Intended Nationally Determined Contributions and Global Carbon Space

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What is the emissions gap?

- INDCs are a positive step in the direction of mitigating global greenhouse gas (GHG) emissions and climate change. But ultimately the challenge is to limit greenhouse gas emissions to a level that confines global average temperature increase to 2°C. Against this target, climate scientists estimate that the world's emissions budget between now and 2100 is 1000 Gt-CO_2eq.
- What are the implications of the INDCs for global emissions in 2025 and 2030? UNFCCC and IEA estimate the global emissions under INDCs in 2030 to be 43 Gt-CO_2eq and 41.9 Gt-CO_2eq respectively (see Table 1). UNFCCC estimates emissions to be further lower by 1.9 Gt-CO_2eq if conditional pledges were also included. These estimates include emissions only from energy use and industrial processes, and exclude land use change emissions.
- Compared to the Business as Usual (BAU, or pre-INDC) scenario, global emissions are estimated by UNFCCC to decrease by 5.9% in 2030 under unconditional pledges.
- But how much closer is the world to the 2°C pathway? Under the 2°C limit, CEEW, UNEP and UNFCCC modelling analysis suggest that global carbon dioxide emissions from fossil fuel and industrial processes, under a least cost mitigation scenario, would be in the range of 32.5-36 Gt-CO_2eq (see Table 1). The IEA estimate (27.6 Gt-CO_2eq) is much lower because it assumes that global emissions will peak before 2020 and start declining beyond that year (in other models, emissions peak and decline after 2025 or 2030). Therefore, under the CEEW/UNEP/UNFCCC models, the global emissions gap (comparing INDCs against a 2°C pathway) is 7-10.5 Gt-CO_2eq in 2030. Under the IEA scenario, the emissions gap is 14.3 Gt-CO_2eq in 2030. These large ranges reflect different assumptions of emissions peaking, technology curves and economic growth rates. All models reflect, despite the positive impact of the INDCs, a big shortfall in global effort.

Table 1: Global Carbon Dioxide Emissions (in Gt-CO_2eq)

		2025	2030
BAU			
	CEEW[#]	42.5	46.2
	UNFCCC	44*	45.7*
2 degree			
	CEEW	35.7	36
	UNFCCC	33.7	32.5
	UNEP		36
	IEA		27.6
INDC			
	UNFCCC	41.9	43
	IEA	40.9	41.9

Note: UNFCCC numbers are reported for all sectors (fossil, industrial processes and land use change emissions), while numbers for other sources exclude land use change emissions. Based on data for 2014, 24% emissions are from land use sectors, which have been deducted from the UNFCCC numbers to arrive at numbers comparable to other sources. It should be noted that UNFCCC also presents ranges; the numbers presented here are the average as mentioned by UNFCCC.

[#] CEEW analysis is based on Global Change Assessment Model (GCAM), an integrated assessment model.

*BAU number for UNFCCC has been calculated by the author based on other information given in the report.

India frees up carbon space

- CEEW analysis of China, the EU and the US finds that, under their INDCs, the cumulative emissions for these three regions between 2015 and 2030 would respectively be 168, 50 and 70 Gt-CO_2eq. Thus, of the total carbon space of 1000 Gt-CO_2eq left for the world between 2015-2100, these three regions will corner 28% before 2030.
- A recent analysis, 'Fair Shares', shows that Indian INDCs imply that India has committed to higher mitigation than its fair share. India's cumulative emissions between 2015 and 2030 will be around 58-64 Gt-CO_2eq depending on the growth rate. In effect, India's pledge, by mitigating more than its fair share, frees up carbon space for other countries.

What are the implications of CEEW's analysis for the world as a whole?

- First, after 2030 the emission mitigation needed to reach the 2°C goal will be more stringent. With the INDCs, the world is locked in a pathway that will lead to emissions in the range of 42-43 Gt-CO_2eq, much higher than the permissible limit. Cumulative global emissions between 2015 and 2030 will be 650 Gt-CO_2eq under INDCs. While some countries like India are doing more than their fair share and others are not, there has been no analysis that reveals the technological pathway that is compatible with INDCs until 2030 and still meeting the 2°C target by 2100. Countries need to start thinking right now about allocating carbon space based on principles of historical responsibility and economic capabilities.
- Second, negative emission technologies will become increasingly important, as it appears that with the current INDC pathway it will be critical to have this set of technologies to meet the target. According to CEEW analysis, global emissions under a 2°C pathway will need to peak in 2030 at 36 Gt-CO_2eq, then decline to 24 Gt-CO_2eq in 2050, and go into negative territory from 2075 (say, with the help of bio-energy carbon capture and storage (Bio-CCS) technology). Availability of CCS also implies that the world can continue to use fossil fuels and still mitigate the resulting emissions. If CCS were removed from the portfolio of choices, energy systems would find it challenging to deliver deep mitigation after 2050. This means emissions would have to peak and decline closer to 2020, as seen in the IEA results.
- Third, there is already growing evidence of climate change impacts. Adaptation needs to be central in COP21 discussions. CEEW-IIMA-IITGn research estimates that in 2030 government spending on building capacity and adaptation would reach $360 billion (in 2005 prices).
- Finally, low income regions like Africa will become key to the post-2030 mitigation agenda. Even with continuous decline in prices of key mitigation technologies (as assumed in various models), market-based mechanisms (carbon trading) and technology transfer regimes will become critical.