Emission reduction trade-offs for meeting concentration targets

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Box 13.7: Reductions Annex I and non-Annex I countries *as a group* for concentration targets

Scenario category	Region	2020	2050
A-450 ppm CO_2-eq[2]	Annex I	**–25% to –40%**	–80% to –95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO_2-eq	Annex I	–10% to –30%	–40% to –90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia	Deviation from baseline in most regions, especially in Latin America and Middle East
C-650 ppm CO_2-eq	Annex I	0% to –25%	–30% to –80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America, Middle East, and East Asia

Back-ground

- AWG-KP recognised that Annex I countries need to reduce their emissions within a range of 25% to 40% below 1990 levels, in order to reach the lowest stabilisation levels.
- Bali action plan:
  - Box 13.7 much attention, but it called for “deep cuts in global emissions” and a reference was included in a footnote
  - comparable mitigation commitments by all developed countries
  - “measurable, reportable and verifiable nationally appropriate mitigation commitments or actions … by all developed country Parties…”
  - appropriate mitigation actions by developing countries by the end of 2009.

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Two questions

1. How were the reduction ranges derived and whether new allocation studies would change the results?
2. What is termed as “substantial deviation from the baseline” for non-Annex I countries and what are the important determinants?

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How were the reduction ranges derived?

- 25 Studies: 16 studies quoted in IPCC, 2 unquoted and 7 new studies
- These studies differ in their assumptions:
  - Allocation calculations (i.e. only CO_2 or all GHGs)
  - Baseline (i.e. more reduction needed for higher baseline)
  - Kyoto implementation (i.e. all Annex I meet Kyoto, or all except US)
  - Global emission limits (i.e. 450, 550 and 650 ppm CO_2-eq)
- The IPCC AR4 based these ranges on the outcomes of all studies. Note:
  - Outliers that provide substantially different results compared to other studies were excluded
  - more weight was given to the more recent multi-gas studies.

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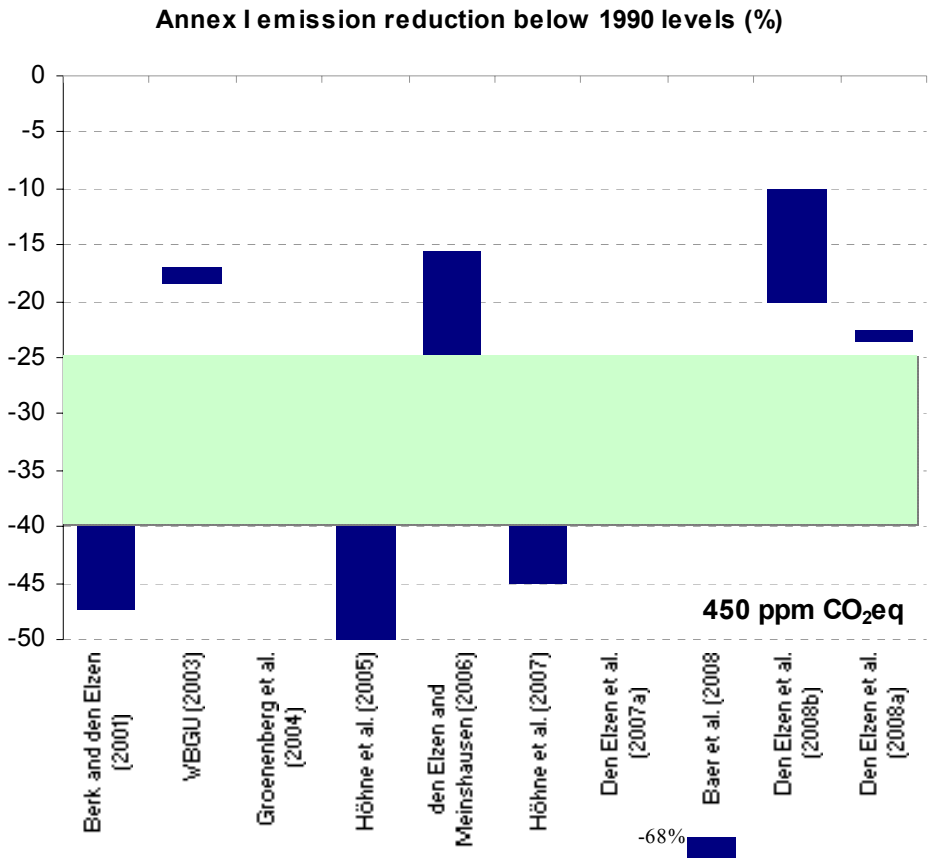
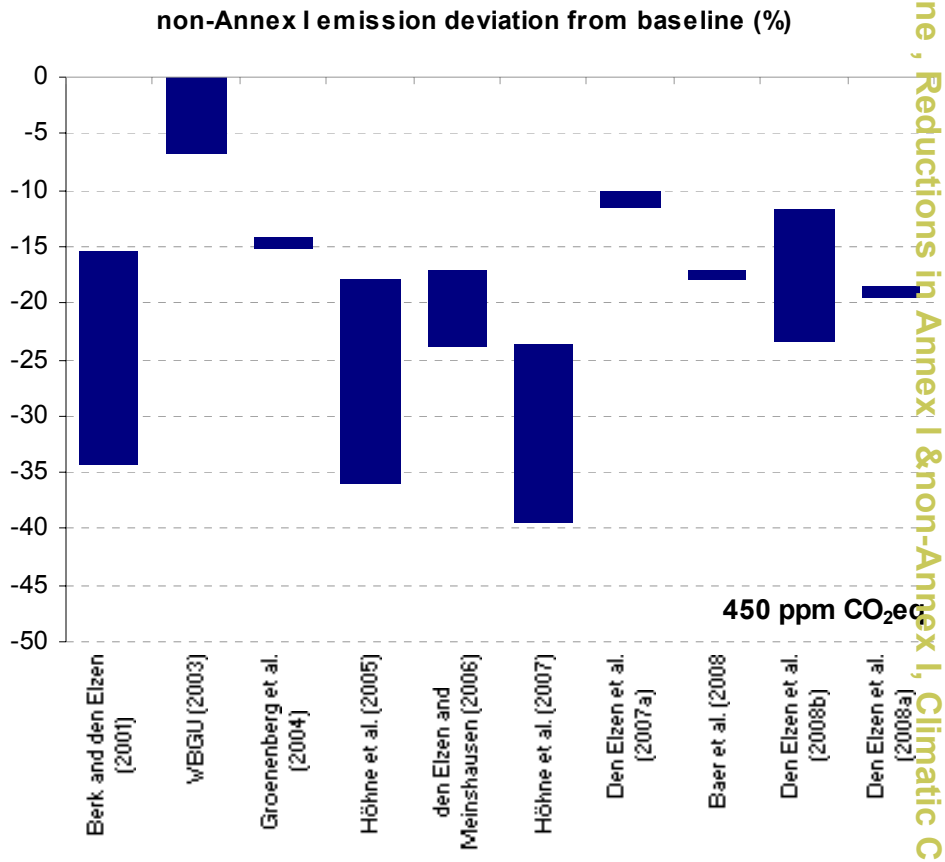
Reductions of Annex I and non-Annex I as a group to meet 450 ppm CO_2-eq (overshoot)





For non-Annex I as a group the reduction from baseline is about 15-30%, of which roughly 10% can be “no-regret options”

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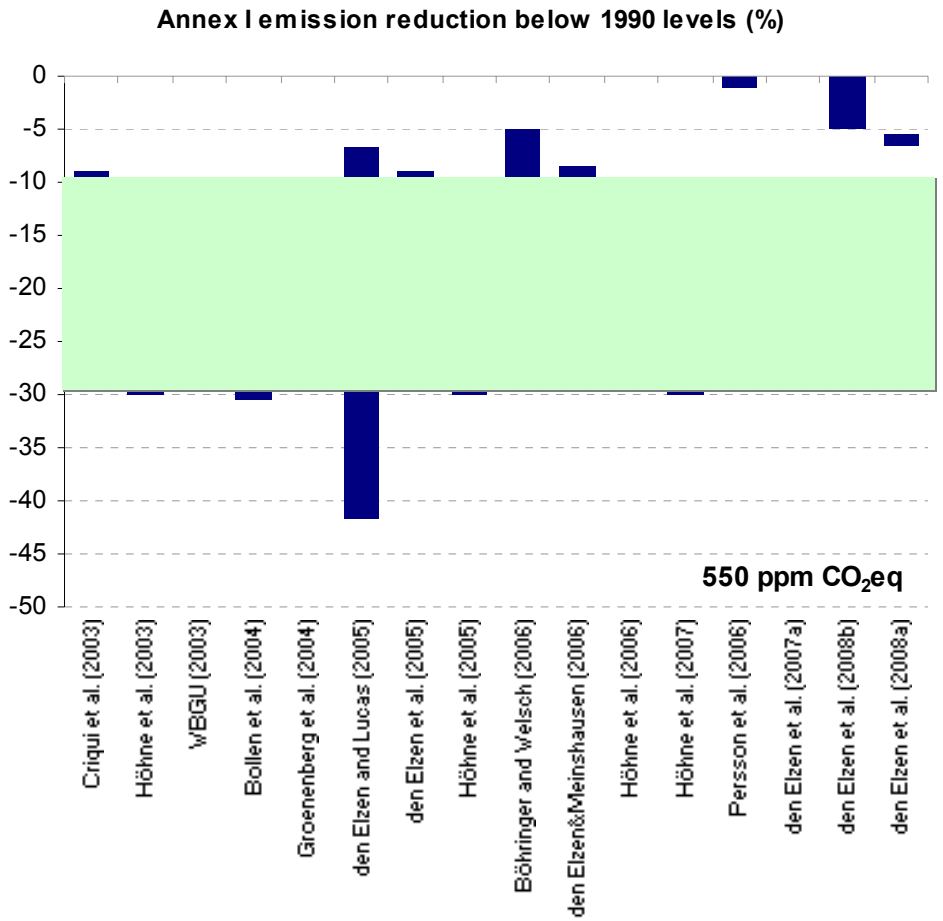
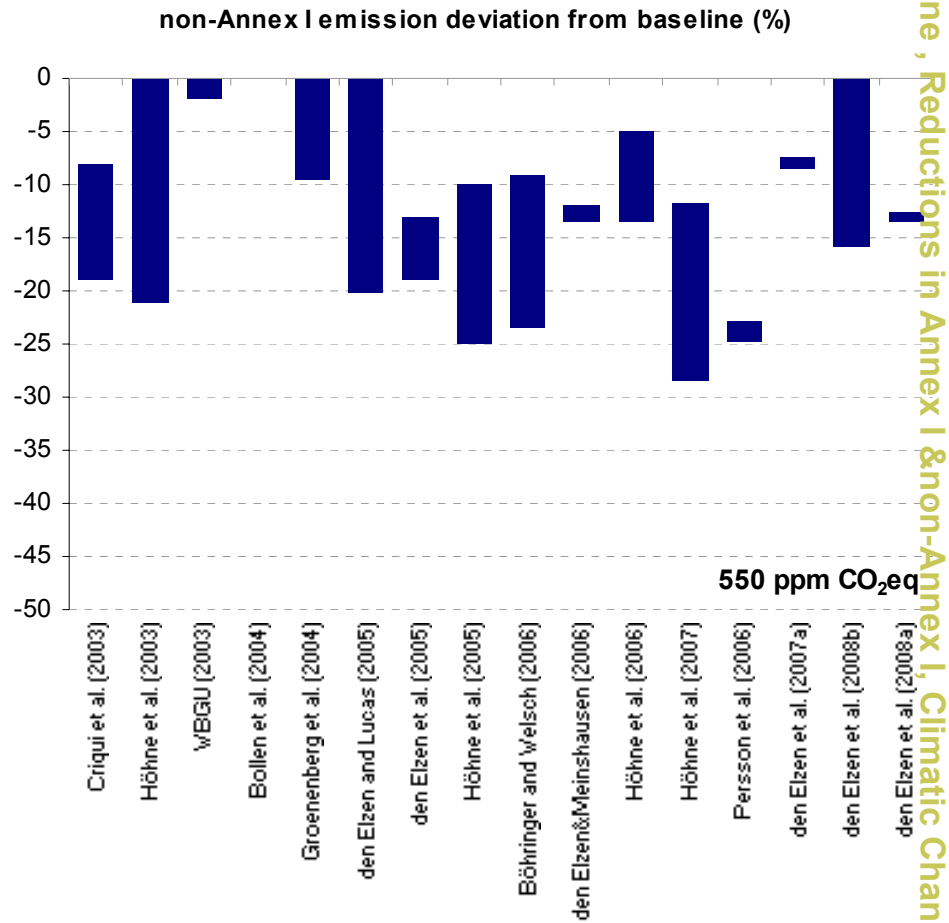
Reductions of Annex I and non-Annex I as a group to meet 550 ppm CO_2-eq





For non-Annex I as a group the reduction from baseline is about 0-20%.

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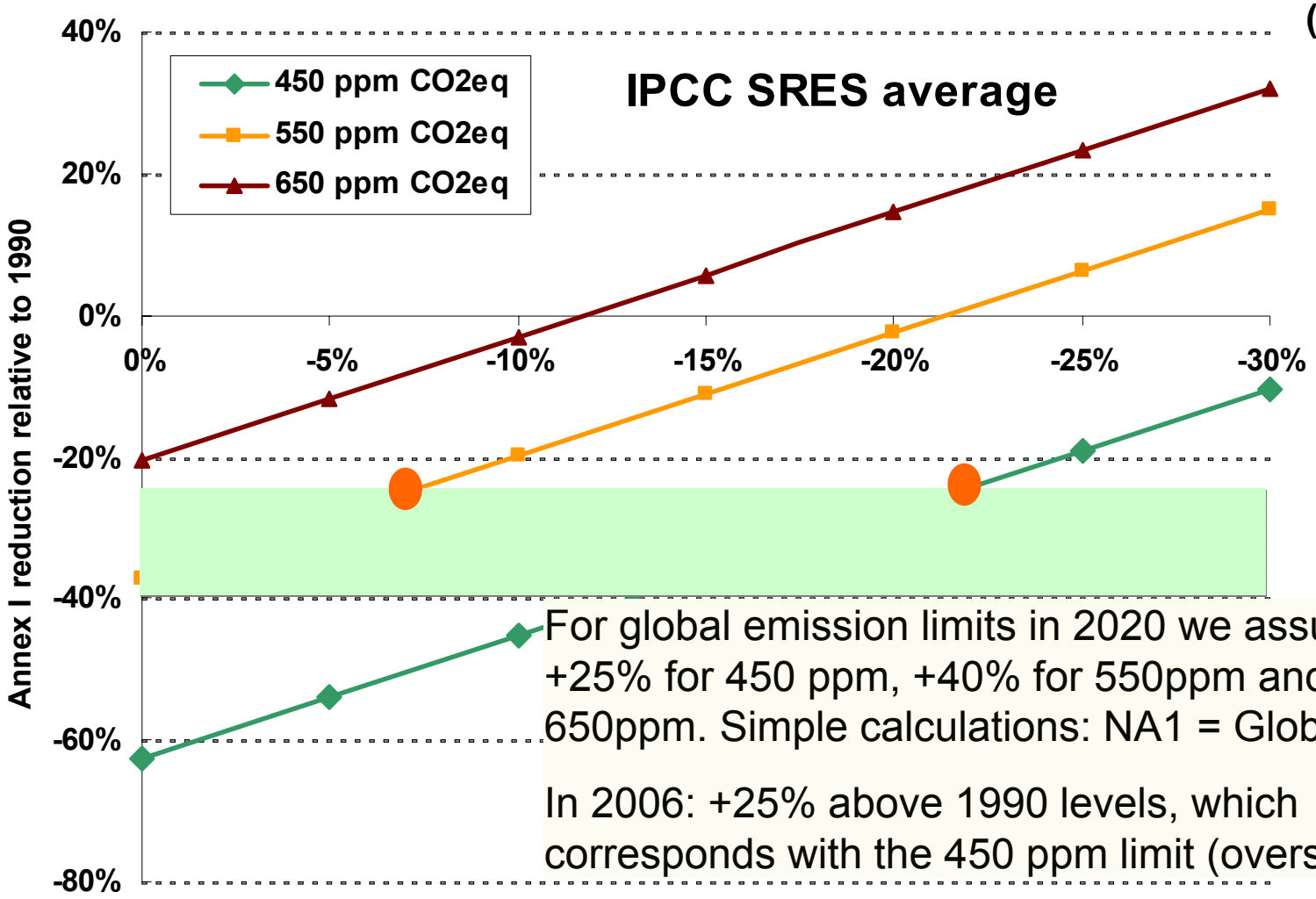
Analysis of reductions of Annex I and non-Annex I to meet concentration targets in 2020



For global emission limits in 2020 we assume +25% for 450 ppm, +40% for 550ppm and +50% for 650ppm. Simple calculations: NA1 = Global – A1

In 2006: +25% above 1990 levels, which corresponds with the 450 ppm limit (overshoot).

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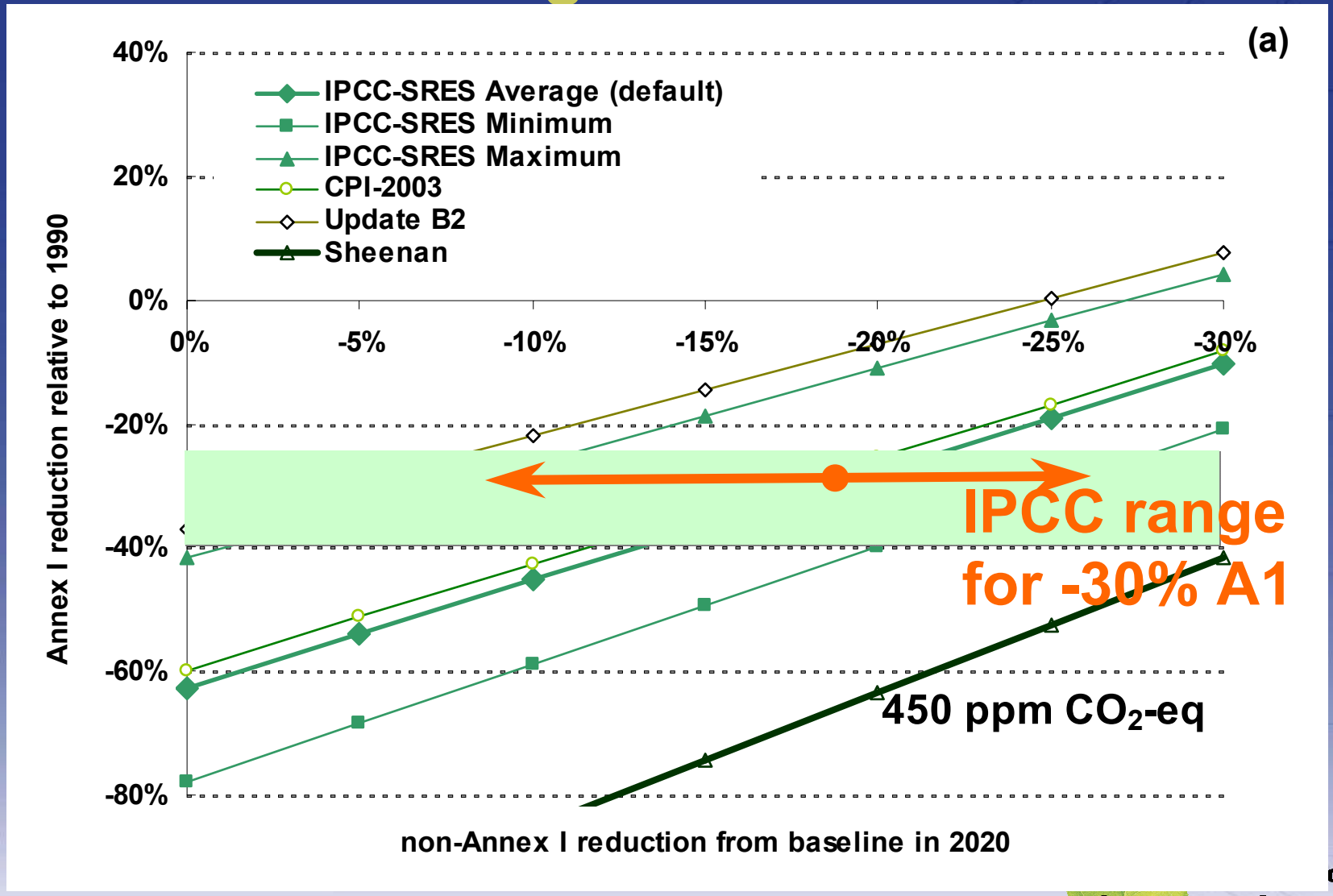
Assumed baseline highly affect the reductions NA1 reduction range of 10-25% under A1 -30%



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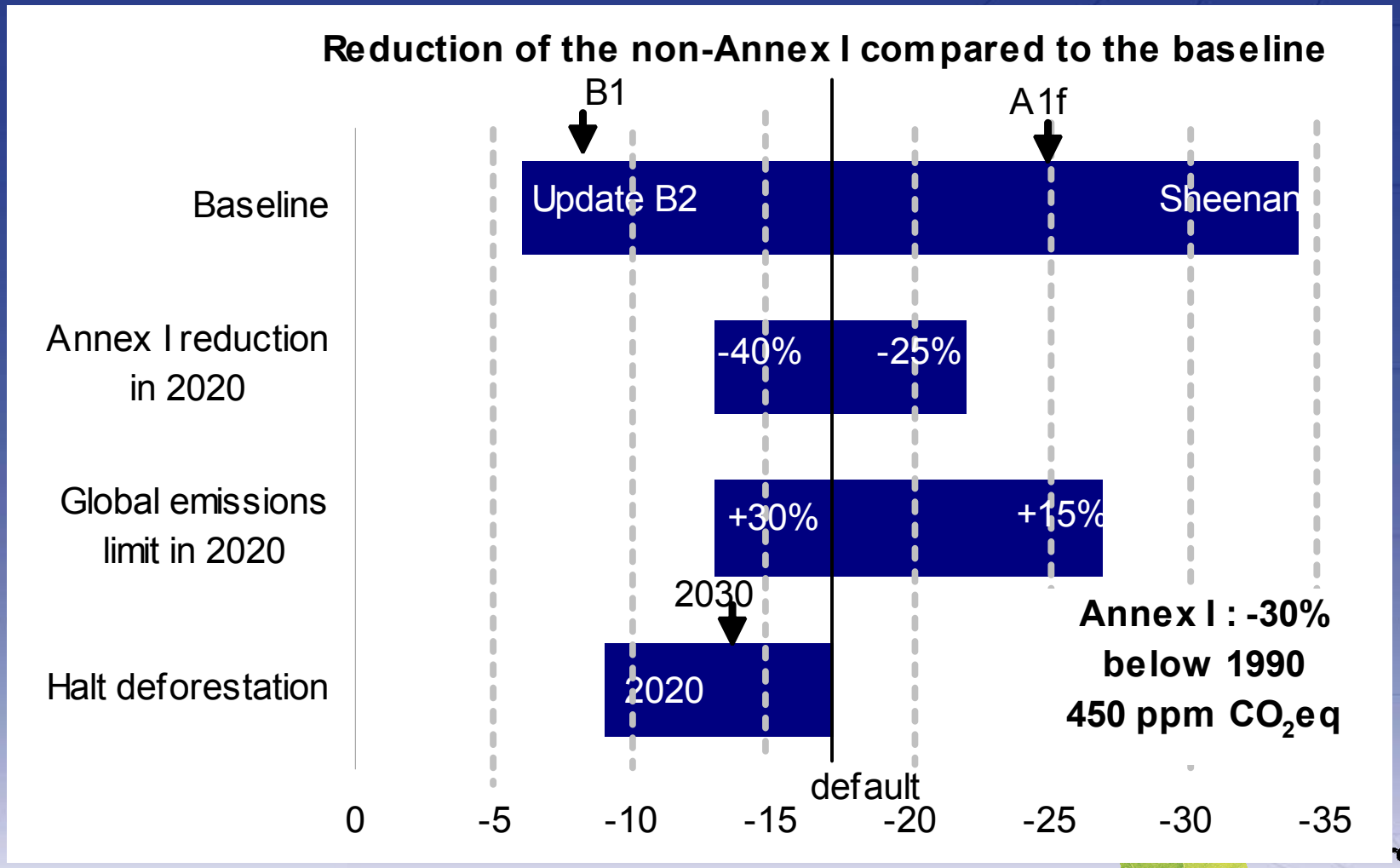
Impact of key assumptions on reduction of non-Annex I as a group if Annex I reduces by 30% (middle AWG-KP range) below 1990 levels



Conclusions

- New allocation studies confirm the reductions in Box 13.7.
- For non-Annex I (NA1) countries as a group "substantial deviation from baseline" is now specified: 15-30% for 450 ppm CO_2-eq, 0-20% for 550 ppm CO_2-eq and from 10% above to 10% below baseline for 650 ppm CO_2-eq, in 2020. Roughly the first 10% can be "no-regret options"
- If Annex I countries as a group reduces with 30% below 1990 level, non-Annex I need to reduce about 10-25% below baseline for meeting 450 ppm CO_2-equivalent
- For baseline that assume ongoing rapid growth in non-Annex I emissions (higher than IPCC SRES range), the reductions will be higher.
- Avoiding deforestation relaxes the reductions for Annex I and non-Annex I

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