurable, reportable and verifiable (MRV) manner
The Copenhagen Accord (2010-)

NAMAs

- Unilateral
- Supported
- Credited

2010-2012

- Immediate financing
- 30 USD billion

2020

- Green Climate Fund
- 100 USD billion per year

Finance

Capacity building

Technology

M R V
How can transport get access to a greater share of climate finance.

- **Voluntary** pledge of 10 billion dollars between 2013-2015

- Scaling up to $100 billion dollars by 2020.
14 of the more important countries out of the 102 sending submissions in response to the Copenhagen Accord between Dec. 2009 and February 2010.


<table>
<thead>
<tr>
<th>Country</th>
<th>Date</th>
<th>Reduction by 2020</th>
<th>Reduction Base Year</th>
<th>Reduction Type</th>
<th>On 1990 Scale (+/-)</th>
<th>Share of World's GHGs</th>
<th>CO₂ Emissions / capita (CO₂eq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>1/27 2010</td>
<td>5 to 25%</td>
<td>2000</td>
<td>-</td>
<td>-3.89% to -24.1%</td>
<td>1.30%</td>
<td>27.4</td>
</tr>
<tr>
<td>Brazil</td>
<td>12/29 2009</td>
<td>36.1 to 38.9%</td>
<td>N/A</td>
<td>+</td>
<td>+6.4 to +1.7%</td>
<td>6.6%</td>
<td>15.3</td>
</tr>
<tr>
<td>Canada</td>
<td>1/30 2010</td>
<td>17%</td>
<td>2005</td>
<td>+</td>
<td>+0.25%</td>
<td>1.86%</td>
<td>24.9</td>
</tr>
<tr>
<td>China</td>
<td>1/29 2010</td>
<td>40 to 45%</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>16.64%</td>
<td>5.5</td>
</tr>
<tr>
<td>EU</td>
<td>1/27 2010</td>
<td>20% / 30%</td>
<td>1990</td>
<td>-</td>
<td>-20% / -30%</td>
<td>11.69%</td>
<td>10.3</td>
</tr>
<tr>
<td>India</td>
<td>1/29 2010</td>
<td>20% to 25%</td>
<td>2005</td>
<td>-</td>
<td>-</td>
<td>4.32%</td>
<td>1.7</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1/26 2010</td>
<td>26%</td>
<td>N/A</td>
<td>+</td>
<td>+22%</td>
<td>4.73%</td>
<td>9.3</td>
</tr>
<tr>
<td>Japan</td>
<td>1/26 2010</td>
<td>25%</td>
<td>1990</td>
<td>-</td>
<td>-25%</td>
<td>3.14%</td>
<td>10.6</td>
</tr>
<tr>
<td>Mexico</td>
<td>1/31 2010</td>
<td>30%</td>
<td>N/A</td>
<td>+</td>
<td>+19.8%</td>
<td>1.58%</td>
<td>6.6</td>
</tr>
<tr>
<td>Russia</td>
<td>2/1 2010</td>
<td>15 to 25%</td>
<td>1990</td>
<td>-</td>
<td>-15 to 25%</td>
<td>4.64%</td>
<td>14.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>1/12 2010</td>
<td>7 to 11%</td>
<td>N/A</td>
<td>+</td>
<td>+124 to +115%</td>
<td>0.11%</td>
<td>11.3</td>
</tr>
<tr>
<td>S. Africa</td>
<td>1/5 2010</td>
<td>34%</td>
<td>N/A</td>
<td>+</td>
<td>+48.2%</td>
<td>0.98%</td>
<td>9.0</td>
</tr>
<tr>
<td>S. Korea</td>
<td>12/30 2009</td>
<td>30%</td>
<td>N/A</td>
<td>+</td>
<td>+63.9%</td>
<td>1.3%</td>
<td>11.8</td>
</tr>
<tr>
<td>US</td>
<td>1/28 2010</td>
<td>17%</td>
<td>2005</td>
<td>-</td>
<td>-3.67%</td>
<td>15.78%</td>
<td>23.1</td>
</tr>
</tbody>
</table>

Emission Reductions. A target which reduces a country's overall greenhouse gas emissions.

Business As Usual (BAU). A commitment to reduce emissions from the most plausible projection of the future if climate-friendly actions were not taken.

Carbon intensity. How much fossil fuels you have to burn to produce an economic unit.
# Example of a NAMA

Box 2: Indonesia’s NAMAs as submitted to UNFCCC (Jan 2010)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sustainable Peat Land Management</td>
</tr>
<tr>
<td>2</td>
<td>Reduction in Rate of Deforestation and Land Degradation</td>
</tr>
<tr>
<td>3</td>
<td>Development of Carbon Sequestration Projects in Forestry and Agriculture</td>
</tr>
<tr>
<td>4</td>
<td>Promotion of Energy Efficiency</td>
</tr>
<tr>
<td>5</td>
<td>Development of Alternative and Renewable Energy Sources</td>
</tr>
<tr>
<td>6</td>
<td>Reduction in Solid and Liquid Waste</td>
</tr>
<tr>
<td>7</td>
<td><strong>Shifting to Low-Emission Transportation Mode</strong></td>
</tr>
</tbody>
</table>


Actually, many sources of climate finance; all will require some form of MRV
MRV is not new

1936 Flood Control Act
1980 Executive Order 12291
1950 Detroit Area Transportation Study
1804-1866 Jules Dupuit
1999 ASIF
Transport NAMAS
Top-Down MRV

National fuel sales (road sector)

X Emissions factor

GHG Emissions
Applications: the next big challenge

Number of Vehicles (Jakarta)

Source: Suhadi, 2010
Key messages

• The Bali Action Plan began to change the nature of the climate change regime
• It allowed countries to pledge their own actions or NAMAs
• Some of these will qualify for support from international institutions
• MRV will be a requirement for what could be increasingly diverse sources of finance