

MARKET WATCH:

A tandem production

Emissions pledges from the United States and China have re-energized the push for a global climate agreement.

Anna Petherick considers how serious the promises are.

This year begins with a sense that the winds of change are picking up speed. As the climate community orientates its efforts towards creating the first legally binding global agreement since 1997, in Paris-Le Bourget in November, there is plenty to fill its sails. Late last year, promises by rich countries to put up money for adaptation in poor ones trickled in, and global mega-emitters stated fresh and more rigorous mitigation intentions for the next 15 years.

The political unit with the third largest emissions, the European Union, said it would reach 2030 with emissions 40% below 1990 levels. In the more common language of projected change relative to 2005, this translates into cuts of 43% for sectors within the auspices of the EU's emissions trading system, and 30% for sectors outside of it¹ — which is good news, for sure, but by no means a lurch in Europe's historical narrative. A lurch did come, however, from the two biggest emitters. The United States, which never ratified Kyoto, announced a 2025 target of greenhouse-gas-emission reductions 26–28% lower than 2005 levels². And China, the world's number one emitter, which ratified but is not restricted by Kyoto, said it would try to stop increasing its annual emissions past 2030, perhaps earlier. In short, two countries that account for nearly half of humanity's greenhouse-gas emissions — and that have been thorns in the side of architects of global climate frameworks — have signalled a willingness to shift course. Most importantly, they did this together.

That said, many aspects of the joint announcement are unclear. The details are smudgy, if not entirely absent, on how either country will meet its target, what (if anything) will pressure them to stay on track, and whether even bull's-eye achievement will be enough to fend off various environmental consequences. Of these three areas of smudginess, a glance at the build up to the deal helps clarify the first two.

Until a few months ago, China clung doggedly to discussing only the carbon

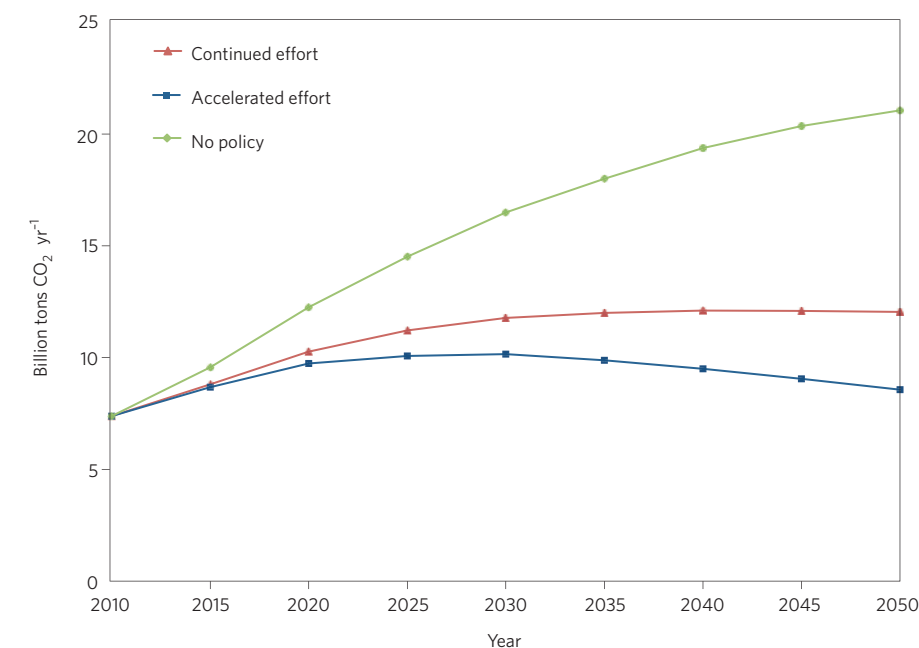


Figure 1 | The expected trajectories of China's carbon dioxide emissions under three alternative groups of policies. 'No policy' self-evidently assumes no carbon taxes, nor fossil-fuel resource taxes, only economically viable hydropower developments, and no promotion of nuclear energy. 'Continued effort' involves the introduction of a carbon tax that rises by 3% annually to reach US\$26 per ton in 2030 and US\$58 per ton in 2050. It also includes some fossil-fuel resource taxes, and meeting existing hydropower and nuclear 2020 targets, with even more nuclear power generation later. 'Accelerated effort', as described in the main text, requires tougher measures on all of these, except hydropower. Data from ref. 4.

intensity of its economy, not absolute emissions. The new deal schedules peak emissions for carbon dioxide, but does not give them a ceiling. The commitment to peak in a decade and a half appears demanding — by some reports³ requiring China to add enough zero-emissions electricity to power Australia, annually, until 2030. Sticking to it will still lead to a world in which China's emissions dwarf those of others. Dabo Guan, a researcher at the University of East Anglia, in Norwich, England, estimates that they will hit thrice those of the US in 2030.

China's intention to peak in 2030 is reflected in the emissions path produced from an 'accelerated effort' group of policies that have been modelled by a team

at Tsinghua University, in Beijing, and the Massachusetts Institute of Technology⁴ (see Fig. 1). In this model, achieving such a trajectory requires a carbon tax with gradual increases towards \$38 per ton in 2030, a 10% tax on coal, an 8% tax on crude oil, additional charges on electricity consumption to finance renewable options, and meeting the government's current plan to generate 58 GW from nuclear power in 2020, plus taking it up a notch thereafter to hit 450 GW by 2050.

Those are nationwide requirements. Guan and his colleagues have shown that China's provinces are heading in a variety of directions, though. Their findings⁵ reveal where keeping the same combination of economic sectors, but cleaning them

up with the deployment of low-carbon technologies, is having an effect, and separately, where re-orientating the economy's sectoral structure is leading to less dirty growth. The results thus suggest the places and industries where China's Thirteenth Five-Year Plan (2016–2020) could perhaps make big jumps towards lower emissions. Between 2002 and 2009, Beijing made its industries individually cleaner, but more of its economy was composed of filthier sectors. Only Guangdong and Jiangsu, rich and coastal, became cleaner in both senses; Xinjiang and Hunan became dirtier in both senses.

Fairly zealous emissions-cutting projects are underway. Local projects abound⁶, and might soon be rolled out nationally in some form. *China Daily*⁷ reported policymakers' goal to build an 'ecological civilization' at the Third Plenum of the Eighteenth Congress of the Chinese Communist Party in late 2013, with promises for sustainability even if it slows growth. The gigatonne gap⁸ that Guan and colleagues spotted by comparing the official inventory of 2010's national emissions with that of the summed provincial emissions, should be closed in the 2015 figures. "Chinese authorities have launched a national project to measure all components related to estimating carbon emissions, for example, coal heat values and emissions from cement processing," says Guan. This is impressive because, "Fuel qualities, which impact heat

values, are rarely taken into consideration in any country's emission calculations."

Over in the US, the immediate question is whether new legislation is needed to hit the new target. With majorities in both houses of Congress held by a party that is set against climate laws, and the particular influence of Environmental Protection Agency-bashing Mitch McConnell (at time of writing, expected to become majority leader of the Senate) and Jim Inhofe (author of a book about climate change called *The Greatest Hoax* and chair of the Senate Environment and Public Works Committee), this looks inconceivable for at least two years. Dallas Burtraw, who crunches numbers on the electricity sector at the think-tank, Resources for the Future, reckons that "the goal is plausible without new laws, but... clearly fairly ambitious new regulations will be needed."

New regulations will not be politically easy to make stick. They could be applied to methane released from shale gas wells. They could encourage the deployment of carbon capture and storage facilities at power stations. But in the near-term, progress of the recent past, such as the US Environmental Protection Agency's inclusion of carbon dioxide within the Clean Air Act, will need defending. Beyond 2016, the future is wide open; the current list of future presidential hopefuls represents the gamut of US political opinion on climate change.

While Inhofe claims that China cannot be trusted to uphold its end of this non-legally binding agreement, it is the US that will struggle more. Certainly, China's run up to the deal has been steadier, and the cultural cliché of face-saving may apply some pressure to observing the 2030 peak, even though the deal received limited reporting in the Chinese media, and even if the US falls short. In the run up to Paris, the focus will be on the rest of the developing world. The diplomatic game has changed. Broadly speaking, it is more hopeful. □

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