Controlling climate change after Copenhagen

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Fellow, European Climate Foundation

Woods Institute Energy Seminar, Stanford University, February 10, 2010
1. Climate change and its impacts
2. Greenhouse gas emissions
3. Keeping climate change within sustainable limits; where to draw the line?
4. Development First
5. Energy supply
6. Transportation
7. Buildings
8. Industry and waste management
9. Land use, agriculture and forestry
10. How does it fit together?
11. Policies and measures
12. International climate change agreements
COPENHAGEN OUTCOME
Copenhagen

• Huge increase in awareness/ political attention
• Inability to conclude 2 year negotiation process
• Acrimoneous process
• Political declaration (not unanimous) >> Copenhagen Accord as input in negotiations
• Decisions to continue negotiations, aiming at completion at COP 16/ Mexico (Nov/Dec 2010)
## Copenhagen Accord (1/3)

<table>
<thead>
<tr>
<th>In</th>
<th>But</th>
<th>Consequence</th>
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</thead>
<tbody>
<tr>
<td>Recognising 2 degree limit</td>
<td>• No reduction commitments to get there; • Targets/actions likely to get in far below top end</td>
<td>We are on track to 3-4 degrees; chances of staying below 2 degrees virtually zero</td>
</tr>
<tr>
<td>Review in 2015 with option to tighten global limit to 1.5 degrees</td>
<td>No strengthening of 2020 reduction commitments</td>
<td>This is lip service to vulnerable countries; has no practical impact; does not increase chance to stay below 2 degrees</td>
</tr>
<tr>
<td>Annex I countries to list their 2020 targets and non-Annex-I PART of their actions by Feb 1, 2010</td>
<td>• Terms “developed” and “developing” (as in Bali Action Plan) disappeared; • Accounting rules NOT uniform; nothing about surplus AAU; • No benchmark on how much they do</td>
<td>• Including “new developed countries” impossible; • Big loopholes on value of targets; • No pressure on maximizing reductions</td>
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### Copenhagen Accord (2/3)

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<tr>
<td>Stressing importance of adaptation and provide about half of $30 billion in support 2010-2012</td>
<td>Money likely to be at least partly relabelled ODA</td>
<td>Vulnerable countries are getting financial support, while climate change impacts are getting much worse</td>
</tr>
<tr>
<td>“we support the goal to mobilise $100 billion by 2020 “; public and private money</td>
<td>•No commitment to deliver this money; •No mechanisms to generate funding; •No governance structure to manage effective disbursement</td>
<td>Unclear if there ever will be significant money</td>
</tr>
<tr>
<td>Copenhagen Climate Fund established</td>
<td>•Nothing how to fill the fund •Nothing on governance (only Panel to study resources)</td>
<td>Unclear if fund will ever be operational</td>
</tr>
<tr>
<td>In</td>
<td>But</td>
<td>Consequence</td>
</tr>
<tr>
<td>-----------------------------------------</td>
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<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Establish a REDD + mechanism”</td>
<td>Nothing established and no process to establish it; no rules</td>
<td>Fast start money will partly flow to countries to avoid deforestation; rest unclear</td>
</tr>
<tr>
<td>Establish a technology mechanism</td>
<td>No details</td>
<td>No effective mechanism to promote technology transfer</td>
</tr>
<tr>
<td>Develop market approaches</td>
<td>Nothing about reforming carbon market</td>
<td>No agreement on CDM reform</td>
</tr>
<tr>
<td>“provide incentives to developing countries to continue on a low emissions path”</td>
<td>Nothing about Low Carbon Growth Plans</td>
<td>No impact on producing low carbon development plans</td>
</tr>
</tbody>
</table>
# Copenhagen Decisions

<table>
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</thead>
<tbody>
<tr>
<td>Decision to continue AWG-LCA and request to deliver outcome by COP16</td>
<td>No statement on legally binding outcome; no process decisions; vague paragraph on Mexico mandate</td>
<td>Totally unclear if there will be serious negotiating process (also in light of acrymoneous debates in CPH)</td>
</tr>
<tr>
<td>Decision to continue AWG-KP and request to deliver outcome at COP16</td>
<td>Demands of EU, Japan, Russia, Australia to have legally binding outcome (=Protocol) from LCA ignored; vague paragraph on Mexico mandate</td>
<td>Kyoto Annex B countries may never agree with KP amendment or never ratify</td>
</tr>
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</table>
What are the reasons for the Copenhagen failure?

**Power has shifted**
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- Their current interest is not to have binding deep GHG reductions
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**UNFCCC process ineffective**
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**US domestic politics**
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- Fixation on China and necessity to have trade sanctions in domestic climate law forces China into defensive attitude (no commitments, no verification)
- Hypocrisy on binding others and demanding total freedom for US

**EU lacked vision**
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- Strategy too dependent on others (only -30% if others comparable, keeping long-term finance till concessions of G77)
- Not prepared for power play
WHY TAKING ACTION TO CONTROL CLIMATE CHANGE IS VERY URGENT
Climate change risks now seen as more serious

From Schneider, S., Nature, vol 458, April 30 2009, p 1104-1105
Climate change risks now seen as more serious

Crop productivity in temperate regions reduced

Crop productivity in tropics reduced

Increased risk of forest fires

Widespread water scarcity (millions)

Increased flooding/droughts (millions)

Large scale permafrost melt

Greenland Ice Sheet melts

From Schneider, S., Nature, vol 458, April 30 2009, p 1104-1105
Where to draw the line and what that implies for GHG emissions?

Stabilization targets:
- E: 850-1130 ppm CO2-eq
- D: 710-850 ppm CO2-eq
- C: 590-710 ppm CO2-eq
- B: 535-590 ppm CO2-eq
- A2: 490-535 ppm CO2-eq
- A1: 445-490 ppm CO2-eq

Post-SRES (max):
- Copenhagen Accord limit
Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels.

<table>
<thead>
<tr>
<th>Stabilization level (ppm CO₂-eq)</th>
<th>Global Mean temperature increase at equilibrium (°C)</th>
<th>Year global CO₂ needs to peak</th>
<th>Year global CO₂ emissions back at 2000 level</th>
<th>Reduction in 2050 global CO₂ emissions compared to 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>490 – 535</td>
<td>2.4 – 2.8</td>
<td>2000 - 2020</td>
<td>2000- 2040</td>
<td>60 to -30</td>
</tr>
<tr>
<td>535 – 590</td>
<td>2.8 – 3.2</td>
<td>2010 - 2030</td>
<td>2020- 2060</td>
<td>-30 to +5</td>
</tr>
<tr>
<td>590 – 710</td>
<td>3.2 – 4.0</td>
<td>2020 - 2060</td>
<td>2050- 2100</td>
<td>+10 to +60</td>
</tr>
<tr>
<td>710 – 855</td>
<td>4.0 – 4.9</td>
<td>2050 - 2080</td>
<td></td>
<td>+25 to +85</td>
</tr>
<tr>
<td>855 – 1130</td>
<td>4.9 – 6.1</td>
<td>2060 - 2090</td>
<td></td>
<td>+90 to +140</td>
</tr>
</tbody>
</table>
Current pledges get us within 5 Gt of a 450 ppm pathway if nations deliver upper range of proposals

Global GHG emissions
Gt CO₂e per year

Reference path-way
"Business as Usual"

Low case of current proposals *

High case of current proposals *

450 ppm pathway (with overshoot)

Needed: 17 GT CO₂eq/ yr below BAU by 2020

* E.g., 20% vs. 30% below 1990 emissions in the EU – taking into account the effect of the recession and lower expected emissions from deforestation and peat

Source: McKinsey Global GHG Abatement Cost Curve v2.0; Houghton; IEA; US EPA; den Elzen, van Vuuren; Project Catalyst analysis
But are putting us on a track to 3 degrees or more……

Global GHG emissions and pathways for GHG stability
Gt CO$_2$e, 2020

- Low range of proposals
- High range of proposals

Probability of temperature increase under 2°C

<table>
<thead>
<tr>
<th>Probability</th>
<th>Expected temperature increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-30%</td>
<td>3.0°C</td>
</tr>
<tr>
<td>40-60%</td>
<td>2.0°C</td>
</tr>
<tr>
<td>70-85%</td>
<td>1.8°C</td>
</tr>
</tbody>
</table>

Source: IPCC WG3 AR4; den Elzen, van Vuuren; Meinshausen; McKinsey Global GHG Abatement Cost Curve v2.0; Project Catalyst analysis
## Implications for contributions by countries

<table>
<thead>
<tr>
<th>Scenario category</th>
<th>Region</th>
<th>2020</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-450 ppm CO₂ -eq</strong></td>
<td><strong>Annex I</strong></td>
<td>-25% to -40%</td>
<td>-80% to -95%</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Annex I</strong></td>
<td>15-30% deviation from baseline in Latin America, Middle East, East Asia</td>
<td>Substantial deviation from baseline in all regions</td>
</tr>
<tr>
<td><strong>B-550 ppm CO₂ -eq</strong></td>
<td><strong>Annex I</strong></td>
<td>-10% to -30%</td>
<td>-40% to -90%</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Annex I</strong></td>
<td>Deviation from baseline in Latin America and Middle East, East Asia</td>
<td>Deviation from baseline in most regions, especially in Latin America and Middle East</td>
</tr>
<tr>
<td><strong>C-650 ppm CO₂ -eq</strong></td>
<td><strong>Annex I</strong></td>
<td>0% to -25%</td>
<td>-30% to -80%</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Annex I</strong></td>
<td>Baseline</td>
<td>Deviation from baseline in Latin America and Middle East, East Asia</td>
</tr>
</tbody>
</table>

IPCC, AR4, den Elzen and Hoehne, 2008

Controlling Climate Change
Country pledges as of February 1, 2020
(source Ecofys/PIK/Climate Analytics)
HOW THE NECESSARY REDUCTIONS IN DEVELOPED AND DEVELOPING COUNTRIES CAN BE REALISED
Global abatement cost curve 2020
(up to costs of €60/t, excluding transaction costs, 4% discount rate)

Average cost of opportunities up to 17 Gt = €0/t (if benefits of left hand side fully captured)

Breakdown by abatement type
• 9 Gt for terrestrial carbon (forestry and agriculture)
• 6 Gt for energy efficiency
• 4 Gt for low carbon energy supply

Source: McKinsey Global GHG Abatement Cost Curve v2.0
Developing country abatement cost curve 2020

Developing country abatement cost curve, 2020
(up to costs of €60/t)

Agriculture and forestry

Power supply

Emerging technologies

Energy efficiency, in buildings, transportation and industry

Source: McKinsey Global GHG Abatement Cost Curve v2.0 and project Catalyst
How an equitable distribution of delivering 17 Gt CO2eq reduction by 2020 can work

Required abatement for developed country target of 25%

Potential abatement in developing countries

Support for incremental cost, e.g., concessional loans, grants, payments

Support for capacity building and loans for capital investment where required

Covering full incremental costs

17

Required abatement for 450ppm pathway

Developed countries’ abatement <€60/t

Flexible mechanism required to meet 25% target

Developing countries’ abatement (NPV negative)

Developing country abatement (NPV positive)

Source: McKinsey Global GHG Abatement Cost Curve v2.0, Project Catalyst analysis
Developing countries would need up to €65-100 billion/yr in incremental cost financing for 2010-20.

Annual financing flows requirement for developing countries

<table>
<thead>
<tr>
<th>Required flows for abatement at cost to society*</th>
<th>Additional cost for higher developing country financing rate (10%)</th>
<th>Estimated transaction costs of €1-5 per tonne carbon abated</th>
<th>Financing need for high cost technology deployment</th>
<th>Total financing requirement for abatement in developing countries</th>
<th>Adaptation estimate**</th>
<th>Total financing requirement for developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>10</td>
<td>5-30</td>
<td>5</td>
<td>55-80</td>
<td>~10-20</td>
<td>2-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7-11</td>
<td>2-9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7-11</td>
<td>55-80</td>
</tr>
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DEVELOPMENT FIRST: WHY MAINSTREAMING CLIMATE CHANGE INTO DEVELOPMENT POLICY IS ESSENTIAL
Development and climate change

Climate Change
- Temperature rise
- Sea-level rise
- Precipitation change
- Droughts and floods

Impacts on human and natural systems
- Food and water resources
- Ecosystem and biodiversity
- Human settlements
- Human health

Emissions and concentrations
- Greenhouse gases
- Aerosols

Socio-economic development paths
- Economic growth
- Technology
- Population
- Governance

Controlling Climate Change
Projected climate change

Development path with HIGH base emissions

Development path with LOW emissions

2 degrees above pre-ind
The response to climate change must be rooted in development

- Development is essential for eradicating poverty
- Climate change can undermine development
- Low carbon and climate resilient development ("climate compatible development") as the answer

Source: Project Catalyst
Low carbon development is economically attractive
Mainstreaming climate change in development policies

- Modernising industry to become competitive
- Improving energy security and reducing oil imports
- Providing clean and efficient transport to people
- Improving air quality to protect health
- Ensuring a strong and sustainable agriculture and forestry sector
- Greening macro-economic policy
- Providing electricity to the poor
- Developing coastal regions sustainably
- Building a good public health system
- Protect nature and biodiversity
How to change development paths?

- Develop capacity for change
- Start at the top
- Coordinate actions
- Climate proofing
- Prepare long term low carbon, climate resilient development plan (= green growth plan)
Low carbon (and climate resilient) growth plans as a strategic instrument for all countries to plan their transition

**Focus:** Development, and mainstreamed mitigation + adaptation

**Time horizon:** Long term and short/medium term

**Content:** Priorities, transition strategies, policies/measures and international support

**Differentiation:** Both developing + developed

**Process:** Ownership, participation, best practices, review, support,
Low carbon development, examples

• China:
  – Renewable Energy Law and the Tenth Five-Year Plan: reduce electricity sector emissions by 5% below BAU in 2020
  – Medium and Long Term Energy Conservation Plan:
    • reduce cement sector emissions by 15% below BAU levels in 2020
    • reduce iron and steel sector emissions by 9% below BAU levels in 2020
  – Fuel efficiency standards for passenger cars, SUVs, and multi-purpose vans: reduce transportation sector emissions by 5% below BAU levels in 2020
• Brazil:
  – Program for Incentive of Alternative Electric Energy Sources (PROINFA): reduce electricity sector emissions by 14% below BAU levels in 2020
  – Brazil’s ethanol program (flex fuel vehicles and cost competitive ethanol): reduce transportation emissions by 18% below BAU levels in 2020
  – No net forest cover loss by 2015
  – GHG emissions 20% below 2005 by 2020
Low carbon development, examples (2)

- India:
  - Reduce transportation sector emissions by up to 15 % below BAU levels in 2020
  - 20 MW solar PV capacity by 2020

- Korea:
  - National Green Growth Plan
  - GHG emissions 4% below 2005 by 2020

- South Africa:
  - National long term climate change strategy
  - GHG emissions 34% below BAU by 2020, 42% by 2025 and peaking between 2020-2025 (conditional)

- Indonesia:
  - GHG emission 26% below BAU by 2020
  - 0.5Mha/yr tree planting; 0.3 Mha/yr forest rehabilitation and stop illegal deforestation

- EU:
  - GHG emissions 80-95% below 1990 by 2050

- US:
  - GHG emissions 80% below 1990 by 2050
TECHNOLOGY TRANSFER
Technology follows investment

Energy efficiency, in buildings, transportation and industry
Support to overcome barriers

Agriculture and forestry
Support to compensate incremental costs

Power supply
Support to compensate incremental costs, international cooperation

Demos/investment in emerging technologies

Abatement potential
Gt CO₂e

Developing country abatement cost curve, 2020
(up to costs of €60/t)

Source: McKinsey Global GHG Abatement Cost Curve v2.0 and project Catalyst
Technology transfer and development

• Major mechanisms:
  – Foreign Direct Investment
  – Export driven modernisation
  – Domestic green growth

• Supporting measures:
  – Regional centers of innovation
  – Investment Facilitation and Insurance
  – IPR licensing and protection promotion

• R&D:
  – Increase public R&D funding
  – Joint R&D centers
  – Joint demonstration programs
IMPLICATIONS OF COPENHAGEN FAILURE
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What are possible implications?

• Unclear how UNFCCC process can deliver ambitious legally binding treaty by COP16
• MEF/G20 not accepted
• Focus may shift to like-minded country actions:
  • REDD
  • Fast-Start Finance for adaptation and mitigation
  • Technology development
  • Policy coordination
• National actions become more important, and trade measures more likely (self interest)
• Moving towards “low carbon prosperity” paradigm to unlock the situation
THE CASE FOR POLICY COORDINATION
We know what are effective policies

• Energy supply:
  – Reduction of fossil fuel subsidies
  – Taxes/ carbon charges
  – Cap and trade systems
  – Feed-in tariffs
  – Renewable energy obligations
  – Producer subsidies

• Transportation:
  – Fuel economy/ CO2 standards
  – Biofuel blending obligations
  – Taxes/ charges/ tax credits on vehicle purchase, registration, road use, parking
  – Investing in public and non-motorised facilities
  – Land-use and infrastructure planning

• Buildings:
  – Building codes
  – Demand side management
  – Appliance standards
  – Public sector procurement
  – Energy Service Companies
Fuel efficiency standards

Controlling Climate Change
Building codes
For more information:
bert.metz@europeanclimate.org

http://www.cup.cam.ac.uk/catalogue/catalogue.asp?isbn=9780521747844