Towards a Low-Carbon Asia: The Role of Development Cooperation & Finance

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Ministry of the Environment & NIES
Tsukuba, 13 February 2009
Outline

• Carbon Trends in Developing/Emerging Asia
• A New Development Model for a Low-Carbon Asia
• Strategies for Development Cooperation and Financing
• Conclusion
Global energy consumption

Source: OECD, 2008
Carbon Trends in Developing/Emerging Asia
Developing/emerging Asia’s share in global carbon emissions from energy consumption

2006 Actual
Total = 27,889 Mil tons CO₂

2030 Projection
Total = 40,553 Mil tons CO₂

Source: IEA World Energy Outlook 2008
Carbon emission from developing/emerging Asia is growing

Source: Compiled by the Ministry of the Environment from the data of IEA, CO₂ Emissions from Fuel Combustion 2007
GHG Emissions per Capita: Selected Country Groupings

**HIGH**
- "New World"
- Australia
- U.S.
- Canada
- N. Zealand

**MEDIUM**
- Other Industrialized
  - EU-25
  - Japan
  - Turkey
- EITs: Russia
- Ukraine

**LOW**
- Lithuanian Latvia
- Large Developing
  - China
  - Indonesia
  - Pakistan
  - India
- Gulf: Qatar, UAE, Kuwait, S. Arabia
- Small Islands: Antigua & Barbuda, Trinidad & Tobago, Singapore, Palau, Nauru
- Middle Income
  - S. Korea
  - Taiwan
  - S. Africa
  - Argentina
  - Mexico
  - Brazil

- 12.8 - 67.8 t CO₂ eq./person
- 5.0 - 12.8 t CO₂ eq./person
- 0 - 5.0 t CO₂ eq./person

Source: WRI, 2005.
1.3 billion people live on less than US $1 a day.
- Overall consumption of the richest fifth of Asia’s population is 16 times that of the poorest fifth.
- Nearly 1 billion people lack access to energy.

Source: UNDP, 2006
Per capita emissions remain low in most developing/emerging Asia

Table 2.2. Energy-related CO₂ emissions by selected Asian countries in 2005

<table>
<thead>
<tr>
<th>Country</th>
<th>Total CO₂ Emissions (million tonnes)</th>
<th>CO₂/Pop. (tCO₂/ capita)</th>
<th>CO₂/GDP (kg CO₂/ 2000$)</th>
<th>CO₂/GDP (PPP) (kg CO₂/ 2000$ PPP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>4</td>
<td>0.27</td>
<td>0.66</td>
<td>0.11</td>
</tr>
<tr>
<td>China, People’s Republic of</td>
<td>5,060</td>
<td>3.88</td>
<td>2.68</td>
<td>0.65</td>
</tr>
<tr>
<td>China, Taiwan Republic of</td>
<td>261</td>
<td>11.41</td>
<td>0.73</td>
<td>0.46</td>
</tr>
<tr>
<td>China, Hong Kong</td>
<td>41</td>
<td>5.87</td>
<td>0.20</td>
<td>0.19</td>
</tr>
<tr>
<td>India</td>
<td>1,147</td>
<td>1.05</td>
<td>1.78</td>
<td>0.34</td>
</tr>
<tr>
<td>Indonesia</td>
<td>341</td>
<td>1.55</td>
<td>1.64</td>
<td>0.45</td>
</tr>
<tr>
<td>Japan</td>
<td>1,214</td>
<td>9.50</td>
<td>0.24</td>
<td>0.35</td>
</tr>
<tr>
<td>Korea, The Republic of</td>
<td>449</td>
<td>9.30</td>
<td>0.70</td>
<td>0.47</td>
</tr>
<tr>
<td>Korea, DPR of</td>
<td>73</td>
<td>3.26</td>
<td>6.97</td>
<td>1.98</td>
</tr>
<tr>
<td>Malaysia</td>
<td>138</td>
<td>5.45</td>
<td>1.23</td>
<td>0.56</td>
</tr>
<tr>
<td>Mongolia</td>
<td>10</td>
<td>3.44</td>
<td>7.75</td>
<td>2.01</td>
</tr>
<tr>
<td>Myanmar</td>
<td>11</td>
<td>0.22</td>
<td>0.73</td>
<td>0.15</td>
</tr>
<tr>
<td>Nepal</td>
<td>3</td>
<td>0.11</td>
<td>0.48</td>
<td>0.08</td>
</tr>
<tr>
<td>Pakistan</td>
<td>118</td>
<td>0.76</td>
<td>1.28</td>
<td>0.36</td>
</tr>
<tr>
<td>The Philippines</td>
<td>76</td>
<td>0.92</td>
<td>0.82</td>
<td>0.20</td>
</tr>
<tr>
<td>Singapore</td>
<td>43</td>
<td>9.93</td>
<td>0.38</td>
<td>0.38</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>12</td>
<td>0.63</td>
<td>0.62</td>
<td>0.15</td>
</tr>
<tr>
<td>Thailand</td>
<td>214</td>
<td>3.34</td>
<td>1.36</td>
<td>0.43</td>
</tr>
<tr>
<td>Vietnam</td>
<td>80</td>
<td>0.97</td>
<td>1.80</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Source: IEA (2007); Note: PPP=purchasing power parity; kg=kilogram
Income and motorization

Source: Robin Carruthers, World Bank, 2003
Vehicle ownership in developing/emerging Asian countries

NUMBER OF VEHICLES PER 1000 PERSONS IN ASIAN COUNTRIES

KOREA: 285
MALAYSIA: 250
THAILAND: 115
PHILIPPINES: 30
INDONESIA: 25
CHINA: 12
INDIA: 10

Source:
Alok Rawat, “Fuel Efficiency Improvement and Automotive CO2 Reduction Policies – an Indian Perspective” UNEP Workshop, Shanghai, October 2004
GDP and primary energy consumption, on per capita base, are still low but growing in emerging economies of Asia.

Source: Li Zheng, Tsinghua Univ.
### Developing/emerging Asia’s primary energy mix

<table>
<thead>
<tr>
<th>Fuel Mix</th>
<th>2006</th>
<th>2030</th>
<th>EU (Present)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>49%</td>
<td>51%</td>
<td>30%</td>
</tr>
<tr>
<td>Oil</td>
<td>23%</td>
<td>24%</td>
<td>7%</td>
</tr>
<tr>
<td>Gas</td>
<td>7%</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>1%</td>
<td>2%</td>
<td>17%</td>
</tr>
<tr>
<td>Hydro</td>
<td>2%</td>
<td>2%</td>
<td>15%</td>
</tr>
<tr>
<td>Biomass</td>
<td>17%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Geo, solar</td>
<td>1%</td>
<td>1%</td>
<td>9%</td>
</tr>
</tbody>
</table>
Gross Domestic Product

North America

Western Europe

Japan and South Korea

Per capita in PPP US dollars:
- More than 25,000
- 20,000 to 25,000
- 15,000 to 20,000
- 10,000 to 15,000
- 7,000 to 10,000
- 4,000 to 7,000
- 2,000 to 4,000
- Less than 2,000

Value:
- This square represents 100 billions US dollars.
A New Development Model for a Low-Carbon Asia
Asia needs to shift to a low-carbon development model

• The current model, which is highly energy & carbon intensive, is not sustainable
• Energy security (rising energy demand) to achieve economic development and poverty reduction (electricity for all)
• National and local environmental concerns (eg. air quality)
• Climate change (adverse impacts on global GHG emissions, next generations, and poor who are most vulnerable)
A low-carbon economy is based on “decoupling” principles.

- Carbon emissions
- Quality of life
- Economic growth
- Changes in production and consumption patterns
- Changes in production and consumption patterns
- Carbon emissions

ADB Institute
To achieve a low-carbon economy, a paradigm shift is necessary:

- De-couple economic growth from carbon emissions
- Increase resource use efficiency and renewable energy development
- Change production (industrial composition) & consumption patterns
- Consider inter-generational equity
“Decoupling” of economic growth from carbon emissions is possible

In Japan, CO2 emissions grew at a much slower pace than GDP growth, from the 1970s

In Japan, SOx emissions grew at a much slower pace than GDP growth, from the 1980s
Significant CO2 reduction potential exists for Asian emerging economies

Source: Compiled by the Ministry of the Environment from the data of IEA, *World Energy Outlook 2007*
# Energy efficiency potential in selected industrial sectors

<table>
<thead>
<tr>
<th>Industrial sector category</th>
<th>Energy efficiency improvement potential</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mtoe/year</td>
</tr>
<tr>
<td>Chemicals/petrochemicals</td>
<td>120-155</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>55-108</td>
</tr>
<tr>
<td>Cement</td>
<td>60-72</td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>31-36</td>
</tr>
<tr>
<td>Aluminium</td>
<td>7-10</td>
</tr>
</tbody>
</table>

If the best of low-carbon energy technology available is spread, developing/emerging Asia can reduce carbon emissions by 20-30% (IPCC 4th Assessment Report)
Potential for improved efficiency in passenger transport

Energy efficiency and CO₂ emissions of public transport compared to car transport

Source: TREMOD
Scope: Germany 2005
Policies that can support transition to a low-carbon Asia

- A national strategy to achieve both economic growth (& poverty reduction) and a low-carbon economy by focusing on “co-benefits”
- Use of market forces through liberalization of fuel prices (e.g. removal of fuel subsidies) and adoption of enabling economic measures (e.g. a cap & trade system and carbon tax)
- Introduction of specific policy measures to improve energy efficiency in targeted sectors (such as industry, power generation, transport)
- Increased public funding for research on low carbon technologies
“Co-benefits” approach indispensable for developing/emerging Asia

Co-benefits Action

Development Needs (National and Local)

Efforts to Address Climate Change

Meet Increasing Energy Demand
Expand Thermal Power Plants

Introduce New Technologies
Switch Fuels in New or Existing Facilities

Increase Energy Efficiency
Reduce GHG Emission

Integrated efforts to address both development needs (growth & poverty reduction) and climate change
Removing fuel subsidies in developing/emerging economies can create tangible benefits

<table>
<thead>
<tr>
<th>Country</th>
<th>Average rate of subsidy (% of market price)</th>
<th>Annual economic gain (% of GDP)</th>
<th>Reduction in energy consumption (%)</th>
<th>Reduction in CO₂ emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>10.9</td>
<td>0.4</td>
<td>9.4</td>
<td>13.4</td>
</tr>
<tr>
<td>India</td>
<td>14.2</td>
<td>0.3</td>
<td>7.2</td>
<td>14.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>27.5</td>
<td>0.2</td>
<td>7.1</td>
<td>11.0</td>
</tr>
<tr>
<td>Iran</td>
<td>80.4</td>
<td>2.2</td>
<td>47.5</td>
<td>49.4</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>18.2</td>
<td>1.0</td>
<td>19.2</td>
<td>22.8</td>
</tr>
<tr>
<td>Russia</td>
<td>32.5</td>
<td>1.5</td>
<td>18.0</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Source: UNEP, 2006
Strategies for Development Cooperation and Financing
Building blocks of a low-carbon Asia

Global Level
- Political agreement on the role of developing/emerging economies by recognizing their historical positions, development needs, differentiated responsibilities, and external assistance

Regional Level
- Creation of efficient carbon markets that attach significant price on carbon at the regional level to reduce CO2 emissions

National Level
- National ownership over development strategies with the “co-benefits” approach
- Balancing markets, regulations, and innovative financing to drive investment into clean technology
Differentiated responsibilities

- Per capita emissions in developing/emerging Asia may be allowed to rise, from a low base, to a certain point over the next years
- But its per GDP emissions should decline, from a high base, in a substantial way
- Once a developing/emerging economy reaches a sufficiently high income level, the economy should make a commitment to overall reductions of CO2 and GHG emissions
- The international community should assist developing/emerging Asia to achieve this
Barriers to a low-carbon economy

Barriers are principally related to:

(i) governmental interventions
(ii) private sector capacity, and
(iii) financial support systems

Specifically:

• Presence of perverse policies and absence of policy incentives due to social concerns
• Limited access to energy efficient technologies
• Shortage of ready availability of finance
• Lack of implementation capacity for policymakers
Strategies in development cooperation for a low-carbon Asia

- Helping developing/emerging Asia in harnessing market mechanisms to accelerate a shift to a low-carbon economy, supported by adequate social sector protection to mitigate the negative impact of higher energy prices on the poor and socially vulnerable

- Technical and economic cooperation in clean energy development & energy efficiency improvement

- Capacity building for strong and effective governments
International support is needed for Asia’s shift to a low-carbon economy

**Mitigation**
- Improving energy efficiency.
- Access to clean energy & technology, smart transport

**High-carbon countries**

**Low-carbon Asia**

**More vulnerable countries**

**Economic assistance for climate actions**

**International financing**

**Public and private financing**

**Technical assistance and capacity building for strong, effective governments**

**Adaptation**
- Climate proofing of vulnerable sectors agriculture, water etc
Financing strategies for climate actions

Public-private partnerships (PPPs) for affordable and competitive climate actions through:

- Maximizing the use of market-based mechanisms (e.g. carbon markets)
- Catalyzing private capital
- Mobilizing concessional resources
## ADB’s core approach

<table>
<thead>
<tr>
<th>Financing Initiatives</th>
<th>Maximizing Market Mechanisms</th>
<th>Catalyzing Private Capital</th>
<th>Mobilizing Concessional Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Advancing Energy Efficiency and Use of Low-Carbon Energy Sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitigation Initiatives</td>
<td>Enabling Sustainable Transport Policies and Applying Efficient Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promoting Improved Urban Sanitation and Reduction of Fugitive Methane Emissions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptation Initiatives</td>
<td>Promoting Sustainable Land Use and Forestry</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Addressing Vulnerability Risks in National Development Strategies and Actions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increasing Climate Resilience of Vulnerable Sectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climate Proofing Projects</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Addressing Social Dimensions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Climate change funds: global and ADB initiatives

### Mitigation
- **Clean Energy Financing Partnership Facility**
  - Global and ADB initiatives
  - $90 m

### Adaptation
- **Small Grants for Promoting Climate Change Adaptation**
  - $1.2 m

### Both
- **Climate Change Fund**
  - $40 m

### Carbon Market Initiative Funds
- **Asia-Pacific Carbon Fund**
  - $151 m to 2012
- **Future Carbon Fund**
  - Target $100 m for post 2012

### Water Financing Partnership Facility
- $65 m, including adaptation

### Poverty and Environment Fund
- $3.6 m, including adaptation

### Climate Change Fund
- GEF as administrator
- Adaptation priority, $80 m - $67 m committed; mitigation, target $15 m

### Least Developed Countries Fund
- GEF as administrator
- $189 m - $58 m committed

### Strategic Priority on Adaptation
- Art of GEF Trust Fund
- $50 m – now fully committed

### Special Climate Change Fund
- GEF as administrator
- Adaptation priority, $80 m - $67 m committed; mitigation, target $15 m

### Strategic Climate Fund of the Climate Investment Funds
- WB Trustee
- Target:
  - Pilot Program for Climate Resilience $500 m
  - Forest Investment Program $500 m
  - Greening Energy Access $500 m

### Clean Technology Fund of the Climate Investment Funds
- WB as Trustee
- Target $5 b for 2009-2012
CMI attempts to maximize market potentials in ADB projects

CMI is available to projects where ADB provides financing support such as loans, technical assistance, equities, and guarantees
Conclusion

- Developing/emerging Asia should and can shift its development model to sustain economic growth and exploit “co-benefits”

- A new development model calls for a set of market-oriented policies to encourage energy efficiency and a wider mix of energy supply, to be complemented by stronger social protection programs

- This requires support from the international community in technical assistance, capacity building (to strengthen institutions) and financing
Thank you

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