

# Fairness in Reducing Greenhouse Gas Emissions

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## Summary

In preparation for a United Nations Framework Convention on Climate Change (UNFCCC) meeting in Paris in December 2015 (COP21), delegates from 196 countries met in Lima, Peru in December 2014 (COP20) to lay the groundwork for a comprehensive treaty to limit greenhouse emissions, the goal of treaty being to limit the Earth's temperature increase to two degrees C above preindustrial time by the year 2100. (Based on the latest IPCC report, this means limiting total greenhouse gas emissions from preindustrial times to the year 2100 to about 1000 billion tons of carbon.) Ideally, each country would develop a specific target, by March 2015, for their future greenhouse gas emissions, and the pledges would form the basis for a binding treaty to be formalized in Paris. Unfortunately only the weakest of agreements was - all countries are simply committed to tackling climate change along the lines of previous agreements, and the reporting rules are voluntary. However, given the nature of the problem, this was not all surprising, as there is no way to meet the 1000 billion ton carbon budget that is both practical and equitable<sup>1</sup>. Perhaps, for Paris, a better goal would be to raise the budget to 1500 billion tons and then push for a "Manhattan Project" to sequester carbon. Countries need to have "stretch goals", not impossible ones.

## Why the need to limit greenhouse gas emissions?

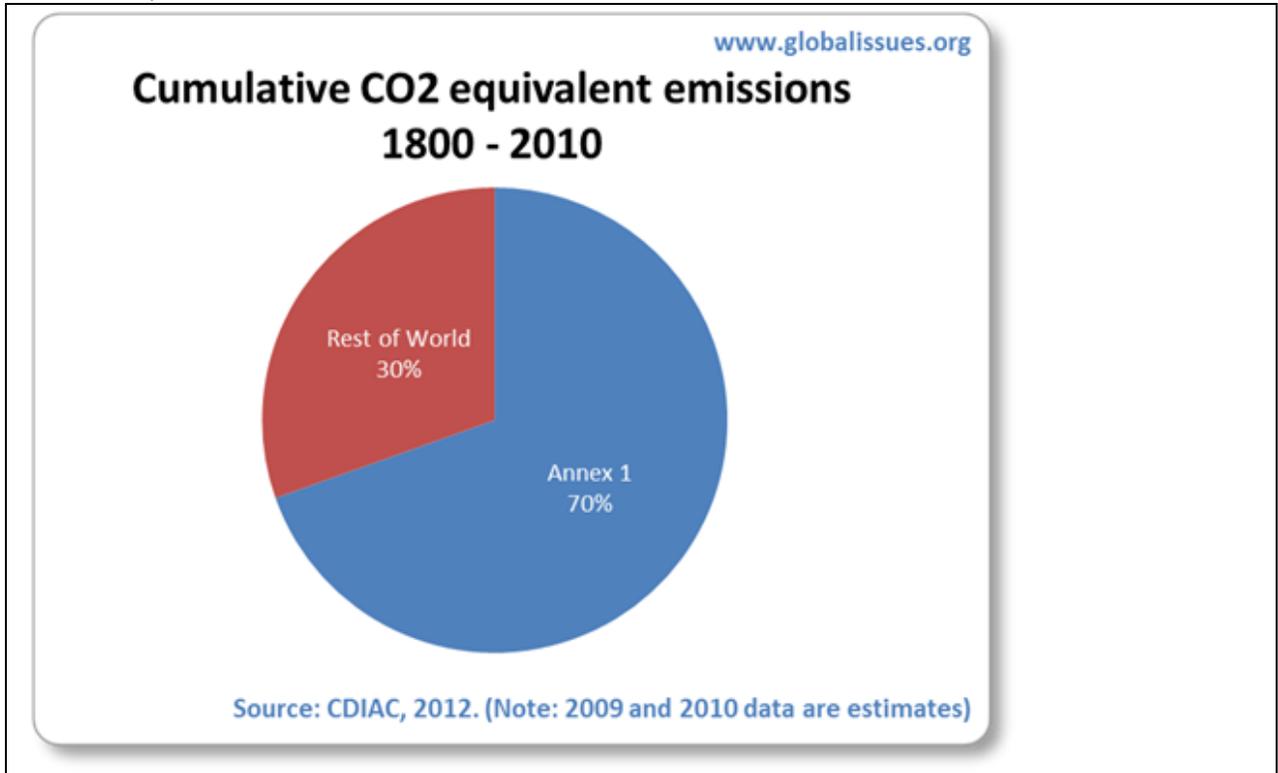
Most climate scientists believe that if we continue to add greenhouse gases to the atmosphere at the current (and accelerating rate) for the rest the century the resulting climate change would likely be catastrophic for our civilization. It is generally accepted that in order to have a reasonable chance of avoiding such climate change, we need to limit the total increase in atmospheric temperature to two degrees C (3.8° F) above pre-industrial times. And the current climate models suggest that in order to have a reasonable (66%) chance of doing this, we need to limit future worldwide greenhouse gas emissions to about 500 billion tons of carbon (the "carbon budget"). Since we currently emit about 11 billion tons of carbon per year, we need to take significant action to reduce emissions as quickly as possible, eventually getting to the point where the atmosphere no longer accumulates greenhouse gases.

Because of the global nature of the greenhouse gas emissions, it makes sense to allocate the 500 billion ton "carbon budget" among the various countries in the entire world in a fair and equitable way, and each country would then work to keep its total emissions within its budget between now and the year 2100. Rather than having a UN commission allocate the CO2 emissions, each country will ideally determine what its fair share of future greenhouse gas emissions will be, and the sum total (an additional 500 billion tons of carbon) should be sufficient to limit global warming to two degrees C.

## Fairness Concepts

When trying to determine a fair allocation of future greenhouse gas emissions for each country, the following things need to be taken into account:

- Developed (Annex 1<sup>2</sup>) countries have been responsible for about 70% of total carbon emissions to date even though they represent only about 20% of the Earth's population (and the US has been responsible for about 27% of the total – almost as much as all of the developing countries combined)<sup>3</sup>



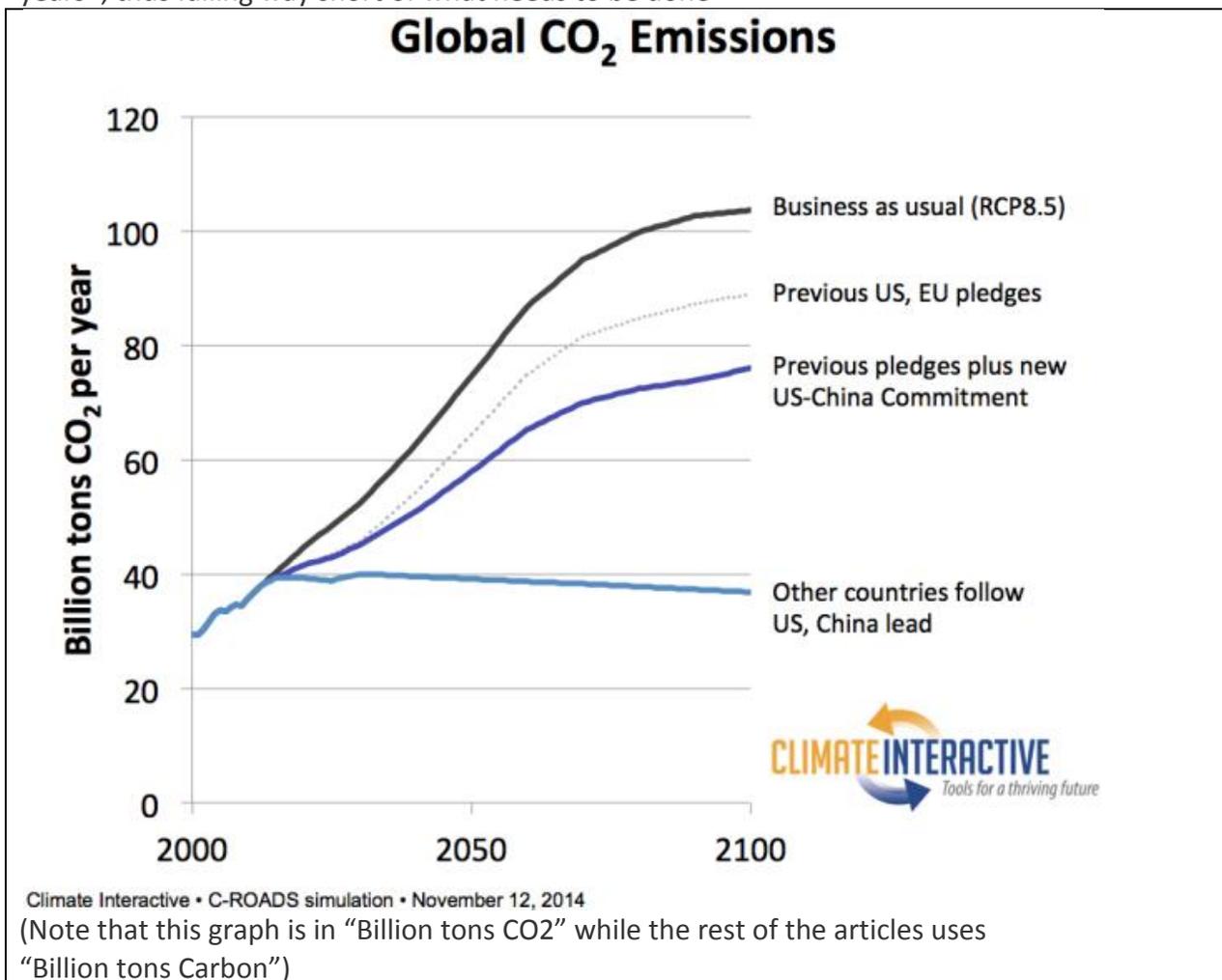
- Per capita emissions in most developing countries are still relatively low<sup>4</sup>

2011 Total Emissions Country Rank	Country	2011 Total Carbon Dioxide Emissions from the Consumption of Energy (Million Metric Tons)	2011 Per Capita Carbon Dioxide Emissions from the Consumption of Energy (Metric Tons of Carbon Dioxide per Person)
1.	China	8715.31	6.52
2.	United States	5490.63	17.62
4.	India	1725.76	1.45
11.	United Kingdom	496.80	7.92
15.	Indonesia	426.79	1.73

- The share of global emissions from developing countries will increase to meet their social and development needs
- It is unfair to expect the developing countries to make emissions reductions in the same ways (and percentage amounts) as developed countries
- A significant portion of the CO<sub>2</sub> emissions in developing countries (perhaps 15-30%) are for manufactured goods sent to the developed world.<sup>5</sup>
- Money should be transferred (e.g., via a “Green climate fund”) from the developed world to the developing world to help pay for reducing emissions and for adapting to climate change

### Where we stand now

- If the EU follows its pledge and if the US and all other developed countries follow the US pledge and if all developing countries follow the Chinese pledge, global emissions will be about 11 billion tons carbon/year for the rest of the century, consuming the entire carbon budget in about 50 years<sup>6</sup>, thus falling way short of what needs to be done



- If the US, with about 4.3% of the world’s population, follows its pledge
  - By 2025 (which is in just 11 years) it will have consumed about 4% of the entire world’s remaining carbon budget (and about 18 % of the entire carbon budget)<sup>7</sup>
  - It will then need to reduce greenhouse gas emissions by 5.1%/year in order to meet the target of an 80% reduction of 2005 emissions by 2050 (at which point it will have consumed about 8% of the entire world’s remaining carbon budget (and about 22 % of the entire carbon budget)<sup>7</sup>

## Analysis

- I can’t imagine that other countries would feel that having the US consume 22% of the entire carbon budget would be fair. So the US will need to significantly reduce its GHG emissions above and beyond the Obama pledge to get other countries to make what they feel are reasonable pledges
- If the countries of the world could figure out an equitable way to keep worldwide emissions within the 500 billion ton CO2 limit, I can’t imagine a US Senate willing to ratify a treaty that commits the US to reduce greenhouse gas emissions at the pace necessary to meet the US’s share.

## Notes

1.	<a href="http://www.ecofys.com/files/files/wwf_ecofyscarbonbudget.pdf">http://www.ecofys.com/files/files/wwf_ecofyscarbonbudget.pdf</a>
2.	<a href="http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php">http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php</a>
3.	<a href="http://www.wri.org/blog/2013/09/world%E2%80%99s-carbon-budget-be-spent-three-decades">http://www.wri.org/blog/2013/09/world%E2%80%99s-carbon-budget-be-spent-three-decades</a> <a href="http://www.globalissues.org/article/231/climate-justice-and-equity">http://www.globalissues.org/article/231/climate-justice-and-equity</a>
4.	<a href="http://www.ucsusa.org/global_warming/science_and_impacts/science/each-countrys-share-of-co2.html#.Vlxp58k8FnM">http://www.ucsusa.org/global_warming/science_and_impacts/science/each-countrys-share-of-co2.html#.Vlxp58k8FnM</a>
5.	<a href="http://www.theguardian.com/environment/2014/jan/19/co2-emissions-outsourced-rich-nations-rising-economies">http://www.theguardian.com/environment/2014/jan/19/co2-emissions-outsourced-rich-nations-rising-economies</a>
6.	<a href="http://www.greenbiz.com/article/us-china-climate-deal-avert-640-billion-tons-co2-pollution">http://www.greenbiz.com/article/us-china-climate-deal-avert-640-billion-tons-co2-pollution</a>
7.	<a href="http://www.cdatacenter.org/documents/USGHGandCarbonBudget.xlsx">http://www.cdatacenter.org/documents/USGHGandCarbonBudget.xlsx</a>

See also

Equity, Greenhouse Gas Emissions, and Global Resources

[http://stephenschneider.stanford.edu/Publications/PDF\\_Papers/15-Ch15%28393-408%29.pdf](http://stephenschneider.stanford.edu/Publications/PDF_Papers/15-Ch15%28393-408%29.pdf)