

CARBON BUDGET

How the US-China deal has appropriated the carbon budget and left nothing for sustainable development of the rest of the world

What is the carbon budget?

1. The IPCC, in its 5th Assessment Report, has published a carbon dioxide emission budget, which tells us how much carbon dioxide can the world emit to stay below 2°C global warming.
2. IPCC estimates that to remain below 2°C the world can emit only about 2,900 billion tonne (giga-tonne or Gt) of carbon dioxide from all sources from the dawn of industrial revolution till 2100.
3. Till 2011, the world has already emitted 1,900 Gt of carbon dioxide. This means that out of the budget of 2,900 Gt, only 1,000 Gt remains to be used between now and 2100.

Who has used the carbon budget till now?

4. Between 1850-2011, the US has emitted 411 billion tonne of carbon dioxide (including emissions and sinks from land use, land use changes and forestry – LULUCF). This means that the US, with roughly 5 per cent of the world's population has emitted 21 per cent of world's total carbon dioxide till 2011. The 28-member European Union (EU-28) has emitted 18.4 per cent of the world's total carbon dioxide till 2011.

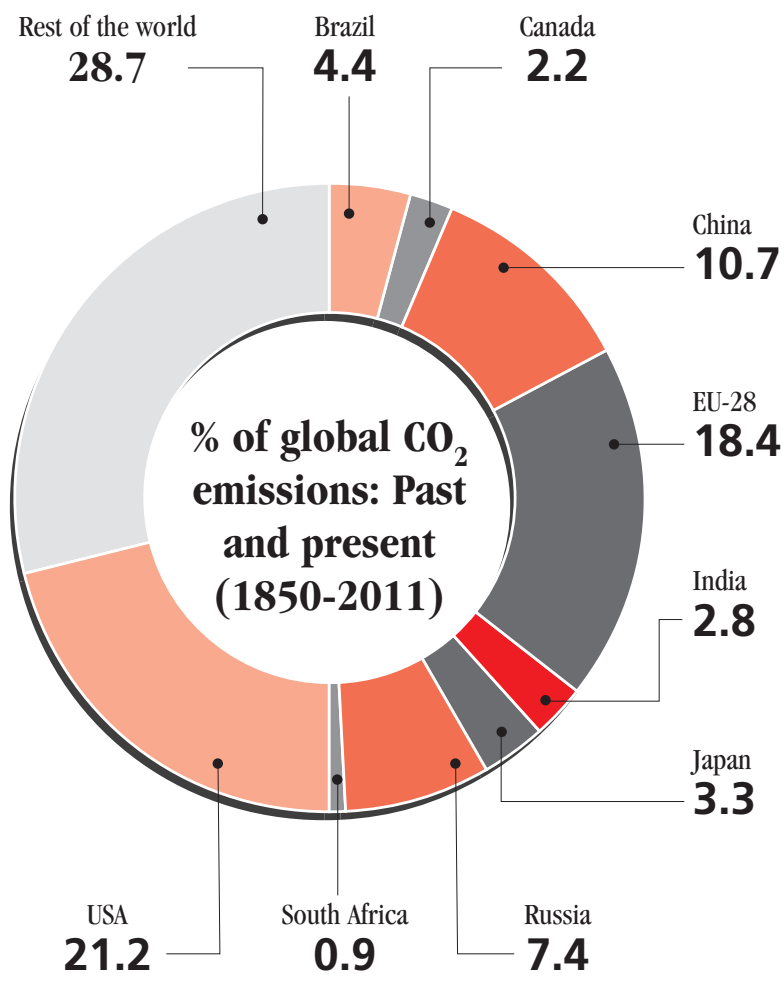
USA, EU-28, Russia and Canada together have emitted 50 per cent of the carbon dioxide during this period. In comparison, China has emitted 10.7 per cent and India, 2.8 per cent.

Who will use up the remaining carbon budget?

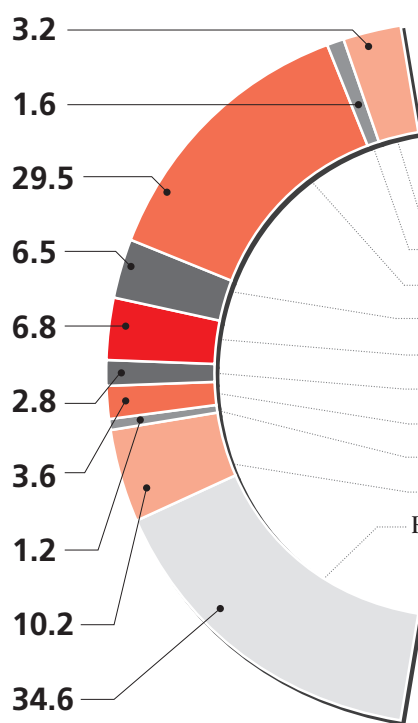
5. To estimate the use of the remaining budget, CSE has factored into the calculations the stated emission reduction plans of different countries. The US, EU and China have announced their plans for emission reduction. As per the China-US agreement signed in November 2014, the US will reduce its emissions by 26-28 per cent below 2005 levels by 2025. China has agreed to 'peak' its emissions by 2030 (if not earlier). EU has declared that it will reduce its emissions by 40 per cent below 1990 levels by 2030. As other countries have not yet announced their plans, the estimation for the use of the remaining carbon budget is based on their past trends with an assumption that the same trend would continue in future.
6. As per this analysis, the world will emit 900 Gt carbon dioxide between 2012-2030. This means that it will effectively finish the entire budget of carbon dioxide in this 20-year period. This also means that there will be nothing left for the future sustainable development needs of the rest of the world.
7. In this period two countries – the US and China – will use up the bulk of the budget. China takes up 29.5 per cent of the total carbon dioxide emissions between now and 2030; US will emit 10.25 per cent. EU-28 will emit 6.5 per cent of the world's total emissions between 2012-2030.
8. In comparison, in the period 2012-2030, India will emit 6.8 per cent of the world's total emissions.

Who has appropriated the carbon space?

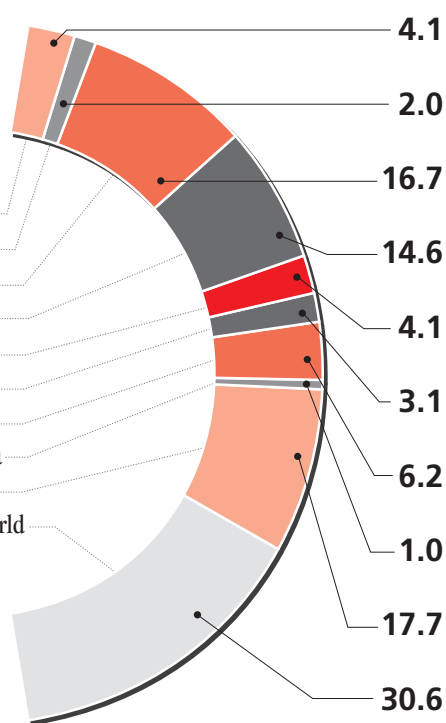
9. Between 1850 to 2030, the US will use up 17.7 per cent and China will use 16.7 per cent of the world's carbon budget. In other words, these two big polluters will converge in terms of total emissions. EU will not be far behind as it will also appropriate 14.6 per cent of the carbon space. These three effectively use up half of the world's carbon space.
10. Even in 2030, the per capita emissions of the US will be 12 tonne. China will also converge at 12 tonne by 2030.



% of global CO₂ emissions: Future 2012-2030



% of global CO₂ emissions: Past, present and future 1850-2030



Source: IPCC, AR5

The carbon budget

Unit: Gt CO ₂	>33% probability of staying within 2°C	>50% probability of staying within 2°C	>66% probability of staying within 2°C
Total anthropogenic CO ₂ budget: 1861-1880 to 2100	5,762	4,441	3,670
Total anthropogenic CO ₂ budget remaining after excluding Non-CO ₂ forcing: 1861-1880 to 2100	3,303	3,009	2,899
Total anthropogenic CO ₂ emitted: 1861-1880 to 2011	1,890	1,890	1,890
Total anthropogenic CO ₂ budget remaining: 2012 to 2100	1,413	1,119	1,009

Source: IPCC, AR5

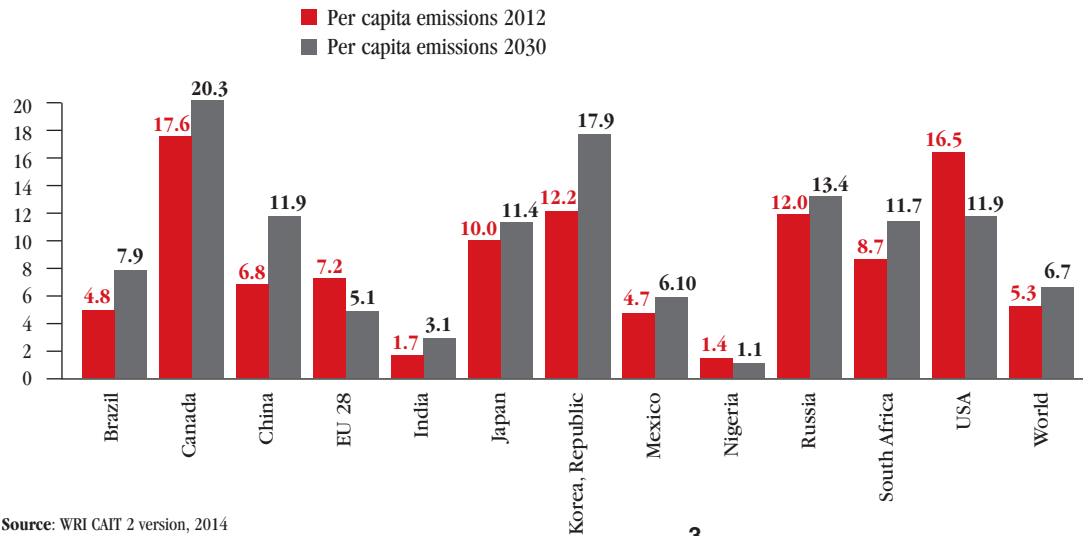
Carbon dioxide emissions with LULUCF (in Gt CO₂)

	1850-1949	1950-1989	1990-2011	Projected 2012-2030	1850-2011	1850-2030
Brazil	17.8	34.7	33.8	28.8	86.3	115.1
Canada	12.8	16.6	13.1	14.0	42.5	56.6
China	44.3	64.5	99.6	265.4	208.4	473.8
EU-28	118.0	147.0	91.3	58.9	356.3	415.2
India	12.4	14.9	26.2	61.5	53.5	115.0
Japan	8.0	28.3	26.9	25.4	63.2	88.6
Korea, Rep.	0.7	3.8	9.0	14.9	13.5	28.4
Mexico	7.5	9.3	10.5	13.7	27.3	41.0
Nigeria	2.7	3.6	4.9	5.1	11.2	16.4
Russia	28.7	76.2	37.7	32.1	142.6	174.7
Saudi Arabia	-0.1	2.7	7.0	14.5	9.6	24.2
South Africa	2.1	7.5	8.3	10.9	17.9	28.7
Turkey	4.7	4.8	5.0	10.0	14.5	24.5
Ukraine	4.5	16.9	8.1	6.2	29.5	35.7
USA	140.8	147.3	123.0	91.4	411.1	502.5
Africa	2.5	13.5	37.4	46.0	53.3	99.3

Source: 1. Höhne, N., Blum, H., Fuglestedt, J., Skeie, R.B., Kurosawa, A., Hu, G., Lowe, J., Gohar, L., Matthews, B., de Salles, A.C.N., Ellermann, C., Contributions of individual countries' emissions to climate change and their uncertainty (2011) Climatic Change, 106 (3), pp. 359-391.
2. Olivier, J.G.J., Janssens-Maenhout, G., Peters, J.A.H.W., (2012) , Trends in global CO2 emissions: 2012 Report. PBL Netherlands Environmental Assessment Agency, Bilthoven, the Netherlands, www.pbl.nl/en
3. Greenhouse Development Rights, 2014

Note: For 2012-2030, the total emissions are BAU emissions except for the US and EU 28 which is based on their respective targets for 2025 and 2030.

Per capita emissions: Present and future



Source: WRI CAIT 2 version, 2014

11. This then leaves nothing for the rest to grow. Particularly, as by 2030, the entire carbon space would be finished. In other words, the vast majority of the poor, in Africa or in Asia, are left without any space for future sustainable development.

What carbon space will India use?

12. So far, India has emitted about 53 billion tonne of carbon dioxide, which is 2.8 per cent of the world's total emission between 1850-2011.
13. From now to 2030, even assuming a business-as-usual scenario, India will emit 61.5 billion tonne of carbon dioxide, which will be 6.8 per cent of the remaining budget.
14. The per capita emission of India in 2030 will be 3.1 tonne compared to 12 tonne of China and US.

What carbon space will Africa use?

15. From 1850-2011, the entire continent of Africa has emitted 53 billion tonne of carbon dioxide, which is 2.7 per cent of world's total emissions.
16. From now to 2030, the entire continent based on a business-as-usual scenario, will emit an additional 50 billion tonne of carbon dioxide, which will be 5.5 per cent of the remaining budget.

Conclusion

The China-US deal is not the template for further negotiations on the global climate change deal for the following reasons:

- a. **It is highly unequal:** Under the agreement, the remaining carbon budget of roughly 1,000 billion tonne (between 2012-2100) will be completely exhausted by 2030. This means that there will be no space for growth for countries like India, who have huge unmet sustainable development needs.
- b. **Few countries will appropriate the entire global carbon budget:** Between 1850-2030, the US will use up 17.7 per cent, China 16.7 per cent and EU 14.6 per cent of the global carbon space. These three will effectively take up 50 per cent of the common atmospheric space.
- c. **It is unsustainable.** The agreement will mean convergence of the two biggest polluters, the US and China at 12 tonne per capita of carbon dioxide in 2030. This is far beyond what the world can sustain and therefore, cannot be the basis of a global agreement.
- d. **It is not ambitious:** Under the Cancun agreement, the US had put on the table the following roadmap for emission reduction: 17 per cent below 2005 level by 2020; 30 per cent by 2025 and 42 per cent by 2030. Now it is only talking about reducing by 26-28 per cent by 2025, which is even lower than the weak Cancun pledge. This is clearly business-as-usual for the US and cannot in any circumstances be called historic or ambitious.
- e. **China's target is unclear and even less ambitious than before:** It is not clear what China means when it says it will 'peak' in 2030. It is important to ask if this target means that it will be only fossil fuel emissions; all emissions; all GHG or only CO and at what level? However, if the business-as-usual trajectory is taken for estimation then China will 'peak' between 17-20 billion tonne of CO₂ in 2030. What is also clear is that its level of ambition in terms of renewable energy has been scaled down. In Cancun it had pledged to source 15 per cent of primary energy from renewables (without hydro) by 2020. In the China-US agreement it is only planning an additional 5 per cent in 10 years. Clearly, this also is business-as-usual.

All countries need the right to sustainable development. Carbon space cannot be appropriated by a few countries, which have contributed to cumulative emissions and are today the cause of temperature increase.