



Emission reductions by the USA in 2020 and the risk of exceeding 2°C warming

Authors

Dr. (h.c) Bill Hare (PIK and Climate Analytics)
Dr. Michiel Schaeffer (Climate Analytics)
Dr. Malte Meinshausen (PIK)

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Quantitative assessment using PRIMAP Potsdam Real Time Integrated Model for the Probabilistic Assessment of Emission Paths, Potsdam Institute for Climate Impact Research (PIK) e.V. and analysis by CLIMATE ANALYTICS GmbH



Executive Summary

This report examines the relationship between the level of emission reductions to be undertaken by the United States by 2020 and the risk of exceeding a 2° Celsius (3.6° Fahrenheit) warming globally in the coming century, within the context of a new international agreement on climate change to be adopted at Copenhagen in 2009. International negotiations are focusing on a reduction range for Annex I countries as a group of 25-40% below 1990 levels by 2020 and for Non Annex I countries of a 15-30% reduction relative to business as usual growth by the same time.

The level of action by the United States is a very significant political variable in the Copenhagen climate negotiations and is likely to influence the level of ambition for the entire agreement. A stronger level of action by the USA would likely lead to more action from others, and vice versa. A delay in achieving emission reductions consistent with the 25-40% Annex I reductions would likely lead to delay by others. It is in this context that the Administration of President Obama faces difficult dilemmas. Under the previous Bush Administration very little was done to limit greenhouse gas (GHG) emissions, and by 2006 they were some 14% above 1990 levels, making a reduction to the 25-40% below 1990 levels within little more than a decade a very difficult task. President Obama has indicated that the United States should reduce its domestic emissions to 1990 levels by 2020, and to 80% below 1990 levels by 2050. Recently the US Special Climate Envoy Todd Stern argued that meeting the 25-40% reduction target range from 1990 levels by 2020 for the Annex I countries can be deferred, and faster reductions in the post 2020 period can make up for slower reductions to 2020.

We address the consequence of different levels of action by the USA by focusing on two questions:

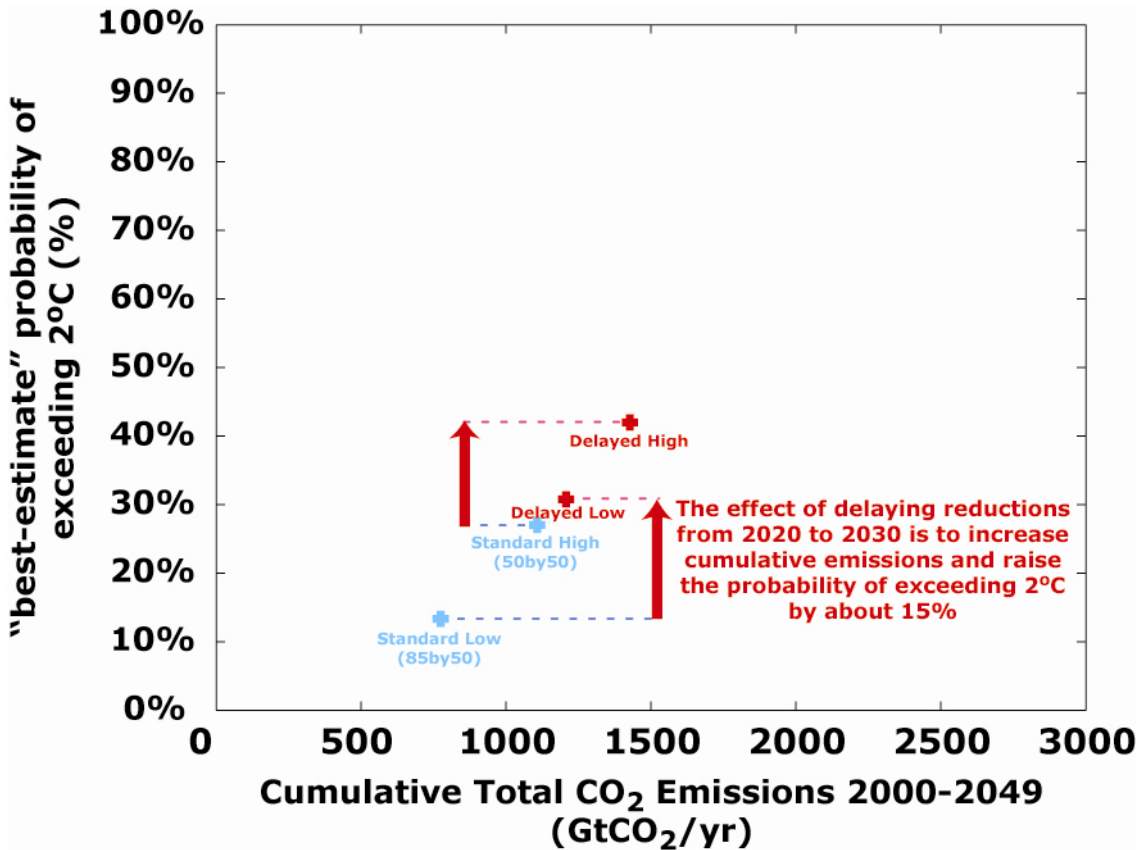
- The relationship between different global emission levels, Annex I reductions and reduced growth in non-Annex I emissions by 2020, and the risk (probability) of exceeding a global 2°C warming above pre-industrial.
- Whether a delay in reaching the 25-40% range of emission reductions from 1990 levels by 2020 for industrialized (Annex I) countries can be made up with steeper emission reductions to 2050. This is evaluated by examining the changes in the risk of exceeding a global 2°C warming.

On these questions we reached two broad conclusions:

- Higher emissions in 2020 resulting from delayed action by Annex I countries, degrades the ability to meet the 2°C warming limit. If global emissions were to return to the level of 1990 by the year 2020, the chance that 2°C warming is exceeded is estimated as roughly 1 in 6, which rises to 1 in 4, if global emissions are still 40% above 1990 in 2020.



- Delaying emission reductions by the Annex I group by 10 years, from 2020 to 2030, results in significantly higher cumulative greenhouse gas emissions and increases the rate of emission reduction in future decades. The probability of exceeding 2°C warming is increased by about 15% for such a delay, from a base probability for the two non-delay scenarios of 14% (6% to 32%) and 27% (14% to 48%), respectively. A delay thus results in an increased risk that is not compensated for by steeper reductions in later years.



Effects of a delay in Annex I countries limiting their emissions to 30% (High) or 45% (Low) below 1990 levels, from 2020 until 2030, on the probability of exceeding 2°C warming above preindustrial levels. Results of two cases are shown: one for a global reduction of 50% by 2050 (High) and the second for a global reduction of 85% in emissions from 1990 levels by 2050 (Low).

Given that it is likely that should the US take weaker action, others would follow suit, a delay in achieving significant reductions by the United States would likely result in an increased probability of exceeding a 2°C warming. The increased risk of exceeding 2°C, caused by a ten-year delay in reaching a 30% reduction from 1990 levels for the Annex I countries, is comparable to the increased risk caused by a 35% higher global level of emission in 2020. This analysis shows that a delay in reducing greenhouse gas emissions by ten years causes a higher overall level of emissions in 2020 and converts an emission pathway with about a 1 in 7 chance of exceeding 2°C to a 1 in 4 chance.