Climate finance

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• **Section 1**: Scale of the challenge and guiding principles

• **Section 2**: A simple storyline for climate finance

• **Section 3**: Matching sources and uses: an example from Ethiopia

• **Section 4**: Conclusions
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Scale of the challenge: to meet climate finance needs in developing countries ODA needs to double

- $150-400b p.a. for total capital investment requirement by 2020 in developing countries (both adaptation and mitigation)
- $100-200b p.a. for incremental cost
- As a comparison, total ODA in 2009 was approximately $120b

Source: World Bank, WDR 2010; Stern Blueprint for a safer planet, 2009; Project Catalyst, Scaling up climate finance, 2010; OECD/DAC
Guiding principles are derived from the theory of public finance, but their application is shaped by climate politics.

<table>
<thead>
<tr>
<th>Stability of revenue raised</th>
<th>Reliability of flows to dev’ing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence and equity</td>
<td>No incidence on developing countries</td>
</tr>
<tr>
<td>Introduction of distortions/corrections</td>
<td>Must correct the GHG externality</td>
</tr>
<tr>
<td>Impact on other revenue bases</td>
<td>Political acceptability domestically</td>
</tr>
<tr>
<td>Compatibility with fiscal policy for growth and stability</td>
<td>Must be decided in the context of stretched budgets</td>
</tr>
<tr>
<td>Compliance and enforcement cost</td>
<td>Easy to apply, possibly through existing institutions</td>
</tr>
</tbody>
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Source: Musgrave and Musgrave (1989)
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The potential for raising climate finance in developed countries is large.

**Carbon pricing**

- GHG emissions in developed countries by 2020 = 15-20bn CO2e
- Potential explicit/implicit price for carbon $20 tonne/CO2e
- Earmarking for international climate action = 10-20% of total rev

\[ \text{Potential explicit/implicit price for carbon} \times \text{Earmarking for international climate action} = \text{Earnings} \]

\[ \text{Earnings} = \$300-400b \text{ p.a.} \]
Carbon pricing is the cornerstone of the climate finance system

- Domestic sources
- International sources
- IFIs/bilateral multipliers
- International private flows
- Carbon market flows
Carbon pricing is the cornerstone of the climate finance system

- ETS/AAU auctioning levy
- Offset levy
- Wires charge
- Carbon tax
- Re-channelling of fossil fuel production subsidies in dev.ed countries
- Maritime/Aviation ETS
- Maritime aviation tax
- Airline ticket levy
- Financial transaction tax on carbon related transactions
- Capital markets multipliers
- Private sector multipliers
- Investments in low-carbon projects
- Investment in REDD+
- etc
- Purchase of offsets in the context of ETS or voluntary markets
Domestic sources of finance are very sensitive to carbon pricing

- ETS/AAU auction levy 10%
  - $10/ t CO2e
  - $5b
  - Offset levy 10%
  - $30/ t CO2e
  - $45b

Note: Year 2020. Assumptions on total market size: $10 = 5Gt; $30 = 15Gt; Offset market size: $10 = 0.5Gt; $30 = 2Gt.
International sources of finance are also very sensitive to carbon pricing

Tax on international maritime emissions

$10/\text{t CO2e}$  $7b$

$30/\text{t CO2e}$  $21b$

Note: Year 2020. Assumptions: total maritime emissions by 2020: approx 1Gt (Source: IMO based on the IPCC SRES). Estimate exclude emissions between developing countries (30% of total based on share of total trade flows)
Avoiding inefficiency in the system

- Avoid double taxation of the same base (ex: raising revenues through EU-ETS auctioning levy and a wires-tax on power)
- Ensure homogeneous taxation across the economy (if domestic emissions are taxed in an economy, so should international emissions between such economies)
- Avoid trade distortions (e.g. avoid different implicit carbon prices for the same good produced in different locations)
- Avoid complex tax collection/tax enforcement cost
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Ethiopia will require almost $50b in investment in the power sector over the next 20 years

Capital requirement to develop power sector infrastructure 2010-30

Total capital requirement, USD b

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydro</th>
<th>Wind</th>
<th>Geothermal</th>
<th>Transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-15</td>
<td>11.1</td>
<td>6.2</td>
<td>3.2</td>
<td>0.3</td>
</tr>
<tr>
<td>2016-20</td>
<td>5.7</td>
<td></td>
<td>3.8</td>
<td>1.6</td>
</tr>
<tr>
<td>2021-25</td>
<td>7.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026-30</td>
<td>14.5</td>
<td>2.1</td>
<td>7.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td>45.8</td>
<td>13.1</td>
<td>24.2</td>
<td></td>
</tr>
</tbody>
</table>

Note: Capital requirements based on EEPCo master plan and additional potential capacity; includes transmission and substation costs estimated as an additional 40% on top of generating costs
Current financing based on traditional infrast. investment is incompatible with aspirations

**Gilgel Gibe III financing structure**

USD m, total = 1,700

- **Financing gap**: 271 USD m
- **Bilateral (China)**: 459 USD m
  - Industrial and Commercial Bank of China (ICBC) providing $459m loan
  - Chinese Dongfang Electric Corporation (DEC) will carry out the hydro-mechanical and electro mechanical part of the project
  - Loan term estimated to be 2-3% interest rate with 10-12 year payback period
- **Bilateral (Italy)**: 623 EUR m ($875m)
  - Italian government providing €250m ($348m) loan to fund construction by Italian firm Salini Costruttori
  - Loan term estimated to be 2-3% interest rate with 10-12 year payback period
- **Gov of Ethiopia**: 348 USD m
  - GoE is the main source of finance to the project through EEPCo as equity
  - GoE will finance the local currency portion of the project’s cost, which is equivalent to €448m ($623m)
- **Local currency**: 623 USD m

No funding from multilateral development banks, commercial lenders or private investors has been secured.
Conclusions

• There are enough resources to support developing countries for their climate related needs
• Internalizing the externality through pricing carbon is the cornerstone of climate finance system and will determine the scale of resources available
• Principles of public finance should guide the application of taxes/levies to avoid inefficiencies
• Narrative, economics and project finance of infrastructural investment in developing countries will need to change in order to benefit from new financing opportunities