

# THE CONVERSATION

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## Paris climate targets aren't enough, but we can close the gap

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To reach zero emissions by 2050, we need to invest in zero emissions technology now. Coal power image from [www.shutterstock.com](http://www.shutterstock.com)

The Paris climate agreement saw countries pledge to limit global warming to well below 2°C, and to aim to keep it within 1.5°C. The problem is that countries' current emissions targets are not enough to meet these goals.

In a paper published today in *Nature*, I and my colleagues from Austria, Brazil, China, South Africa, Germany, the Netherlands and Switzerland take a closer look at those pledges, and the studies that have so far evaluated them. The bottom line is that under the existing Paris pledges the world would be facing 2.3-3.5°C of warming by 2100.

The pledges, known as Intended Nationally Determined Contributions or INDCs, would result in emissions 14 billion tonnes higher than they should be in 2030 under the cheapest pathway to limit warming.

While this path is well below the “business as usual” scenario, it is not yet in the range of the 1.5-2°C objectives we have set ourselves. So it's a first step, but bigger steps are needed.

The less effort we make before 2030, the harder it will be to reduce emissions afterwards.

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However, my colleagues and I have found there are several ways to close the gap.

## Why do the current targets make it harder after 2030?

To limit global warming to any level, we ultimately have to completely stop CO<sub>2</sub> emissions and ramp down other greenhouse gas emissions. For any given warming threshold, we have to limit total emissions to a certain amount, known as the “carbon budget”.

It is likely that to keep warming well below 2°C we have a remaining carbon budget of between 750 billion and 1.2 trillion tonnes. For context, global emissions in 2010 were around 50 billion tonnes.

Remaining on the current path, as laid out by the INDCs, would mean the world would have to make very drastic cuts in emissions after 2030 to keep warming below 2°C (and would likely make the 1.5°C limit completely unachievable).

This dramatic cut would mean a lot of stranded investments, as emissions will have continued to rise up to 2030, suggesting continued investment in infrastructure that won't deliver our long-term target. The same potentially goes for any investments in “transition” fuels, such as gas. If current investments cannot be part of a 2050 world that is close to zero emissions, then they would probably have to be retired before their usual use-by date.

If in 2030 there is a sudden realisation that we have to do more, the world would have to cut emissions by 3-4% each year. Countries like Australia would have to cut them by 10% each year. It's like walking slowly up to a cliff and then jumping off it.

This is not the cheapest way to keep warming below 2°C. The least-cost option is to start investing now in the right technology. The International Energy Agency has argued that if we want a zero-carbon economy in 2050, or at least one that is close to zero-carbon, we need to make zero-emission investments today, because it takes a long time to turn over the existing investment stock.

The other problem is carbon capture and storage (CCS). The Paris Agreement pledges net zero greenhouse gas emissions after 2050. There is no pathway to this that doesn't involve “net-negative” emissions, because there will still be some greenhouse gas emissions we can't reduce, and we will have already overshoot the carbon budget for keeping warming below 2°C, let alone 1.5°C. So we are going to have to come up with a way to pull CO<sub>2</sub> from the atmosphere.

How can we do that? The main option is thought to be bio-energy with carbon capture

and storage (BECCS). This process involves growing biomass fuel, such as trees, then using the woodchips to produce electricity, then capturing the CO<sub>2</sub> produced, and finally sequestering and storing it underground.

In the past, CCS has been mostly combined with fossil fuels. But the dramatic fall of wind and solar costs will make it easier to decarbonise the electricity sector.

CCS would also likely require a carbon price, to incentivise the necessary investment in CCS by 2030. Retrofitting existing fossil fuel power plants with CCS or keeping coal demand high by supporting new coal power plants with CCS in India and China is hence likely an uphill battle that is lost on economic grounds. However, we would still need CCS and specifically BECCS to remove CO<sub>2</sub> from the atmosphere.

### **So how can we close the gap?**

Our study has found several ways to reduce emissions further before 2030.

The first is to ratchet up the INDCs by using the review mechanism built into the Paris Agreement. This is thought by many to be the single most important element of the agreement, and would see INDCs revised and increased every five years. Of course these increases would have to be underpinned by domestic policies.

Some countries will overachieve their INDCs. China, for instance, has pledged to peak its emissions by 2030, but seems to have the domestic policy in place to get there before 2020 given the concern about clean air.

Other countries have pledged emission levels that are so generously high that they would have to spend serious amounts of money to increase their emissions up to those levels. Turkey, Ukraine, Russia are examples. There are likely a billion tonnes of projected emissions that we will hence never get to see. Fortunately.

The INDCs could also be expanded to cover other greenhouse gases (which aren't included by some countries), such as nitrous oxide and methane in China.

International shipping and aviation could also play a huge role. Aviation is one of the hardest nuts to crack because of the difficulties of producing sustainable, carbon-neutral jet fuel. So while the near-term emissions reductions options aren't as big as many people think, these high-value sectors are hugely important because they can help to raise resources for mitigation action elsewhere.

For instance, the International Civil Aviation Organisation's pledge of no-carbon growth after 2020 would require large offsets. This could unleash a lot of action, and transfer

finance to other sectors.

However, both aviation and maritime transport need to part of the whole framework - and given that the Paris Agreement mentions all global emissions in its Art. 4.1, they are already included to some extent.

We found other initiatives – in the business sector and at regional and municipal levels – that could reduce emissions by a further 1 billion tonnes each year by 2030. However, more recent research suggests this could be as high as 6-11 billion tonnes each year, if all those additional initiatives in the solar energy, wind energy, forestry and methane sectors were implemented.

For instance, Europe's solar and wind initiatives, if both implemented, could increase Europe's target of 40% below 1990 levels by 2030 to 60%.

And the United States' Sunshot and wind programs could overshoot its current emissions target, from 26-28% below 2005 levels to a staggering 60%.

These initiatives would put us well on the path to keeping warming below 2°C. Now we just have to get serious about it.

In Australia, we have neither an ambitious enough 2020 or 2030 target, nor the policies to get there. Current emissions are likely to overshoot the -5% target by 2020 (although accounting options to use previously banked credits will likely keep Australia compliant with its Kyoto Protocol targets).

There are good signs – such as state renewable energy targets, which now add up to more than the national target. And there is an immense opportunity for Australia in a zero carbon world: no other developed country is so blessed with solar and wind resources.

If Australia plays its cards right, it could become the energy superpower in a zero carbon world. But there's still a way to go.

 **Climate change**   **Paris 2015 climate summit**   **Paris climate agreement**