Emission reductions for stabilisation and mitigation potentials

Information from the IPCC Working Group III AR4 and new studies

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The lower the stabilisation level the earlier global CO2 emissions have to peak
What reductions are needed?

<table>
<thead>
<tr>
<th>Stab level (ppm CO2-eq)</th>
<th>Global Mean temp. increase at equilibrium (ºC)</th>
<th>Year CO2 needs to peak</th>
<th>Year CO2 emissions back at 2000 level</th>
<th>2030 CO2 emissions compared to 2000 (%)</th>
<th>2050 CO2 emissions compared to 2000 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>445 – 490</td>
<td>2.0 – 2.4</td>
<td>2000 - 2015</td>
<td>2000- 2030</td>
<td>-45 to 0</td>
<td>-85 to -50</td>
</tr>
<tr>
<td>490 – 535</td>
<td>2.4 – 2.8</td>
<td>2000 - 2020</td>
<td>2000- 2040</td>
<td>-20 to +15</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>+15 to +30</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>+15 to +55</td>
<td>+10 to +60</td>
</tr>
</tbody>
</table>

Equity implications (all GHG emissions without LULUCF)

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

- Regime assumptions
- Baseline assumptions
- Allowed 2020 global emission level
  - 450 ppm CO2eq: +15 to +30 (vs 1990)
  - 550 ppm CO2eq: +30 to +45 (vs 1990)
- 2010 emission levels

Non-Annex I deviations from baseline, consistent with stabilisation trajectories

Source: den Elzen and Höhne, 2008
### Effect of baseline assumptions

(450-ppm CO2eq case)

- **Baseline default**
- **IPCC-SRES Average (default)**
- **IPCC-SRES Max**
- **IPCC-SRES Min**
- **CPI-2003**
- **Update B2**
- **Sheenan**

#### Sensitivity analysis

Reduction of the non-Annex I compared to the baseline

- **Baseline**
- **Annex I reduction in 2020**
- **Global emissions limit in 2020**
- **Halt deforestation**

**Source:** den Elzen and Höhne, 2008
Deviation from baseline

- 450 ppm CO2eq: -15 to -30%
- 550 ppm CO2eq: 0 to -20%

- Additional reductions from avoided deforestation could take 5 percentage points off
- All numbers without offsets

What reductions are needed from developed and developing countries?

Reduction non-AI ~ 8.5 Gt
Reduction AI ~ 6 Gt
Economic mitigation potential in 2030 (bottom-up)

All sectors and regions have the potential to contribute (2030World)

Note: estimates do not include non-technical options, such as lifestyle changes.
Reductions needed and mitigation potential

- Reduction non-AI ~ 8.5 Gt
- Reduction AI ~ 6 Gt

IPCC 2030 Mitigation potential < $100/tCO2eq
[excluding forestry, but plus 10% for underestimation]

Co-benefits of mitigation

- Near–term health benefits from reduced air pollution may offset a substantial fraction of mitigation costs
- Mitigation can also be positive for: energy security, balance of trade improvement, provision of modern energy services to rural areas, sustainable agriculture and employment
- Land-use measures positive for improving resilience to climate change and carbon storage