

# Sucking up all the Carbon in the Room: U.S.-China Collude to Pollute in “Historic” Climate Announcements

A critical essay and interactive spreadsheet

By

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## Introduction: What exactly are the two announcements?

Political agreements are rarely based on science, and are often entered into for theater. The U.S.-China climate change announcements made in November 2014 and September 2015 are no exception. Setting the stage for the U.S. and China’s positions at the upcoming U.N. Framework Convention on Climate Change meeting, the 2014 announcement brought the two top emitters, the U.S. and China, towards the common collective goal of reducing emissions to prevent global warming. The ‘deal’ is this: the U.S. will cut back emissions from 2005 levels by 26% to 28% by the year 2025. China, for its part, will ramp up emissions until 2030 and then stabilize at that level.<sup>1</sup>

Claimed as “historic” by President Obama, the 2014 announcement amounted to little more than the two countries pursuing business as usual. By blessing the possibility of large future increases for China, it appeared the two emissions giants had staked out a claim so large that it would crowd out the rest of the world’s chance to pursue similar economic growth strategies if meaningful collective action were to be taken on climate change.

The September 2015 joint Presidential statement appears to reign in the possibility that China would take advantage of the 2015-2030 open season to drive emissions to superheated levels. Specifically, the statement sets out a Chinese goal of reducing

the energy intensity of its economy by 60 to 65% by 2030. While this commitment allows one to construct scenarios where climate change might be held to the widely promulgated target of not exceeding warming of 2 degrees Celsius, the U.S. and China still appear to be positioning themselves to monopolize global CO<sub>2</sub> emissions through the middle of the century.

As the world lauds the announcements put forward by the two countries, this essay takes a closer look at the numbers, and discusses implications for the rest of the world and for the prospects of achieving the common goal of a warming not to exceed 2 degrees Celsius. This essay first coarsely analyzes the implications of the 2014 announcement. Next, the essay refines the analysis in light of the September 2015 announcement. The underlying assumptions and calculations are available in the attached interactive spreadsheet.

The analysis in this paper extends beyond 2030, and out to the year 2050, enabling it to capture two important effects. First, the U.S. has pledged to accelerate its reductions starting in 2026 in order to meet a goal of 2050 emissions being at a level of just 20% of 2005 levels. Achieving this goal requires annual cuts of 5% during the 2025 to 2050 time frame. Throughout it is assumed the U.S. meets both the 2025 and the 2050 goals. The major effect of carrying the analysis out to 2050 is to capture the impact of Chinese emissions *after* 2030. Two scenarios are considered. The first scenario assumes China adheres to the letter of its announcements and will keep emitting at its 2030 annual rate every year after that. A

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<sup>1</sup> White house press release, November 11, 2014

second possibility considered here is that in a decarbonizing world, the Chinese will steadily reduce CO<sub>2</sub> emissions after 2030 (a 5% annual reduction is considered, consistent with a rate the U.S. has pledged to achieve over the same period).

### **2014 'Deal': China and the U.S. could together emit the current global total CO<sub>2</sub> emissions.**

The starting assumptions for the analysis in this paper are fairly straightforward:

- China was already the globe's top emitter at 8.1 billion tonnes in 2012,<sup>2</sup>
- The U.S. was at 5.3 billion tonnes in 2012,<sup>3</sup>
- It is assumed both the U.S. and China succeed in honoring their commitments as announced in 2014 and 2015,
- It is assumed China continues to grow GDP at an annual 7% rate to 2030
- Combined, the U.S. and China currently emit about 40% of anthropogenic annual CO<sub>2</sub> emissions. In two scenarios considered below, the rest of the world (ROW) is assumed to tailor its CO<sub>2</sub> emissions to maintain over time the current ratio of 40 % (US + China) to 60% (Rest of World),
- Based on IPCC documents, it is assumed that achieving the goal of keeping global warming below 2 degrees Celsius will require keeping cumulative CO<sub>2</sub> emissions below 900 billion tons.<sup>4</sup>

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<sup>2</sup> U.S. Energy Information Administration

<sup>3</sup> Ibid

<sup>4</sup> [IPCC Climate Change 2014 Synthesis Report Summary for Policy Makers:](#) "Multi-model results show that limiting total human-induced warming to less than 2°C relative to the period 1861–1880 with a probability of >66% would require cumulative CO<sub>2</sub> emissions from all anthropogenic sources since 1870 to remain below about 2900 GtCO<sub>2</sub> (with a range of 2550 to 3150 GtCO<sub>2</sub> depending on non-CO<sub>2</sub> drivers). About 1900 GtCO<sub>2</sub> had already been emitted by 2011." For 2012-14, annual emissions have been around 30Gt, so about 900 Gt of headroom remain.

- Note also, that emissions after 2050 are not considered. This is an arbitrary choice and adding those emissions would clearly make exceeding the 900 billion tonne mark more likely.

The table below summarizes the results of four scenarios – two built up from the 2014 announcement and two built up from the 2015 revision. The text that follows then outlines the key results and implications from each of the four resulting scenarios.

The attached interactive spreadsheet contains six tabs:

- Data summaries
- 2014 Announcement
- 2014 Announcement, ROW Adapts
- 2015 Announcement
- 2015 Announcement, ROW Adapts
- Free Play

The last tab, Free Play, allows the reader to look at a more equitable distribution of emissions, i.e., per capita not total. The ROW decides to emit at per capita levels comparable to the U.S. and China. The U.S. and China honor their commitments beyond 2030 and out to 2050. This means the ratio has shifted to 75:25 rather than 60:40. Even in this most optimistic scenario for U.S. and Chinese performance, the global 2-degree goal is not met. While it is not the focus of this article, equity in CO<sub>2</sub> production is a crucial issue in climate negotiations, and the Free Play tab merely provides the interested reader a venue to develop alternate scenarios.

## Projected Total Emissions 2015-2050 Under the Two US-China Announcements

Country	2014 Announcement	2014 Announcement, China + ROW adapt	2015 Announcement	2015 Announcement, China + ROW adapt
U.S. total emissions (Bt)*	111	111	111	111
China total emissions (Bt)	824	610	348	273
ROW (Bt)	1404	178	689	515
<b>Global total**</b>	<b>2339</b>	<b>899</b>	<b>1148</b>	<b>899</b>
U.S.-China % of global total CO2 emissions	40%	80%	40%	43%
U.S. annual emissions growth rate	-4.1%	-4.1%	-4.1%	-4.1%
China annual emissions growth rate	+2.9%	0%	-0.1%	-3.0%
ROW annual emission growth rate	+3.2%	-11.8%	-0.6%	-2.4%

\* Bt=Billion tonnes

\*\* To stay below 2-degree Celsius warming, the global carbon emissions budget is 900 billion tonnes or below

**2014 Announcement:** Assuming China's economy continues to grow at its current projected annual rate of 7 percent, and that there is no additional energy efficiency, by 2030 when China stabilizes, its annual emission would be running at 27 billion tonnes, and honoring this agreement would allow the Chinese to emit that amount every year thereafter. Taking these stabilized emissions out to 2050 puts total China's emissions from 2015 to 2050 at 824 billion tonnes. Arguably, this is the upper bound of what China would produce.

Meanwhile, the U.S. pledge implies total emissions from 2015 to 2050 of 111 billion tonnes. *Under this forecast, the U.S. and China alone would exceed the world's emissions budget of 900 billion tonnes.* Even if the rest of the world quit emitting altogether, the 2-degree temperature rise would likely be reached and exceeded. The spreadsheet models a more probable response – it assumes the rest of the world maintains its proportion of emissions relative to the U.S.

and China. Currently the two biggest emitters contribute about 40% of the world's annual CO2 emissions. The spreadsheet assumes the rest of the world calibrates its emissions to maintain a 60% share. In that case, the world will emit 2,339 billion tonnes by 2050, far exceeding its common goal to limit to the 2-degree rise.

*Outcome: Under this scenario, the common goal of 2 degrees Celsius would be far exceeded, and nations would continue to grow, doing business as usual.*

**2014 Announcement, China and ROW adapt:** Under this scenario it is assumed that: 1) China peaks rather than stabilizes in 2030 and begins 5% annual reductions in CO2 emissions starting in 2031, and 2) The rest of the world limits its CO2 emissions so as to keep cumulative global emissions below 900 billion tons. An elaboration of these ideas follows:

To view the countries' 2014 announcements in a fair light, simply assuming that China will 'stabilize' seems overly pessimistic. Technology will move on and China and the U.S. will likely steadily reduce CO2 emissions. As mentioned above, the U.S. has already pledged that after 2050 it will emit just 20% of what it did in 2005, pointing to a target of 1.2 billion tonnes. Hitting that target requires an annual 5% reduction in emissions from 2025 (the target date for the U.S. side of the agreement with China) out to 2050.<sup>5</sup>

"China adapts" is an assumption that it starts on a reduction path similar to that of the U.S., of 5% per year emissions after the agreement ends in 2030. If that happens, the U.S. and China will together almost hit the 900 billion tonne mark and gobble up most of the "emissions pie" for the rest of the world.

"ROW adapts" is an assumption that the rest of the nations will shoulder the burden of keeping emissions below the 900-billion tonne threshold once the U.S. and China have emitted their share. In this case, impossibly aggressive cuts of 11 percent would be required each year from every country to make way for emissions from the U.S. and China.

*Outcome: Under this scenario, the U.S. and China do business as usual, the common goal of not exceeding 2-degrees is achieved, but the rest of the world has to do some impossibly heavy reductions in emissions.*

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<sup>5</sup> As with most political agreements, the most severe cuts come in the out years. The sequence foreseen by the Obama Administration is 2005-2020 (1.25%/year), 2021-2025 (2.5%/year), 2025-2050 (5%/year). This proposal can be interpreted as technological optimism – it may be easier and cheaper to cut carbon emissions later in the century as new inventions appear and old ones are optimized.

**2015 Announcement:** In a joint statement issued in conjunction with Chinese President Xi's visit to the U.S. in September 2015, states that, "China will lower carbon dioxide emissions per unit of GDP by 60% to 65% from the 2005 level by 2030."<sup>6</sup>

Mathematically, a 65% reduction over 15 years requires annual percentage reductions in carbon intensity of 6.8%. Put against a GDP growth rate of around 7%, the implication is that Chinese *emissions would effectively stabilize now, and continue to remain so.* Assuming that the rest of the world maintains its current 60:40 split of CO2 emissions with the U.S. and China (i.e. ROW 60%: US+ China 40%) the rest of the world would need to make emissions reductions amounting to 0.6% annually.

*Outcome: Under this scenario, while the common goal of staying under 900 billion tonnes is exceeded by roughly 250 billion tonnes, reasonable emissions reductions are afforded to the ROW.*

**2015 Announcement, China and ROW adapt:** It is assumed that: 1) China peaks rather than stabilizes in 2030, and begins 5% annual reductions in CO2 emissions starting in 2031, and 2) The rest of the world limits its CO2 emissions at 2.4 percent reductions, so as to keep cumulative global emissions below 900 billion tons. The U.S. emissions reductions are 4.1 percent and China's are 3 percent.

*Outcome: Under this scenario, the world is able to achieve its common goal to keep warming under 2 degrees Celsius, and the ROW has to make plausible annual emissions reductions.*

**Some justice for China in the 2014 announcement?**

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<sup>6</sup> Sept. 25 U.S.-China Joint Presidential Statement on Climate Change, point 12.

The disparity of commitments that came with the 2014 announcement was startling — 15 years of rising or flat emissions for China, versus a downward trend for the U.S. The differing trajectories in emissions may indicate the underlying psychology of the ‘deal’—that China will stabilize once its citizenry has reached a certain level of wealth and not before, just as the U.S. population once did. China’s population is about four times that of the U.S.’s, and a plausible outcome of the agreements could result in China’s annual emission being roughly four times the U.S.’s. If current U.S. emissions of around 5 billion tonnes per year are used as the benchmark, then China might achieve parity at around 20 billion tonnes. In other words, it looks like the underlying policy is that China will let up once its per capita emissions catch up to that of U.S. per capita emissions.

### **Little justice for the rest of the world**

Such a deal may appeal to an abstract sense of historic justice, but it appears to ignore the rest of the world. No one can blame China for wanting its economy to grow and to level the playing field in terms of quality of life. But, what does this mean for the rest of the world, where other countries are also trying to get to a position where they can comfortably fulfill the Millennium Development Goals for their people? If all G20 countries aimed to take per capita emissions to the same level as the U.S. and the EU, or even in the vicinity of those levels,

they will far exceed the level for a current collective goal of a 2-degree rise. The reality of the ‘deal’ is that China and the United States have agreed to grow at a pace that is to their convenience and benefit, and have left little room for other countries if the 2-degree warming cut off is to be observed, unless China and the U.S. aggressively pursue their stated goals in the recent September 2015 announcement, and then go a step further once the 2025-30 period is over.

### **September 2015 target offers the rest of the world some room—but not much**

Huge as the commitment is in the 2015 announcement, the fact remains that it still leaves the rest of the world with remarkably little room for CO2 emissions if the 2-degree goal is to be achieved. Even with taking into account this dramatic decarbonization of the Chinese economy, the U.S. and China with about a one-quarter of the Earth’s population are laying claim to more than 40 percent of the world’s ‘remaining’ carbon emissions.

As the world jets into Paris to address the problem of global warming, keep in mind that historic announcements have indeed been made— and the U.S. and China have already colluded to spend more than their fair share of the world’s carbon budget. That settled, one supposes the other nations of the world may still find something to do in Paris.

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NOTE: The accompanying interactive spreadsheet shows:

- Each of the 4 scenarios sketched out in this essay, along with assumptions,
- An extra sheet (tab titled “Free Play”) where the reader can plug in other values to see the impact of changing assumptions.

**Disclaimer:** This is a working paper, incorporating informal feedback from peers, but is not peer-reviewed in the traditional sense of the word. Please use information from this paper with this caveat in mind.

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