Estimates of investment and financial flows for mitigation in 2030

Erik Haites
Margaree Consultants

Presented to:
Dialogue on Long-Term Cooperative Action
Vienna – August 28, 2007
Project Goal

- To estimate additional investment and financial flows needed in selected sectors to return global greenhouse gas emissions to *current levels in 2030*

Challenges

- Estimate investment and financial flows in as much detail as possible – including regional disaggregation.
Approaches

• Additional investment and financial flows estimated in a particular year as the difference between the flows in mitigation and reference scenarios in that year.
• Future flows are compared with sources of funds for current flows.
• Period of 2005 – 2030: the level of detail declines sharply as the time horizon is extended beyond 2030
• Scenarios: IEA World Energy Outlook 2006 Reference and Beyond Alternative Policy Scenarios for energy-related CO₂ emissions, US EPA scenarios for non CO₂ emissions, and cost-effective mitigation potential for agriculture and forestry.
Limitations

- Limited availability of data for **regional disaggregation**.
- Current data cover investment flows for aggregated sectors. Identifying **role of different sources of funding for specific sectors** is not easy.
- The mitigation scenario does not consider the need for **increased electricity access in developing countries**.
- No reference **scenario available for forestry**.
- Difficult to project investment needs for **non-commercialized mitigation technologies** like CCS.
- The analysis does not provide **total cost of climate change mitigation**.
- The **estimates are preliminary**, should be treated as **indicative**.
Findings
### Additional investment and financial flows in 2030

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Global, billion USD</th>
<th>Share of NAIP (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Supply Infrastructure</td>
<td>(-) 67</td>
<td>55%</td>
</tr>
<tr>
<td>Industry</td>
<td>36</td>
<td>55%</td>
</tr>
<tr>
<td>Building</td>
<td>51</td>
<td>27%</td>
</tr>
<tr>
<td>Waste</td>
<td>0.9</td>
<td>67%</td>
</tr>
<tr>
<td>Transport</td>
<td>88</td>
<td>40%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>35</td>
<td>67%</td>
</tr>
<tr>
<td>Forestry</td>
<td>21</td>
<td>99.5%</td>
</tr>
<tr>
<td>Energy RD&amp;D</td>
<td>35 - 45</td>
<td>-</td>
</tr>
</tbody>
</table>

- **Global:** 200 – 210 billion USD (0.92% of projected global investment and 0.26% of global GDP in 2030)
- **Non Annex I Parties:** 76 - 77 billion USD (0.86% of Investment and 0.29% of GDP in 2030)

*Amounts large in absolute terms, but small relative to GDP and investment*
• 35% of USD 432 billion annual investment shifted to renewables, CCS, nuclear and hydropower; over 55% in Non Annex I Parties.

• Investment made by government-owned or private, usually regulated, utilities and is domestically funded in most regions.

• Renewables concentrated in few countries; private investment and CDM.

• T&D investment needs further analysis.
Annual investment in 2030 reduced by about 10% to USD 263 billion; about 55% in non-Annex I Parties
Investment continues to grow, but at a reduced rate
Investment mainly by large corporations, either government owned or private
Industry

• Additional investment of USD 36 billion for energy efficiency, CCS, and reduction of process emissions (CO$_2$ and non-CO$_2$); about 55% in Non Annex I Parties

• Energy efficiency and process emission reductions financed internally

• Increased investment in energy efficiency and process emission reductions is best achieved through appropriate policies or regulations
Building

- Additional investment of USD 51 billion for energy (electricity and fossil fuel) efficiency; about 27% in non-Annex I Parties
- Energy efficiency financed internally
- Increased investment in energy efficiency is best achieved through appropriate policies or regulations (investments are incremental, and have short payback periods, but adoption is hampered by recognized barriers)
Transportation

- Additional investment of USD 88 billion for improved efficiency (90%) and biofuels (10%); about 40% in non-Annex I Parties
- Vehicle owners will bear the higher initial cost of more efficient vehicles
- Private sector will invest in biofuel production
- Increased investment needs appropriate policies or regulations for vehicle fuel efficiency and biofuel use
Waste Management

- Additional investment of USD 0.9 billion to capture CH₄ from landfills and wastewater treatment for energy use; about 67% in non-Annex I Parties
- Most landfills, wastewater treatment facilities are government owned or regulated
- Investment depends on government action
- CDM improves economics appreciably; can increase investment in non-Annex I Parties
Agriculture

- Investment of USD 15 billion in agroforestry to enhance sinks and financial flow of USD 20 billion to reduce non-CO$_2$ emissions; about 67% of latter in non-Annex I Parties
- Agroforestry more profitable, but has negative cash flow for a few years
- Actions to reduce non-CO$_2$ emissions probably need financial incentives
- CDM projects reduce CH$_4$ emissions from manure
Forestry

- Financial flow of USD 21 billion to reduce emissions and investment of USD 12 billion for reducing deforestation, USD 8 billion for forest management and USD 1 billion for forestation; almost all in non-Annex I Parties

- Reduced deforestation, forest management need financial incentives; great uncertainty and many operational issues to be resolved

- Several options for supporting reduced deforestation proposed by Parties and NGOs; little funding for forest management
Energy R&D and Deployment

• Government spending on energy R&D has stagnated at about USD 10 billion, while private sector spending has fallen; most research in Japan and USA

• Stern Review suggested government energy R&D budgets need to be doubled to USD 20 billion

• Support for deployment of low GHG emitting technologies needs to double from USD 30 billion to about USD 60 billion
Additional investment and financial flows in 2030

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Global, billion USD</th>
<th>Share of NAIP (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Supply Infrastructure</td>
<td>(-) 67</td>
<td>55%</td>
</tr>
<tr>
<td>Industry</td>
<td>36</td>
<td>55%</td>
</tr>
<tr>
<td>Building</td>
<td>51</td>
<td>27%</td>
</tr>
<tr>
<td>Waste</td>
<td>0.9</td>
<td>67%</td>
</tr>
<tr>
<td>Transport</td>
<td>88</td>
<td>40%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>35</td>
<td>67%</td>
</tr>
<tr>
<td>Forestry</td>
<td>21</td>
<td>99.5%</td>
</tr>
<tr>
<td>Energy RD&amp;D</td>
<td>35 - 45</td>
<td>-</td>
</tr>
</tbody>
</table>

Global: 200 – 210 billion USD (0.92% of projected global investment and 0.26% of global GDP in 2030)

Non Annex I Parties: 76 - 77 billion USD (0.86% of Investment and 0.29% of GDP in 2030)

*Amounts large in absolute terms, but small relative to GDP and investment*
Potential For Enhanced Investment and Financial Flows
Sources of investment and financial flows

- Most of the investment in mitigation measures is domestic
- Important to focus on the role of private-sector investments as they constitute the largest share of investment flows
- ODA is important in Africa and the LDCs
- Potential of the financial mechanism of the Convention is limited if it continues to rely on current levels and voluntary contributions = USD 990 million for the period 2006-2010
- Carbon market is already playing an important role in shifting investment flows.
Summary of changes needed

- Need **substantial shifts** in investment **as well as increase** in investment and especially **financial flows**
- **National policies** can play key role in driving many of the needed shifts and increases
- **Currently available sources** could cover a substantial part of the additional investment and financial flows needed
- However, **optimal combination of mechanisms**, such as the carbon markets, the financial mechanism of the Convention, ODA, national polices and **new sources** of finance is needed
- **Substantial share in non Annex I Parties**; lowest investment per tCO$_2$e reduction there
- **The entities that make the investment decisions are different** in each sector, and the policy and/or financial incentives needed will vary accordingly
Carbon Markets

- CDM already shows a significant potential to leverage domestic and international investments
- The supply of Kyoto units will be abundant compared with the level of compliance demand for the period 2008–2012
- Under a low estimate of compliance demand by Annex I Parties in 2030 (market of USD 5–25 billion per year), the current flow of CDM projects would provide sufficient supply
- Under a high estimate of compliance demand (market of USD 100 billion per year), a large fraction of the potential emission reductions, from all existing and new categories of projects/mechanisms would be needed to for the supply
- Policy certainty is important for investors. A longer-term international agreement on climate change broadens the range of mitigation measures that are attractive investments
Policies

• Appropriate national policies can achieve many of the changes in all countries:
  • Types of new generation capacity
  • Energy efficiency regulations, biofuels
  • Planning regulations and design standards for infrastructure
• Policies should differ by sector
• Policies to attract foreign investment can increase the funds available
• International co-ordination of policies is desirable in technology R&D and deployment, and energy efficiency standards for internationally traded appliances and equipment
Options for new sources of funding

• Several possible new sources of funds, e.g.:
  – Int’nl air travel levy USD 10 to USD 15 billion/year
  – Access to renewables programmes in developed countries - USD 500 million
  – Donated special drawing rights - USD 18 billion

• Could generate funds commensurate with needs predictably

• Sources and uses of funds need to be negotiated as part of new agreement