

Mid-Century Strategies to Stay Within Paris Agreement Temperature Limits

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Overview

The Paris Agreement calls for countries to submit “long-term, mid-century low greenhouse gas emission development strategies” (hereafter, “Mid-Century Strategies” or “MCSs”) by 2018 and sets a goal to limit warming to “well below 2°C and to pursue efforts to limit the temperature increase to no more than 1.5°C.” In this document we share results from our analysis of more than 600 scenarios for fifteen countries and country groups modeled in C-ROADS. Results indicate the range of MCSs that achieve the Paris agreement temperature limits.

Mid-Century Strategies

The (Intended) Nationally Determined Contributions (INDCs and NDCs) countries have submitted to date to the UNFCCC extend to 2025 or 2030. Climate Interactive analyzed the impact of these Paris pledges and a range of other scenarios (<http://climatescoreboard.org>). In the scenario capturing the impact of the Paris pledges themselves we take the nations of the world at their word that they will fully implement their pledges, but we do not include action that nations have not pledged to make. That analysis shows that full implementation of all the Paris pledges, with no further action, would result in expected warming of 3.5°C (6.3°F) by 2100. The Mid-Century Strategies (and more ambitious emissions reductions before 2030) are therefore essential to have a reasonable chance of limiting warming to no more than 2°C (3.6°F). Some parties already have national policies and goals that outline their long-term emission reduction trajectories, including Canada, Mexico and the United States, each of whom announced their mid-century strategies on 16 November 2016, in conjunction with COP22. However, most countries have yet to signal their long-term emissions path. The Paris Agreement calls for countries to submit these mid-century strategies by 2020.

Here we identify the level of ambition required for the MCSs for different nations so that global emissions fall at a rate sufficient to limit expected warming to no more than 2°C. Specifically, we identify when emissions would have to peak, and how fast they would have to decline for each nation/region.

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Method

We used the [C-ROADS climate policy simulation](#) model to identify emissions reductions for each country, and potential carbon dioxide removal (CDR) policies, required to limit expected warming below 2°C. We examined many hundreds of scenarios. Of those, more than 600 limited expected warming by 2100 to 1.5-1.9°C.

Scenarios were created by varying three primary factors.

1. Assume nations meet or exceed their (I)NDCs

If a country or country group **fulfills** its Paris pledge, we assume that they do so by their target year (typically 2030, except notably for the US and Brazil, with target years of 2025).

If the country or country group **exceeds** their Paris pledge, we consider scenarios in which they meet their target for each year between 2025 and 2029.

2. Rates of emissions decline beyond the INDC pledge period

To examine potential MCS pathways, we examined scenarios for emissions reduction rates after the INDC goal is achieved. To do so we assume that the emissions of each party decline at a given fractional rate. We consider rates ranging from 3%/year to 10%/year for developed nations and 2%/year to 9%/year for developing nations.

3. Scenarios for carbon dioxide removal (CDR)

We also included scenarios including carbon dioxide removal – the summed impact of afforestation, agricultural soil carbon, bio-energy carbon capture and sequestration, direct air capture, and ocean uptake (e.g. liming, Fe fertilization). We consider CDR scenarios achieving 1 GtCO₂/yr of CDR by 2050 and 6 GtCO₂/yr by 2100. One half of the roughly 600 scenarios consistent with warming below 2°C include CDR.

Developed Relative to Developing Nations

Following the procedure described above, we ran over 800 scenarios with different combinations of assumed CDR, Paris pledge fulfillment dates and rate of emissions reductions from the fulfillment date through 2100, with different dates and rates for each of the countries represented in C-ROADS.

We then examined those scenarios in which warming by 2100 was below 2°C, and, to capture equity issues, that met the following conditions:

1. Developed countries as a group follow the same emissions decline rate post-Paris, and always cut emissions at a faster annual rate than developing countries.
2. Developed countries always begin emissions reductions at the same time or sooner than developing countries.

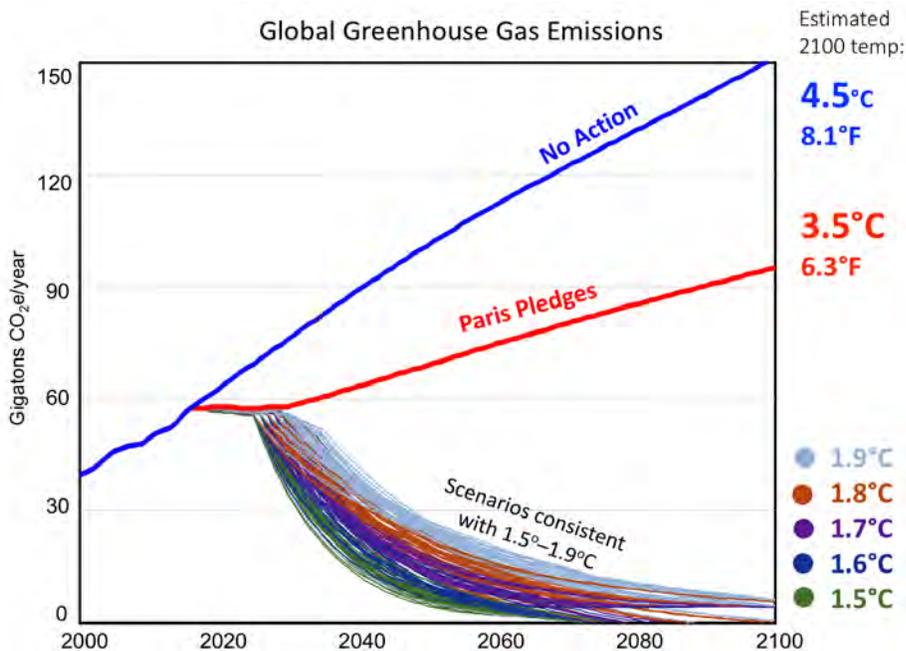
C-ROADS Model

The analysis was done with the C-ROADS (Climate-Rapid Overview and Decision Support) computer simulator, which is calibrated to the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report results. C-ROADS was developed by Climate Interactive in partnership with the Massachusetts Institute of Technology Sloan School of Management (MIT Sloan). C-ROADS is [downloadable](#) and available for public use.

Results: Global

The graph below shows the roughly 600 scenarios that keep expected temperature increase below 2°C, including some that keep temperature change to 1.5°C. In all scenarios global emissions peak before 2035.

Global greenhouse gas emissions include carbon dioxide, methane, nitrous oxide, and the F-gases. To achieve the reductions necessary will require a nearly complete decarbonization of our energy sector, dramatic reductions in emissions across land and agriculture, as well as reductions in the use of high impact greenhouse gases like HFCs in our industrial and consumer goods manufacturing.



Results: Regional

The global emissions pathways shown above, with warming by 2100 limited to no more than 2°C, can be achieved with different combinations of reductions by individual countries and regions. As shown below, however, to do so, all countries/regions must not only meet their Paris pledges, but in many cases—and particularly to limit warming to 1.5°C—must exceed their Paris pledges. The

earlier such greater ambition is implemented, the lower the average rate of emissions decline required post-Paris.

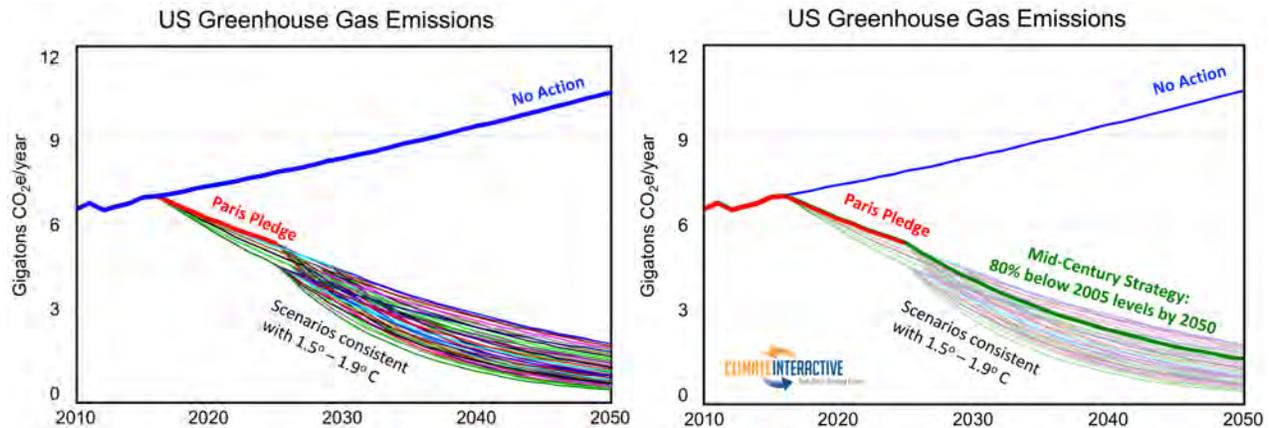
United States

The United States committed to reduce emissions 26-28% below 2005 levels by 2025. The United States is one of the few countries that made a pledge only through 2025, rather than through 2030. During COP22 the US announced a Mid-Century Strategy aiming to reduce US GHG emissions to 80% of 2005 levels by 2050.

Of course there is now substantial uncertainty about the willingness of the US to fulfill its pledge under the Paris agreement or implement the policies needed to achieve its MCS. However, in the scenarios tested that successfully limit warming below 2°C, we found that the United States would need to reduce emissions 72-94% below 2005 levels by 2050—that is, even greater ambition would likely be required.

None of these scenarios can achieve below 2°C without other countries acting as well, so additional considerations such as historical responsibility and capacity should be evaluated in assessing how much the US cuts. Deeper cuts by the US would leave a larger share of the remaining carbon budget for developing countries.

At the Paris climate negotiations in 2015, the United States aligned itself with the High Ambition Coalition that successfully advocated for the inclusion of the 1.5°C temperature goal in the agreement. For the United States to be consistent with the goal of limiting warming to 1.5°C, the United States would need to reduce emissions 88-94% below 2005 levels by 2050, a much deeper commitment than the US MCS, but consistent with the “Beyond 80” scenario described in the US MCS report (https://www.whitehouse.gov/sites/default/files/docs/mid_century_strategy_report-final.pdf).

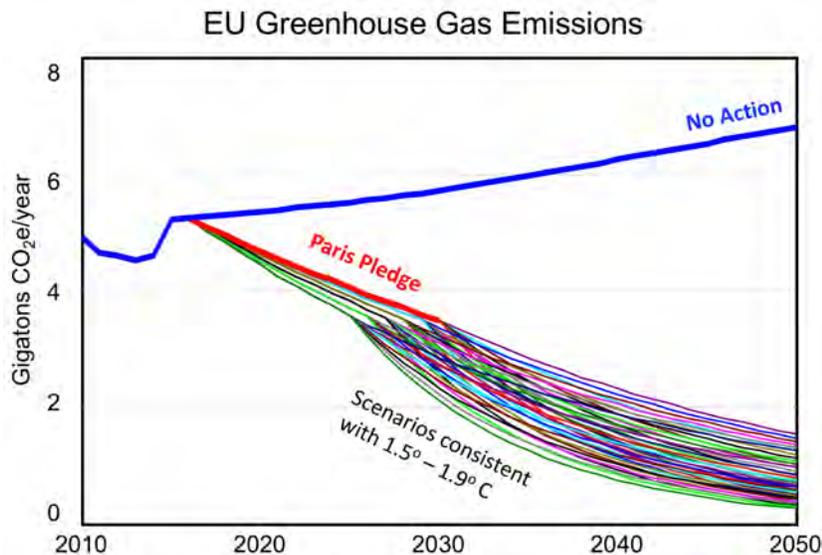


European Union

The European Union committed to reduce their greenhouse gas emissions 40% below 1990 levels by 2030. EU leaders have further indicated a long-term goal to reduce emissions 80%-95% below 1990 levels by 2050. This range of long-term reductions fits the range of possible reduction

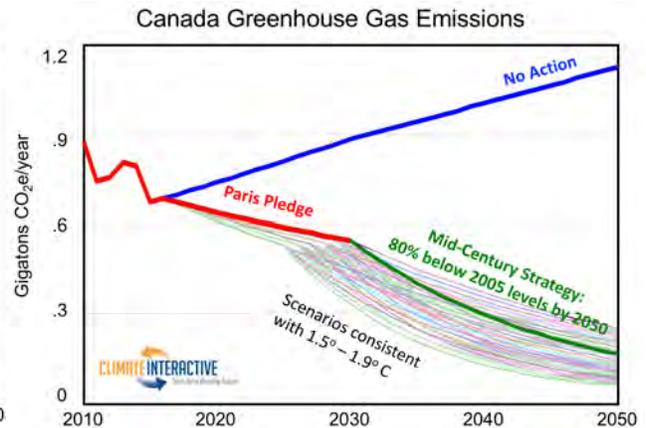
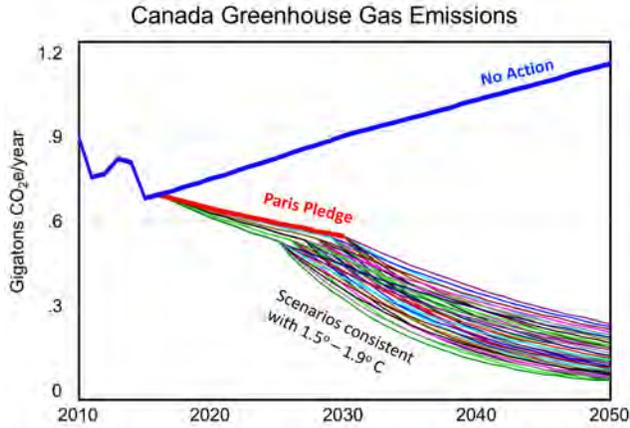
pathways consistent with limiting warming below 2°C. In successful scenarios the EU's emission reductions range from 73-95% below 1990 levels by 2050. None of these scenarios can achieve below 2°C without other countries acting as well, so additional considerations such as historical responsibility and capacity should be evaluated in assessing how much the EU cuts. Deeper cuts by the EU would leave a larger share of the remaining carbon budget for developing countries.

To achieve reductions consistent with the EU's support of the target to limit warming to 1.5°C, the EU must take up the most ambitious end of their targets—towards 95% reductions of greenhouse gas emissions from 1990 levels by 2050. Scenarios that achieved a 1.5°C outcome require the EU to reduce emissions by at least 89-95% below 1990 levels by 2050.



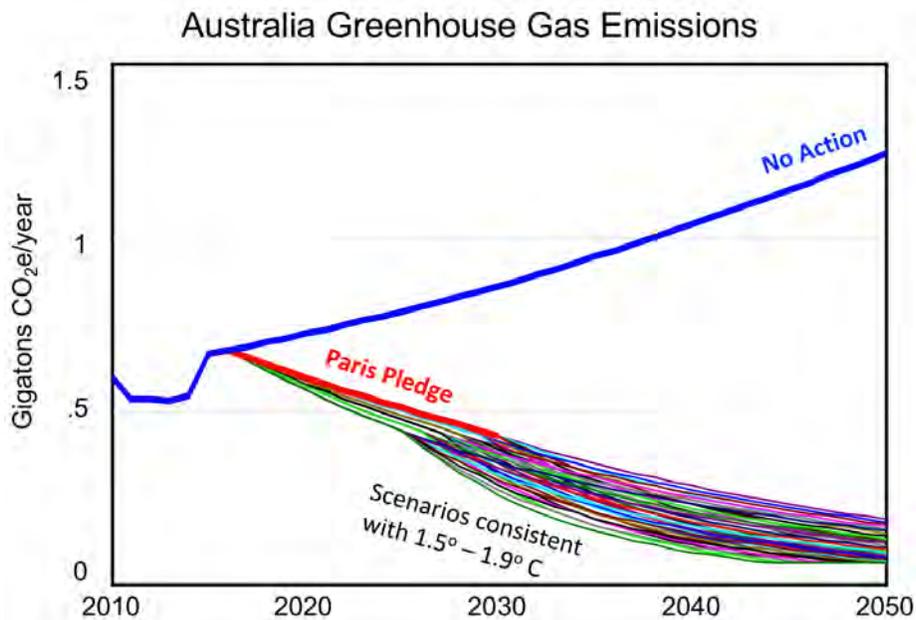
Canada

Canada committed to reduce their emissions 30% from 2005 levels by 2030. To be in line with scenarios that would achieve the Paris temperature targets the Canadian Mid-Century Strategy would need to be approximately 86% below 2005 levels by 2050 (average reductions across all scenarios). For Canada's Mid-Century Strategy to be consistent with 1.5°C requires emissions reductions of 87-93% from 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by Canada would leave a larger share of the remaining carbon budget for developing countries.



Australia

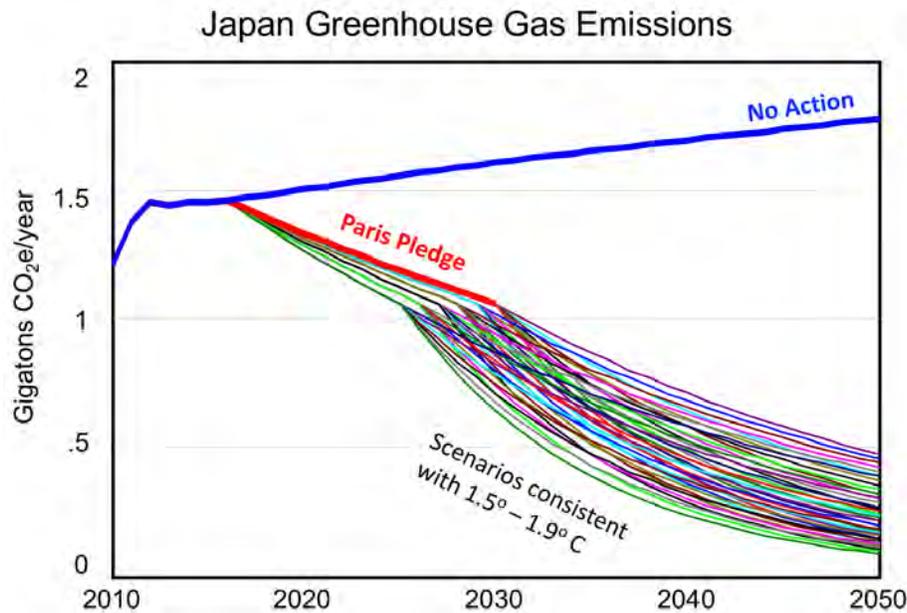
Australia has offered to reduce their emissions 26% below 2005 levels by 2030 in their Paris pledge. To ensure long term emissions reductions keep the world on a course to staying below 2°C, Australia will need to commit to reducing emissions around 67-88% below 2005 levels in 2050 (average reductions across all scenarios). To be consistent with a path to 1.5°C Australia will need to reduce their emissions at least 86-88% below 2005 levels by 2050, with all other countries acting as well. Deeper cuts by Australia would leave a larger share of the remaining carbon budget for developing countries.



Japan

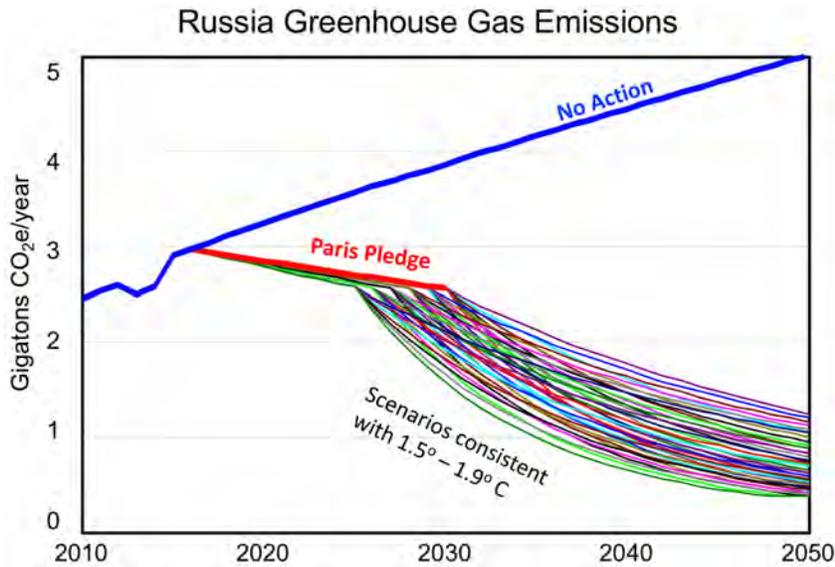
Japan pledged to reduce emissions 26% below 2013 levels by 2030. Deeper reductions will be needed to stay well below 2°C so that their emissions are consistent with a 66-94% reduction

below 2005 levels by 2050. To be consistent with 1.5°C, Japan will need to reduce their emissions 86-94% below 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by Japan would leave a larger share of the remaining carbon budget for developing countries.



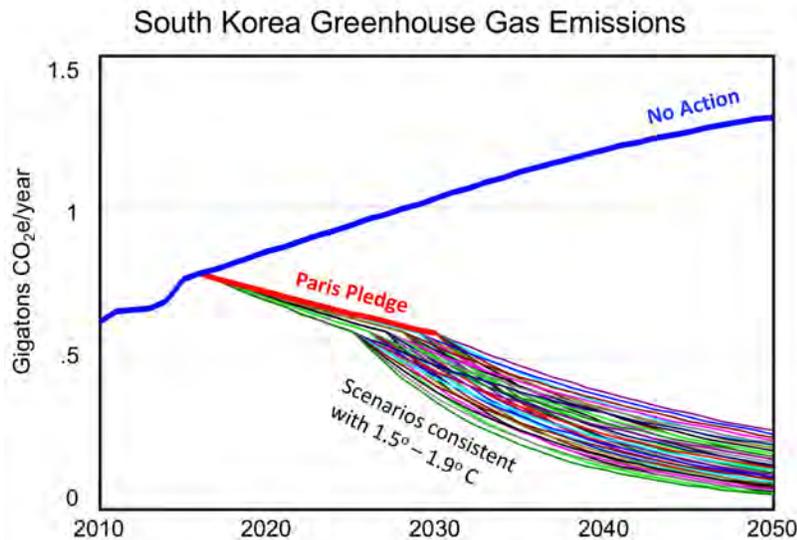
Russia

Russia's nationally determined contribution to the Paris climate talks was to reduce their emissions 25% from 1990 levels by 2030. The graph below reveals that to stay below 2°C, Russia will need to increase their rate of reductions significantly. The analysis indicates that Russia would have to reduce greenhouse gas emissions 67-92% below 1990 levels by 2050 to be consistent with trajectories limiting warming to below 2°C. To limit warming to 1.5°C, Russia would need to follow the most ambitious end of the scenarios and reduce their emissions 86-92% below 1990 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by Russia would leave a larger share of the remaining carbon budget for developing countries.



South Korea

South Korea made a commitment to reduce its emissions 37% from their business as usual levels ahead of the Paris climate talks in 2015. To stay below 2°C, South Korea would need to reduce their emissions 15-84% from 1990 levels by 2050. To keep below 1.5°C, South Korea would need to reduce their emissions at the upper end of the range (64-84% below 1990 levels by 2050). None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by South Korea would leave a larger share of the remaining carbon budget for developing countries.

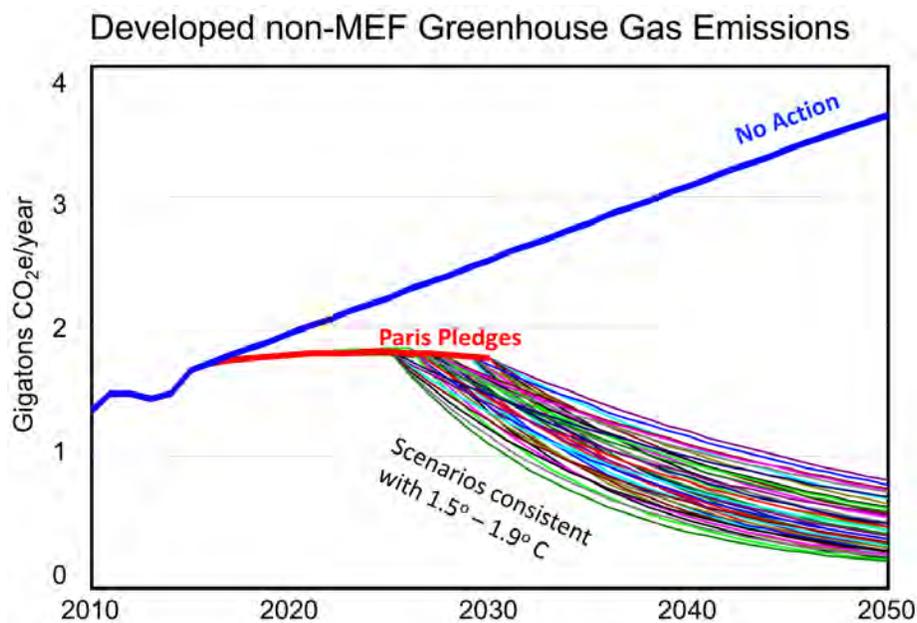


Other Developed Countries

This grouping includes all the developed countries not included in the Major Economies Forum: New Zealand, Albania, Bosnia & Herzegovina, Croatia, Macedonia, Slovenia, Armenia,

Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine, Uzbekistan (includes former Yugoslavia and fraction of former USSR).

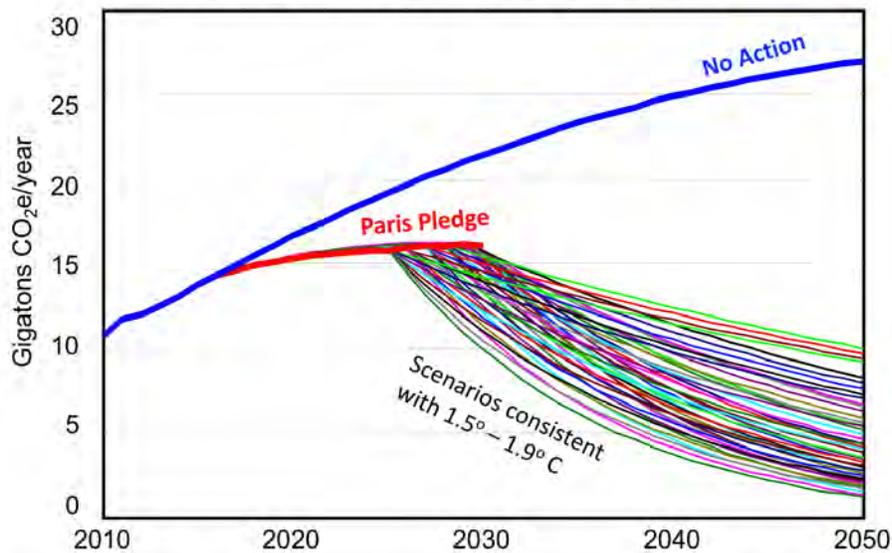
The aggregate of the emissions reduction pledges these nations have made is 26% below 1990 levels in 2030. That includes Paris pledges from 81% of the member countries with pledges, which range from 8% above to 64% below 1990 levels. Relative to countries in other regions of the world these countries do have greater capacity and will need to make deeper reductions to ensure the world stays well below 2°C. To fit within our suite of scenarios that achieve warming of 2°C or less these countries would need to reduce their emissions on average 76% below 2005 levels by 2050. To limit warming to 1.5°C this group would need make reductions in the range of 76-88% below 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by these nations would leave a larger share of the remaining carbon budget for developing countries.



China

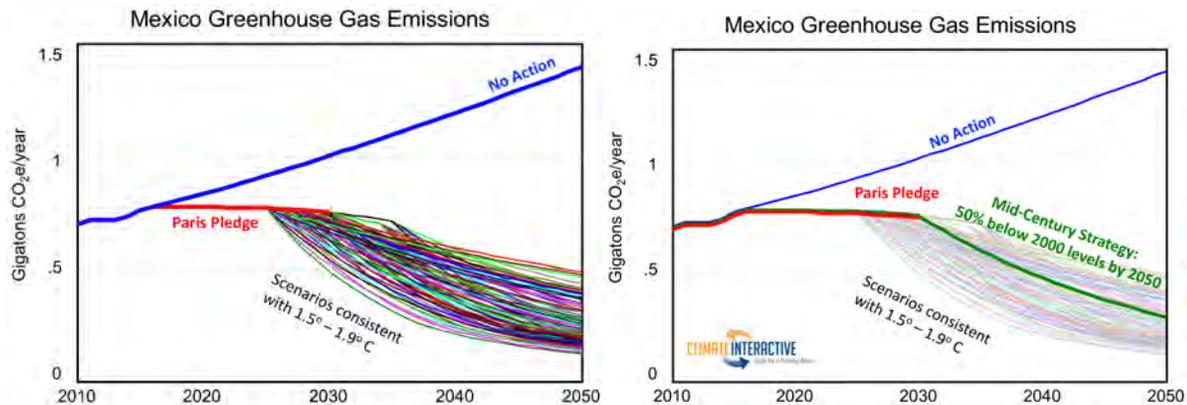
In 2014, China announced that they intended to achieve a peak in their CO₂ emissions no later than 2030 and increase their efforts to promote afforestation. China has yet to indicate what they intend to do after 2030. In the scenarios below we assume that all of China's greenhouse gases peak by 2030 and begin to decline. For China to be on a pathway that leads to below 2°C, it would require emissions fall 27% below 2005 levels by 2050. To be on a pathway consistent with 1.5°C, China would need to reduce emissions on average 64% below 2005 levels by 2050. Many of the scenarios also have China peaking their emissions and then reducing them sooner than 2030. None of these scenarios can limit warming below 2°C without other countries acting as well. Deeper cuts by China would leave a larger share of the remaining carbon budget for developing countries.

China Greenhouse Gas Emissions



Mexico

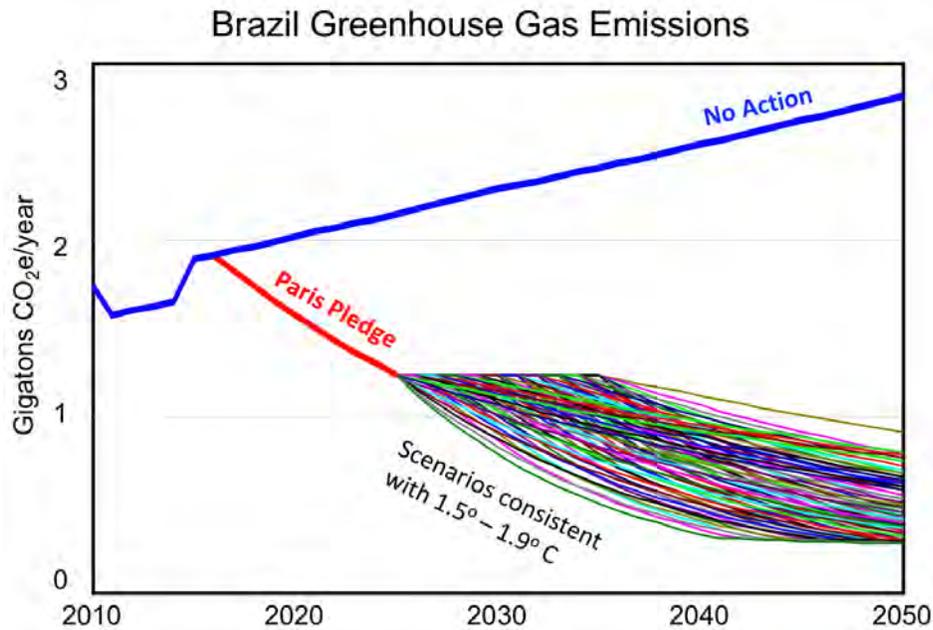
By 2030, Mexico plans to reduce their greenhouse gas emissions 25% from their business as usual (or No Action) levels. In Mexico's national policy they have also set a target to further reduce their emissions 50% from 2000 levels by 2050. Mexico is one of the few developing countries to have indicated their long-term emissions pathway ahead of COP22 in November 2016. The scenarios below indicate that Mexico's emissions should fall at least 27-87% below 2005 levels by 2050 to be consistent with achieving below 2°C. To achieve 1.5°C, Mexico would need to increase their 2050 target to at least 67%-87% below 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well.



Brazil

Brazil has offered to reduce their greenhouse gas emissions 37% below 2005 levels by 2025. They have also indicated that this could extend to 43% reductions by the year 2030. To be consistent with 2°C or less, Brazil would need to reduce their emissions 66-88% below 2005 levels by 2050. To limit expected warming to 1.5°C the Brazil should chart an emissions pathway with cuts at the

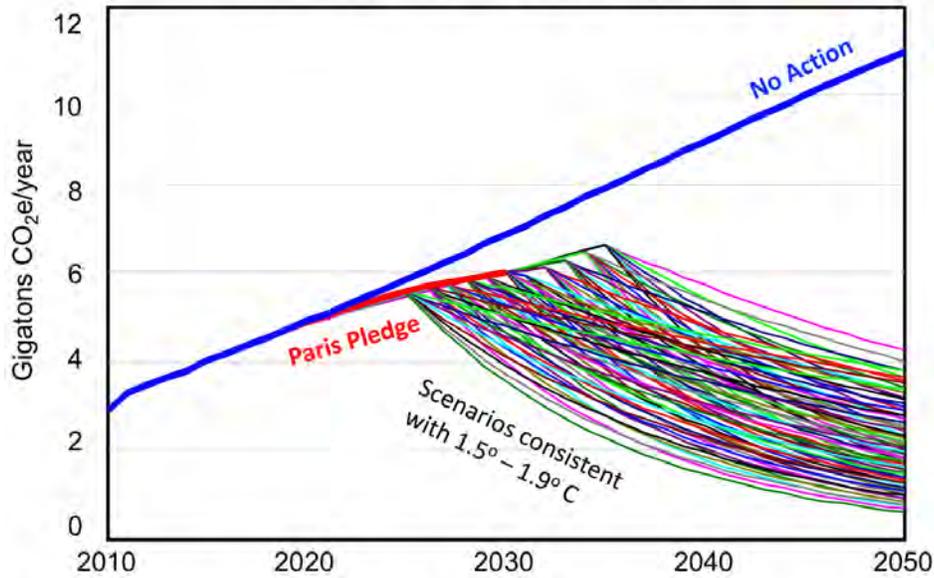
higher end of that range (85-88% below 2005 levels by 2050). None of these scenarios can limit warming below 2°C without other countries acting as well.



India

Before the 2015 Paris Climate Talks India pledged to reduce their emissions intensity (how much CO₂ is generated per unit of real economic activity) by 33-35% from 2005 levels by the year 2050. For India to be on a pathway consistent with below 2°C requires that they peak their absolute emissions between 2025 and 2035, with reductions thereafter. To ensure India, and nations in a similar position working to lift millions out of poverty, are successful in also reducing emissions requires support from the international community. Reducing emissions can also present opportunities to meet sustainable development goals from the provision of clean energy infrastructure that enables distributed and more resilient electricity for all, to decreased reliance on fossil fuels that cause local air pollution. For India to be on a pathway consistent with 1.5°C they should be provided support to achieve a peak in emissions between 2025 and 2028 and reduce their emissions on average 57% below 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well.

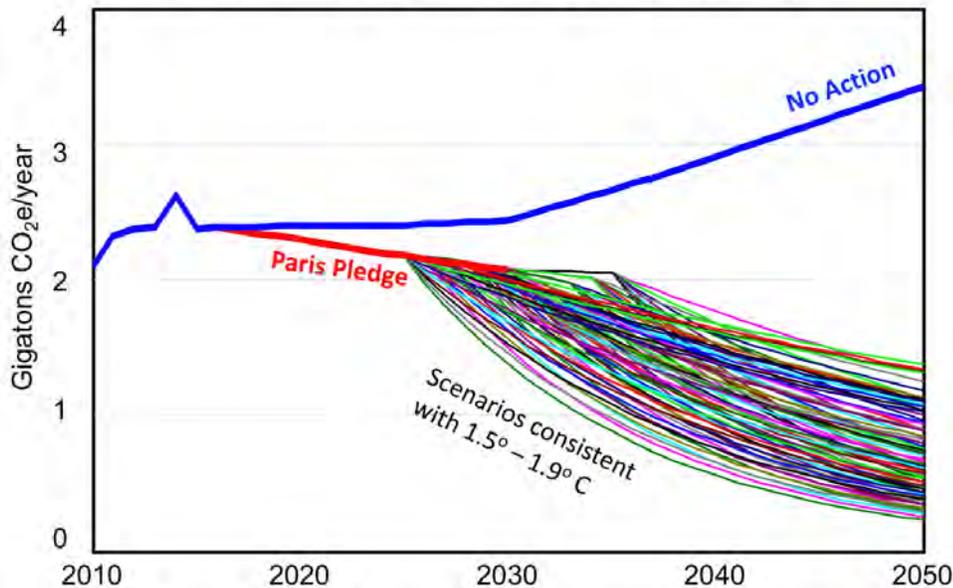
India Greenhouse Gas Emissions



Indonesia

Indonesia has pledged to reduce their emissions 29% below their business as usual levels by 2030. To be on path consistent with achieving below 2°C, Indonesia should reduce their emissions 31-88% below 2005 levels by 2050. For their path to be consistent with 1.5°C, Indonesia should reduce their emissions 69-88% below 2005 levels by 2050. None of these scenarios can limit warming below 2°C without other countries acting as well.

Indonesia Greenhouse Gas Emissions

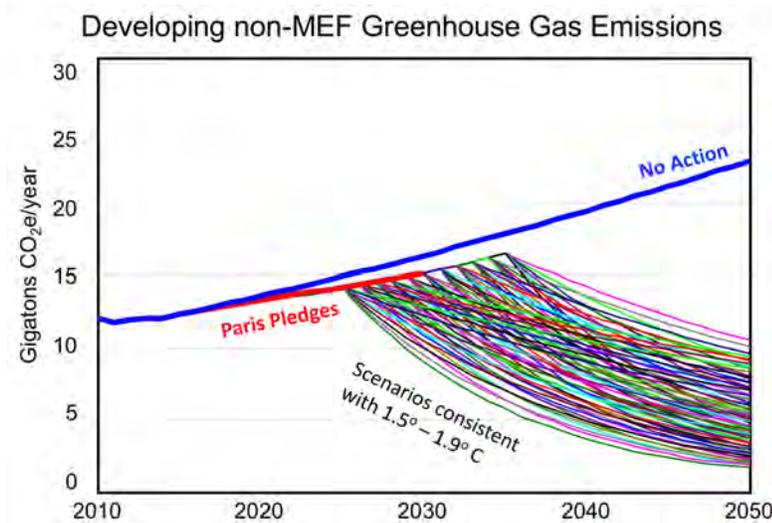


Other Developing Nations

This grouping of nations includes all the nations that are not major emitters individually and part of the Major Economies Forum. Countries and regions that are part of this group include the Philippines, Thailand, Taiwan, the Middle East, much of Latin America, much of Africa, and over 20 small nations in Asia.

Collectively this group has committed to reduce their emissions 7.5% below their business as usual (BAU) trajectory by 2030. That comes from 55% of member countries in this group with unconditional pledges, which range from 1-99% reductions below BAU. Due to the number of countries included and the relatively high levels of population and economic growth expected in this bloc, their emissions are expected to grow rapidly without action. Developed countries, development banks, and others will need to mobilize capacity of various types (e.g., financial, technical, administrative; technology transfer) to enable the nations in this bloc achieve the needed emissions reduction to ensure the world stays well below 2°C.

To stay below 2°C requires that these developing countries achieve a peak in their emissions between 2025 and 2035, and then begin to reduce emissions. For them to be on a pathway consistent with 1.5°C, they should be provided support to peak their emissions between 2025 and 2028 and reduce their emissions 53-79% (average 69%) below 1990 levels by 2050. For these scenarios to be successful all other countries must act as well.



Summary Tables

Table 1. Expected temperature change in 2100 given variations in the annual emissions reduction rate, year to achieve target or peak emissions, and successes in carbon dioxide removal.

Annual Emissions Decline Rates Post Target Year		Expected Temperature Change in Degrees C in 2100											
Developed	Developing	2025		2026		2027		2028		2029		2030	
		No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR
-10%	-9%	1.5	1.4	1.5	1.5	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.5
	-8%	1.5	1.4	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.6
	-7%	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6
	-6%	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6
	-5%	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.7
	-4%	1.7	1.6	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7
	-3%	1.8	1.7	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8
-2%	1.9	1.9	>2	1.9	>2	1.9	>2	1.9	>2	>2	>2	>2	
-9%	-8%	1.5	1.5	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.6	1.6	1.6
	-7%	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6
	-6%	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6
	-5%	1.6	1.5	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.7	1.7	1.7
	-4%	1.7	1.6	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7
	-3%	1.8	1.7	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8
-2%	1.9	1.9	>2	1.9	>2	1.9	>2	1.9	>2	>2	>2	>2	
-8%	-7%	1.6	1.5	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6
	-6%	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6
	-5%	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.7	1.7	1.7
	-4%	1.7	1.6	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7
	-3%	1.8	1.7	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8
	-2%	1.9	1.9	>2	1.9	>2	1.9	>2	1.9	>2	>2	>2	>2

-7%	-6%	1.6	1.5	1.6	1.5	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6
	-5%	1.6	1.6	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.7	1.7	1.8
	-4%	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7	1.8	1.7
	-3%	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.8
	-2%	>2	1.9	>2	1.9	>2	1.9	>2	>2	>2	>2	>2	>2
-6%	-5%	1.7	1.6	1.7	1.6	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7
	-4%	1.7	1.6	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7	1.8	1.8
	-3%	1.8	1.7	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.9
	-2%	>2	1.9	>2	1.9	>2	1.9	>2	>2	>2	>2	>2	>2
-5%	-4%	1.7	1.7	1.8	1.7	1.8	1.7	1.8	1.7	1.8	1.8	1.9	1.8
	-3%	1.8	1.8	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.9	1.9	1.9
	-2%	>2	1.9	>2	1.9	>2	>2	>2	>2	>2	>2	>2	>2
-4%	-3%	1.9	1.8	1.9	1.8	1.9	1.8	1.9	1.9	>2	1.9	>2	1.9
	-2%	>2	1.9	>2	>2	>2	>2	>2	>2	>2	>2	>2	>2

Table 2. Greenhouse gas emission reduction ranges for 2050 from 1990 levels and 2005 levels by region to keep expected warming below 2°C by 2100.

Mid-Century Strategies Necessary to Limit Warming to 1.5 – 1.9°C

	Percent reduction from 1990 levels in 2050	Percent reduction from 2005 levels in 2050
US	68% - 94% (87%)	72% - 94% (89%)
EU	73% - 95% (88%)	72% - 94% (88%)
Russia	67% - 92% (86%)	54% - 89% (80%)
Canada	61% - 91% (83%)	69% - 93% (86%)
Japan	62% - 93% (84%)	66% - 94% (86%)
Australia	60% - 86% (81%)	67% - 88% (85%)
South Korea	15% - 84% (64%)	54% - 91% (80%)
Developed non MEF	65% - 92% (85%)	46% - 88% (76%)
China	-156% - 58% (-45%)	-29% - 79% (27%)
India	-176% - 61% (-54%)	-77% - 75% (1%)
Indonesia	-2% - 83% (40%)	31% - 88% (59%)
Mexico	14% - 85% (49%)	27% - 87% (57%)
Brazil	49% - 82% (68%)	66% - 88% (79%)
South Africa	2% - 83% (41%)	17% - 86% (49%)
Developing non MEF	-22% - 79% (30%)	2% - 84% (44%)

Key: High value - Low value and (Mean)

Table 3. Greenhouse gas emission reduction ranges for 2050 from 1990 levels and 2005 levels by region to keep expected warming below 1.5°C by 2100.

Mid-Century Strategies Necessary to Limit Warming to 1.5°C		
	Percent reduction from 1990 in 2050	Percent reduction from 2005 in 2050
US	86% - 94% (91%)	88% - 94% (93%)
EU	89% - 95% (93%)	88% - 94% (93%)
Russia	86% - 92% (91%)	81% - 89% (88%)
Canada	83% - 91% (89%)	87% - 93% (92%)
Japan	84% - 93% (90%)	86% - 94% (91%)
Australia	83% - 86% (85%)	86% - 88% (88%)
South Korea	64% - 84% (78%)	81% - 91% (88%)
Developed non MEF	85% - 92% (90%)	76% - 88% (85%)
China	-12% - 58% (29%)	44% - 79% (64%)
India	-4% - 61% (33%)	33% - 75% (57%)
Indonesia	54% - 83% (71%)	69% - 88% (81%)
Mexico	61% - 85% (75%)	67% - 87% (79%)
Brazil	77% - 82% (81%)	85% - 88% (87%)
South Africa	54% - 83% (72%)	61% - 86% (76%)
Developing non MEF	53% - 79% (69%)	62% - 84% (75%)

Key: High value – Low value and (Mean)

Table 4. To keep expected warming below 2°C in 2100 the minimum annual rate of reductions for developed and developing countries, after peaking or current targets are achieved, would be the following.

Developed Country Annual Emissions Decline Rates Post Target Year	Minimum Post Target Rates by Developing Countries (%/year) to Remain Below 2 Degrees C in 2100											
	2025		2026		2027		2028		2029		2030	
	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR
-6%	-3%	-2%	-3%	-2%	-3%	-2%	-3%	-3%	-3%	-3%	-3%	-3%
-5%	-3%	-2%	-3%	-2%	-3%	-3%	-3%	-3%	-3%	-3%	-3%	-3%
-4%	-3%	-2%	-3%	-2%	-3%	-2%	-3%	-3%	-3%	-3%	-3%	-3%

CDR scenarios assume carbon dioxide removal of 6 Gigatons CO₂ by 2100.

Table 5. To keep expected warming to 1.5°C in 2100 the minimum annual rate of reductions for developed and developing countries, after peaking or current targets are achieved, would be the following.

Developed Country Annual Emissions Decline Rates Post Target Year	Minimum Post Target Rates by Developing Countries (%/year) to be 1.5 Degrees C in 2100											
	2025		2026		2027		2028		2029		2030	
	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR	No CDR	CDR
-10%	-8%	-6%	NA	-6%	NA	-7%	NA	-7%	NA	-8%	NA	-9%
-9%	-8%	-6%	NA	-6%	NA	-7%	NA	-8%	NA	NA	NA	NA
-8%	NA	-6%	NA	-6%	NA	-7%	NA	NA	NA	NA	NA	NA
-7%	NA	-6%	NA	-6%	NA	NA	NA	NA	NA	NA	NA	NA

CDR scenarios assume carbon dioxide removal of 6 Gigatons CO₂ by 2100.