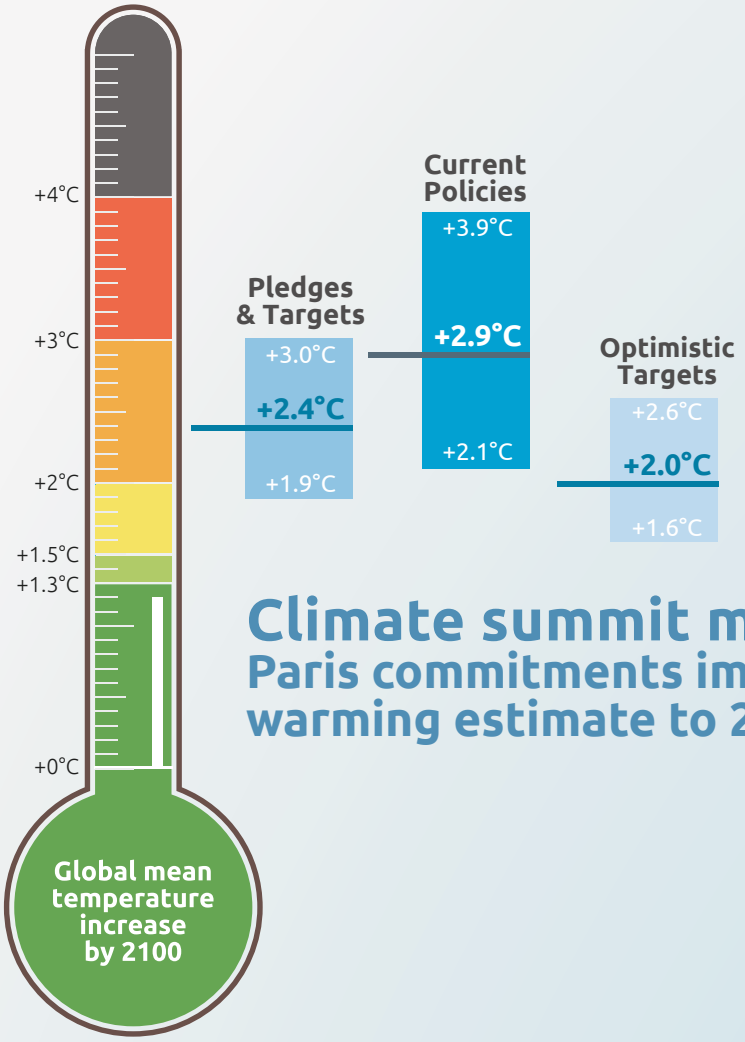
Climate Action Tracker



Climate summit momentum:
Paris commitments improved warming estimate to 2.4°C

Climate Action Tracker

Warming Projections Global Update

May 2021

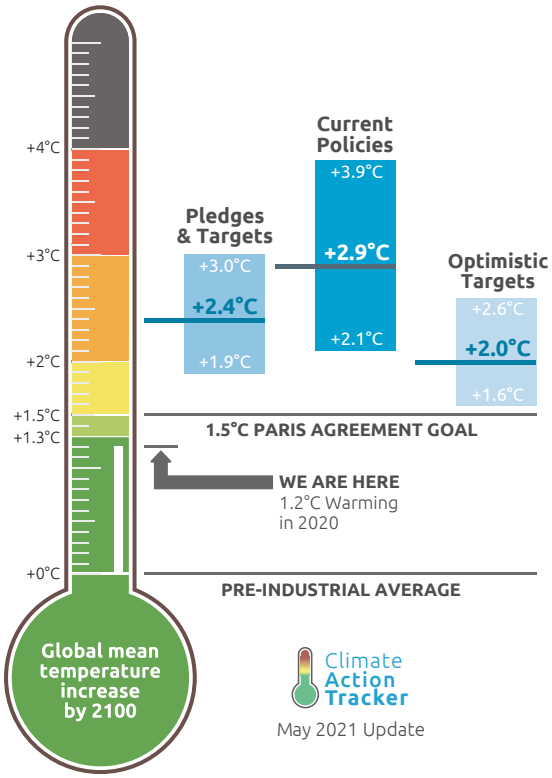
CLIMATE ANALYTICS

NEW CLIMATE INSTITUTE

Summary

- Climate action announcements at US President Biden's Leaders Summit on Climate, together with those announced since September last year have improved the Climate Action Tracker's warming estimate by 0.2°C. End of century warming from these Paris Agreement pledges and targets is now estimated to be 2.4°C.

- Assuming full implementation of the net zero targets by the US, China and other countries that have announced or are considering such targets, but have not yet submitted them to the UNFCCC, global warming by 2100 could be as low as 2.0°C ('Optimistic Targets' scenario). 131 countries, covering 73% of global GHG emissions, have adopted or are considering net zero targets (up by four since our last assessment). However, it is the updated 2030 NDC targets, rather than the additional countries, that contribute the most to the drop in projected warming compared to our last estimate, highlighting the importance of stronger near-term targets.



- While all of these developments are welcome, warming based on the targets and pledges, even under the most optimistic assumptions, is still well above the Paris Agreement's 1.5˚C temperature limit.

- The emissions gap in 2030 between Paris pledges and targets and pathways compatible with 1.5°C has narrowed by around 11-14% (2.6-3.9 $GtCO_2e$). The largest contributions came from the US, the EU27, China and Japan.

- This emissions gap needs to be closed with further NDC target updates this year.

- NDC updates need to continue in advance of the COP in Glasgow. Those countries that have not improved their targets need to rethink: Australia, Mexico, Brazil, Russia, Indonesia, Turkey, and Saudi Arabia.

- All targets have yet to be supported by ambitious policies. Our temperature estimate of all adopted national policies ('current policies' scenario) is 2.9°C.[1]

1 This estimate is based on our September 2020 assessment and has not been updated.

Table of Contents

1 Leaders' Summit on Climate creates new momentum on climate action

At the end of April, President Biden invited 40 world leaders to participate in a climate change summit, demonstrating that world leaders are again turning their attention to the climate crisis.

The **US**, **Japan** and **Canada** announced new 2030 nationally determined contribution (NDC) targets. The US target of 50-52% below 2005 levels is a significant step forward, but falls short of the 57-63% below 2005 levels needed to be compatible with the Paris Agreement's 1.5°C temperature limit. The Japanese target of 46% below 2013 levels fell short of expectations that the country would announce halving emissions in 2030, let alone adopt the more than 60% needed to be Paris compatible. Canada would only improve its CAT rating if it ditched the less ambitious end of its newly-announced target range of 40-45% below 2005 levels by 2030.

Argentina announced a further strengthening of its target by 2.7% (excl. LULUCF). The announcement builds on the country's December 2020 update where it essentially made its previous conditional target, unconditional.

China announced plans to strictly control coal consumption over the next 14th Five-year Plan period (FYP 2021-2025) and to start gradually phasing out coal during the 15th FYP (2026-2030). While restraining the coal industry is a continuation of current policy priorities, this is the first time China has announced a timeframe for the peaking of coal, planned for 2025. This should be considered a significant milestone. Importantly, however, the commitment does not include placing an absolute limit on coal growth in the next five years, or an actual date for a complete coal phase-out, nor ending financing of fossil fuel infrastructure abroad. It is also reflected in our assessment of President Xi's announced NDC update made during the Climate Action Summit in December, as this gradual phase out would be needed to achieve peaking emissions before 2030.

The **UK** announced a new 2035 target, having previously submitted its updated NDC in December 2020, while **South Korea**, **New Zealand**, **Bhutan** and **Bangladesh** all committed to submitting more ambitious NDC this year. **South Korea** also committed to ending all public financing for coal-fired power plants overseas. **South Africa** discussed its draft NDC update, currently undergoing public consultation.

Brazil's President Bolsonaro brought forward the country's climate neutrality goal by 10 years from 2060 to 2050. However, the commitment is dubious as changes in Brazil's 2030 baseline as part of its NDC update last December, effectively weakened its NDC target. Likewise, **Australia** promised to reach to net zero emissions, at an unspecified date depending upon technology development, but failed to announce stronger 2030 targets.

While the leaders of **India**, **Indonesia**, **Mexico**, **Russia**, **Saudi Arabia** and **Turkey** all spoke, none announced stronger NDCs.

2 Number of NDC updates is on the rise, but more and stronger targets are still needed

The new NDC announcements at the Summit build on the wave of submissions made at the end of last year. Progress is being made, but there is still a long way to go.

Just over 40% of the countries that have ratified the Paris Agreement, representing about half global emissions and about a third of the global population have submitted updated NDCs (Figure 1).

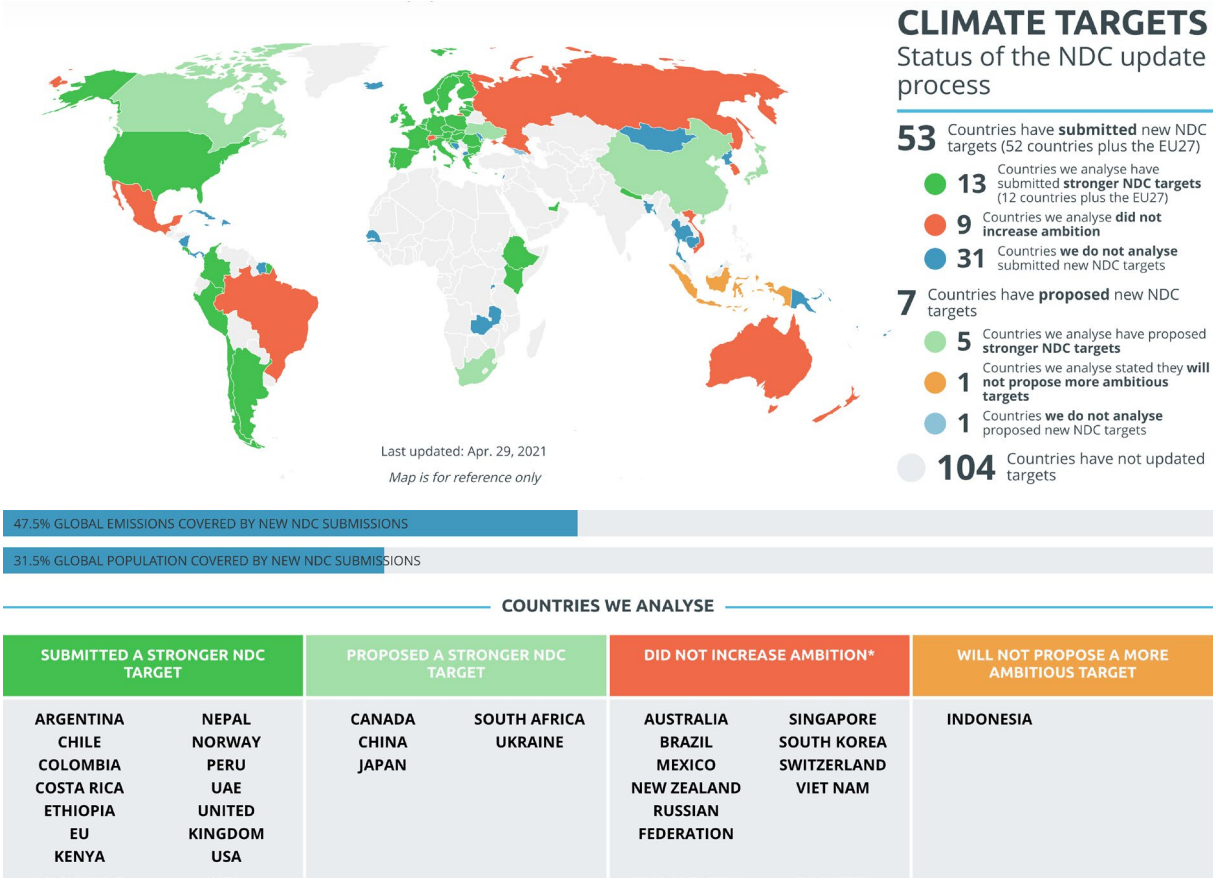


Figure 1 Status of NDC updates as of 30 April 2021. See our Climate Target Update Tracker page for further details.

Some of these 'updates' have done little to actually address emissions.

- Brazil and Mexico's submitted the same numerical targets; however, changes to their baseline assumptions mean that these are actually weaker overall.
- Russia and Viet Nam's updates appear stronger on paper but do not constitute a change as they can easily be met with current policies.
- Australia simply recommunicated its original NDC. Last year, media reports suggested that Indonesia intended to resubmit its original NDC target. We heard nothing at the Summit that changes that. The CAT has calculated that Indonesia could cut its emissions by 30% below its 2030 target if it were to address its burgeoning coal issue, by retiring old plants and cutting back its huge coal plant pipeline.
- Singapore and South Korea improved on the architecture of their targets, but not the ambition. However, as noted above, South Korea has committed to making a further NDC update this year.
- Switzerland increased the domestic component of its NDC, but not the overall target.
- New Zealand submitted its original NDC target, but, like South Korea, has committed to submitting a stronger NDC this year.

3 We have begun to narrow the gap, but only just

All of the NDC updates since September last year, have narrowed the 2030 emissions gap by around 11-14% (2.6-3.9 $GtCO_2e$).

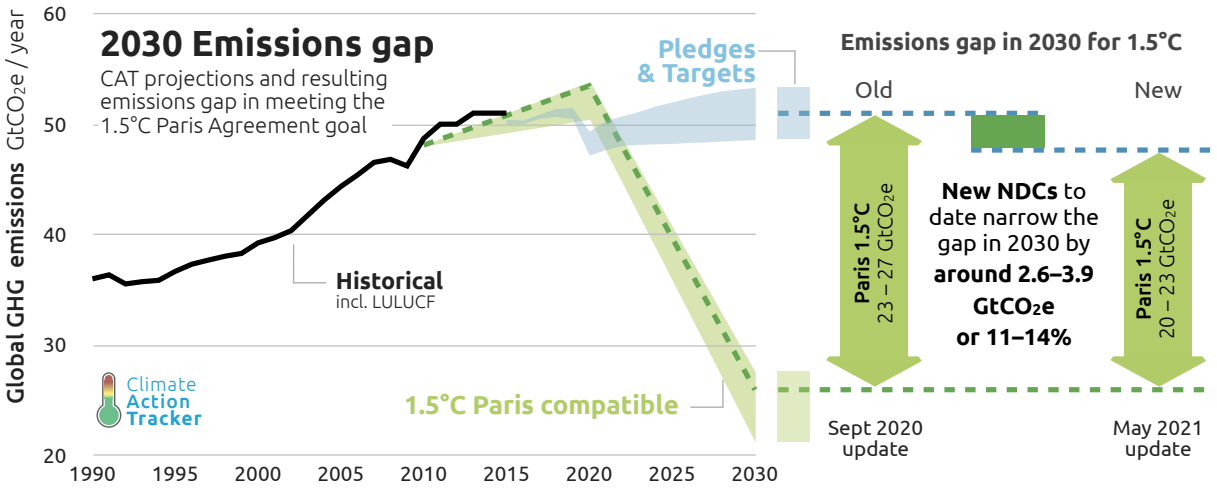


Figure 2 Comparison of emissions gap in 2030 for 1.5°C compatible scenario based on CAT analysis in September 2020 and May 2021.

The largest contributions came from the US, the EU27, China, and Japan.

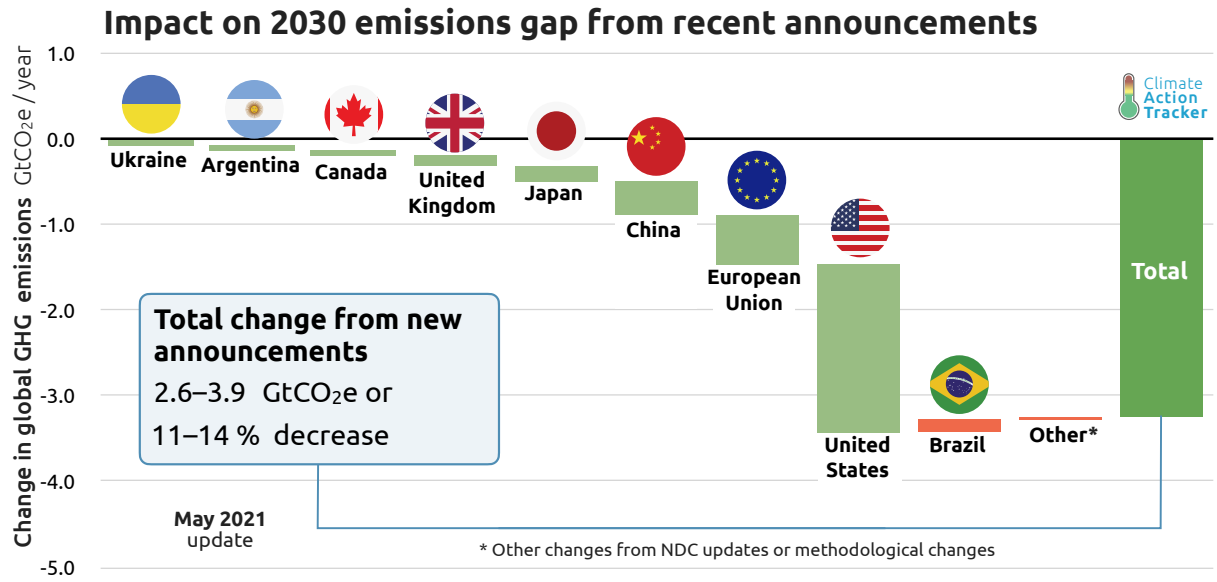
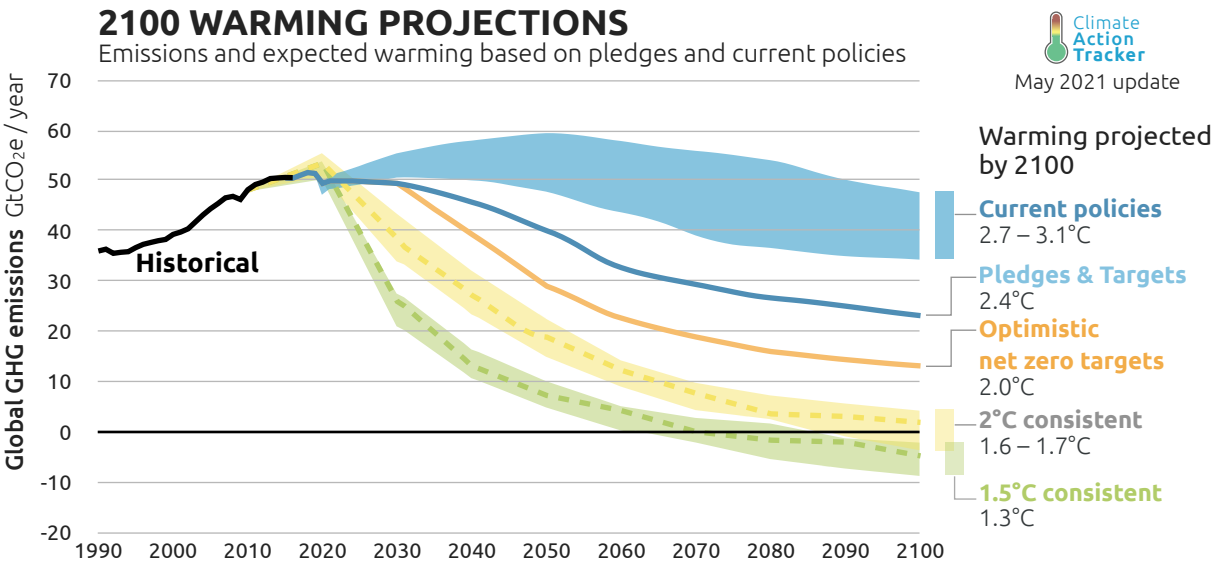


Figure 3 Impact of recent NDC announcements and submissions since September 2020 on the reduction in the 2030 emissions gap.

4 NDCs updates still put end-of-century warming far above Paris 1.5˚C limit

NDC announcements and updated submissions since September 2020 have brought down our temperature estimate of all Paris Agreement pledges and targets to 2.4˚C - a drop of 0.2˚C.[2]



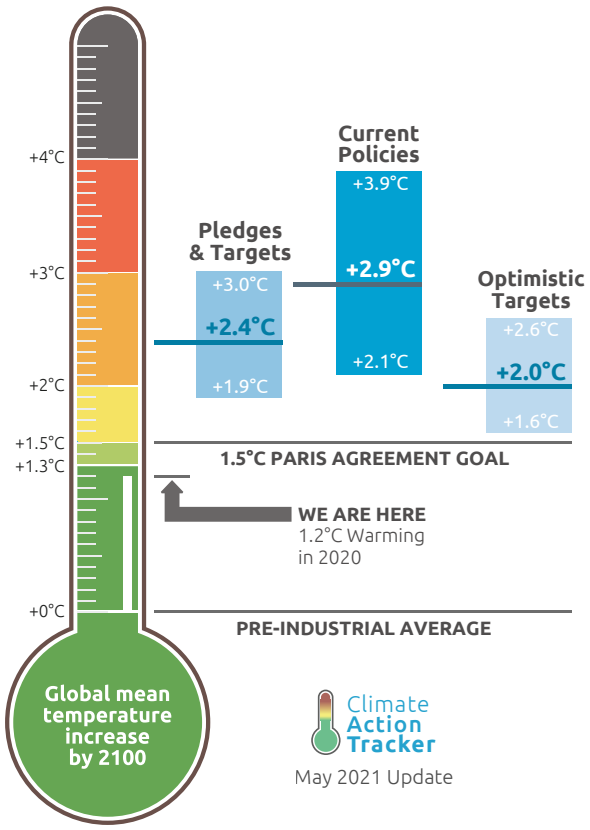


Figure 4 Global greenhouse gas emissions from Pledges and Targets, Current Policies and the Optimistic Targets scenarios and the Climate Action Tracker thermometer showing projected impact on temperature increases by 2100. This estimate for the Current Policies scenario is based on our September 2020 assessment.

Figure 5 The Climate Action Tracker thermometer showing projected impact on temperature increases by 2100 based on Pledges and Targets, Current Policies and the Optimistic Targets scenarios.

2 We also include long-term or net zero targets that are included in countries' long-term strategies submitted to the UNFCCC or adopted in law in our pledges and targets scenario, though occasionally we will remove long-term targets that we deem are no longer valid. This run includes the long-term or net zero targets of: Canada, Chile, Costa Rica, the EU27, Japan, Norway Singapore, South Africa, South Korea, Switzerland and the UK. Normally, we only consider NDCs that have been officially submitted; however, to fully assess the impact of the latest updates we have also included NDC announcements from: Canada, China, Japan, South Africa and Ukraine as we assume that NDCs of, at least, this level of ambition will be submitted to the UNFCCC this year.

5 Stronger 2030 targets, rather than new net zero targets, have improved our most optimistic scenario

Our most optimistic targets scenario global warming by 2100 could be as low as 2.0°C, which is a slight drop compared to our December 2020 analysis.[3] This scenario assumes the full implementation of the net zero targets announced by the US and China and 129 other countries with similar targets or announcements, covering 73% of global emissions. Four more countries have announced net zero since our last assessment: Andorra, Brazil, Kazakhstan, and Panama.[4]

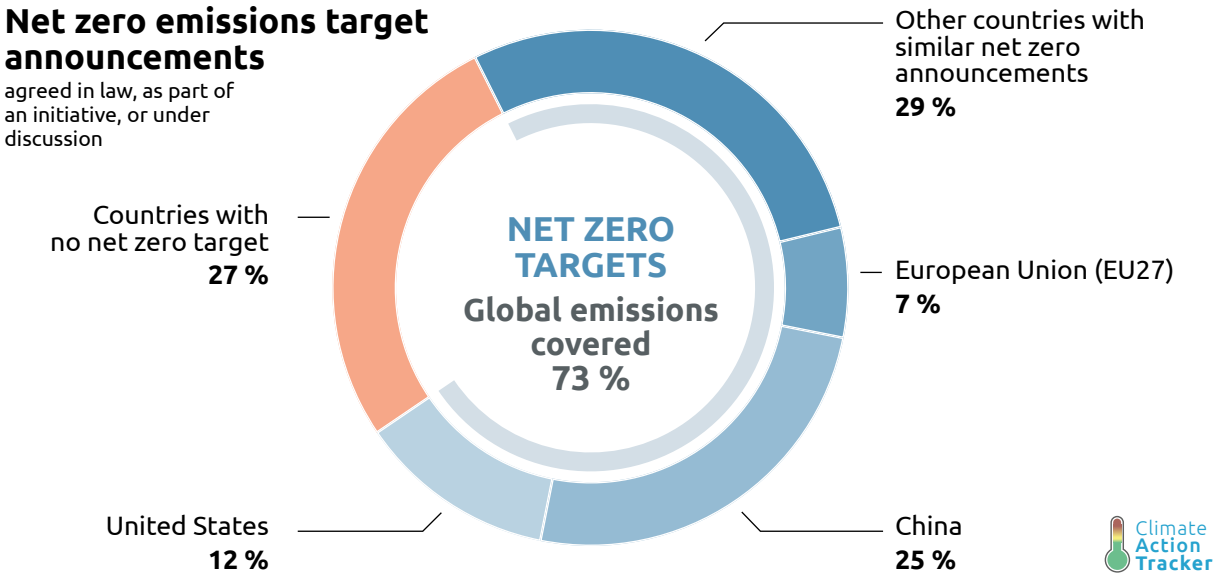


Figure 6 Share of GHG emissions covered by countries that have adopted or announced net zero emission targets (agreed in law, as part of an initiative, or under discussion). Compilation based on ECIU (2021) as of 29 April 2021 complemented by CAT analysis. Emissions data for 2017 taken from EDGAR emissions database.

Stronger 2030 targets, and not these additional countries, contributed the most to this drop in temperature of the optimistic scenario, as it lowers the cumulative emissions pathway to meet the long-term goals. China's and the EU's lower 2030 targets contributed the most here and should reinforce the necessity of having strong 2030 targets.

Reaching the 2.0°C level is an important milestone, but there is only a 50 / 50 chance that it is indeed 2.0°C. This means that there is a 50% chance that the calculated temperature would be exceeded if the given emissions pathway were followed. In probabilistic terms, warming is likely[5] below 2.2°C.

3 This drop between our December 2020 2.1°C estimate and this estimate is smaller than 0.1°C, with the change driven principally by NDC improvements. The reported 0.1°C difference is due to rounding of the temperature results.

4 We have quantified the Brazil and Kazakhstan targets. The approach for Andorra and Panama is the same as that outlined in our December 2020 briefing. For Brazil, we assume that in 2050, CO_2 emissions excluding LULUCF balance projected net removals from LULUCF taken from a decarbonisation strategy for Brazil produced by the Fórum Brasileiro de Mudança do Clima. Non-CO_2 emissions are assumed to fall linearly to zero in 2070. For Kazakhstan's net-zero GHG target, we assumed that LULUCF sinks will contribute as much as the largest sink recorded in Kazakhstan's inventory data (i.e., Kazakhstan's GHG emissions in 2060 are assumed to equal the minimum LULUCF emissions between 1990 and 2018). This assumption was based on the reforestation plan as announced by the Kazakh government, accompanying their net-zero target.

5 A 66% or greater chance.

6 The Paris Agreement continues to drive climate action

Since we began tracking the temperature impact of climate targets more than a decade ago, our temperature estimate has decreased 1.1°C (3.5°C to 2.4°C) taking all Paris Agreement pledges and targets or by 1.5°C (3.5°C to 2.0°C) if one takes into account all of the net-zero announcements.[6] The Paris Agreement is responsible for this drop and has spurred governments to adopt more ambitious targets.

Not only the good intentions, also the national policies implementation has improved over time, driven by new pledges and in particular falling prices of renewable energy. Our temperature effect of climate policies has also decreased by 0.7°C (from 3.6°C to 2.9°C).[7]

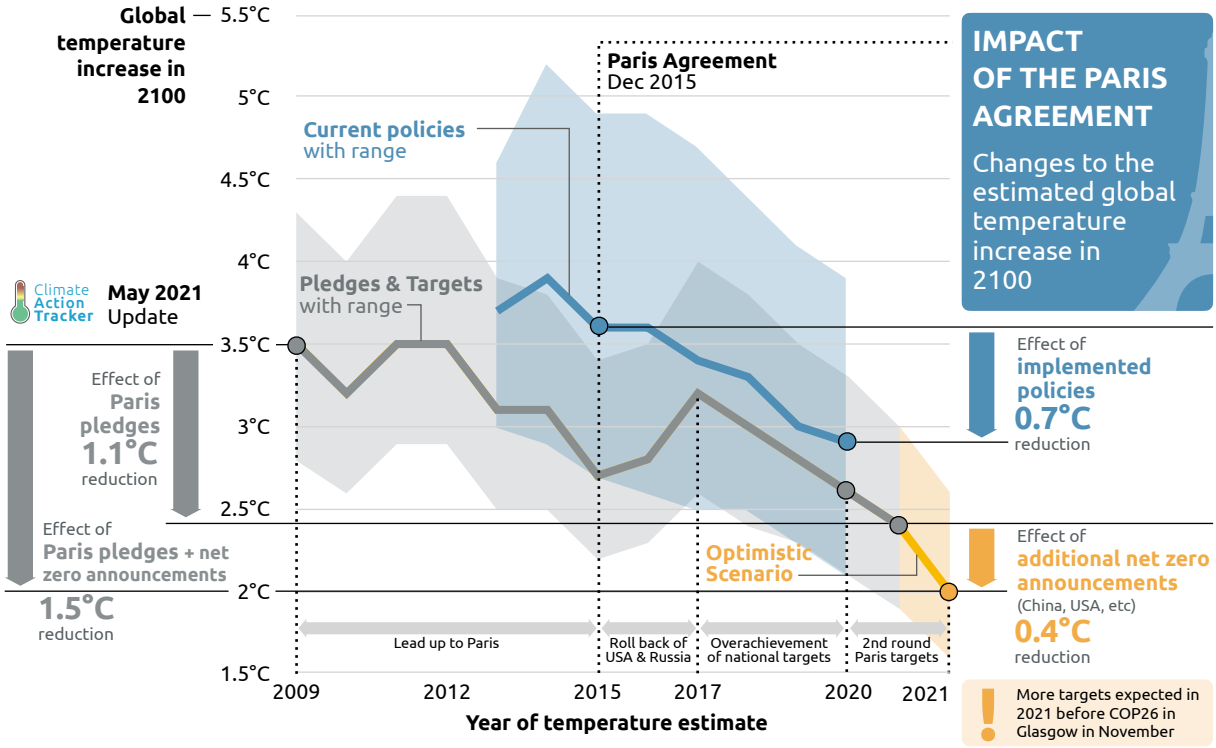


Figure 7 Impact of the Paris Agreement on the estimated global temperature increase in 2100. Figure shows the estimates of the Climate Action Tracker from 2009-2021 for its "pledges and targets" and "current policies" scenarios.

While we are moving in the right direction, even under the most optimistic target assumptions, we are still far from the 1.5°C limit. The fact that current global warming is now at 1.2°C above pre-industrial levels only serves to reinforce the urgency of further NDC updates.

Moreover, governments have yet to adopt sufficient policies to actually meet the targets they have set. In September 2020, we estimated that currently implemented policies, including the effect of the pandemic, will lead to a temperature rise of 2.9°C by the end of the century.[8]

6 The Climate Action Tracker is continuously updating and refining its methodology. As a result, the temperature estimates in figure 7 cannot solely be attributed to target improvements or real-world action; however, the figure does show the overall progression of our estimates.

7 This estimate is based on our September 2020 assessment and has not been updated.

8 We will update our current policies scenario later this year.

7 What needs to happen by Glasgow?

Our analysis shows that while progress is being made, the emissions gap in 2030 has only narrowed by 11% to 14%. There is still much work to be done by the time of the COP in Glasgow to keep the window to limiting warming to 1.5°C open.

There are several key steps to narrow the remaining gap:

- **Countries that have already updated** their targets that are not 1.5°C aligned need either reconsider or overachieve them. All targets submitted should be viewed as the floor: emissions reductions should be "at least" below the stated amount.
- **All those that have announced**, but not submitted, have an opportunity to consider revising their targets further in light of the new momentum.
  - China, the world's largest emitter, has not yet officially updated its NDC.
- **Countries that have promised to submit an updated NDC** should do so as soon as possible in order to continue to build momentum.
  - South Korea and New Zealand are in this category.
- **The 100+ countries that have not submitted** an update, covering about half of global emissions, need to do so, by submitting much more ambitious targets.
  - This list includes India, Turkey and Saudi Arabia
- **Countries that already submitted the same targets, targets that are easily met** with current policies, or that **are less ambitious** than the first NDC, must reconsider and resubmit:
  - This includes Australia, Mexico, Brazil, Russia, Singapore, Switzerland and Viet Nam. Japan and Argentina, who announced second, more ambitious submissions, are positive examples.
- **Countries with targets that are less ambitious than their current emission trajectory** could easily update their targets.
  - For countries like India, Indonesia, Russia (even with its November 2020 updated NDC target), Saudi Arabia, Singapore, Turkey, and Viet Nam, we already do not consider their targets in our global calculations, but take the current policy trajectory, as it is more ambitious than the target.
- **Developed countries also need to significantly scale up their climate finance.** Many developing countries will only be able to meet ambitious 1.5°C compatible pathways with significant support from developed countries.
- Beyond NDC updates, **countries also need to both tighten their policies and urgently implement them**. This scaling up of action is necessary to achieve these targets would put the world on a 1.5°C pathway.

8 What climate action is needed in key sectors?

What action do we have to take in individual sectors in order to cut emissions in half in the next ten years and reach net zero by 2050? Sector-specific pathways compatible with the goals of the Paris Agreement can support governments in designing ambitious NDCs. These can also serve as useful benchmarks for assessing the adequacy of interventions planned by governments to decarbonise sectors and economies. This section highlights developments required in key sectors, based on a Climate Action Tracker report from August 2020.

Climate action up to today has not yet been fast and deep enough to put most sectors onto a Paris-compatible path. Two areas with promising trends in recent years are renewable electricity technologies and electric vehicles. While innovative approaches either exist or are emerging for the buildings and industry sectors, their development is still far too slow. Of great concern are the persisting plans of some governments to build new infrastructure not compatible with Paris goals, such as new coal-fired power plants, increasing uptake of natural gas as a source of electricity and that there are large inefficient personal vehicles in some countries.

Power sector

Action in the electricity sector has a high priority as it directly enables the successful decarbonisation of all other sectors that can move from fossil fuels to electricity. In all countries, emissions per unit of electricity need to rapidly decrease to reach zero, ideally by 2040, latest by 2050.

For this transition, a fast ramp up of CO_2-free technologies to practically 100% is required. From all CO_2-free options, renewables seem to be the most viable. Variable renewable energy sources can be backed with a variety approaches including storage, flexible gas turbines powered with synthetic gas or green hydrogen and smart grid developments.[9]

Coal, the most emissions-intensive electricity generation, needs to be phased out by 2030 in developed countries and 2040 in developing countries and emerging economies. Renewables will be important in the displacement of coal, reaching 75-100% share electricity generation by 2040.

Transport sector

For the total of transport (all modes and passenger/freight), low carbon fuels (electricity, hydrogen or biomass) need to enter the energy mix rapidly: around 15 to 20% by 2030 and towards 100% in 2050. Electric passenger vehicles (or other zero emission vehicles) need to reach a very high market share by 2030 (95% for developed countries) and close to 100% by 2040, so that the global passenger car fleet will be almost 100% emission free by 2050. Despite challenges to full decarbonisation, multiple mitigation strategies should be pursued to decrease the emissions intensity of aviation and shipping.

9 We do not see fossil gas with carbon capture and storage (CCS) as an option because CCS itself is not emissions free and would require non-trivial negative emissions to compensate. The current generation of nuclear is not flexible enough to provide cost-effective backup power.

Industry

Industry is a large emitter which needs very specific solutions to decarbonisation based on the solutions available in each subsector. Where possible, industrial energy supply should be electrified, with the objective of around 50% of final energy in 2050 being met with electricity.

Cement and steel production emit a large share of the non-energy emissions of the industry sector, but decarbonisation by 2050 is possible:

- In the cement industry, emissions intensity needs to be reduced by 30% to 40% by 2030 and 90% by 2050 compared to today. Key measures to reduce emissions are reducing the share of the emissions-intensive cement clinker, transitioning to alternative fuels for thermal energy and novel cements that have low process emissions through incorporation of CCS and CCU. With additional efforts in material substitution and material efficiency, the cement sector as a whole could achieve zero emissions by 2050.
- The steel industry needs to reduce emissions intensity by 25% to 30% by 2030 and to zero by 2050. The best route for decarbonisation depends heavily on the country context. Recycling of scrap steel will play a key role in many countries; the maximum share of future production varies between 7-80% based on availability.
- No new conventional primary steel plants (BF-BOF) should be built. In the short term, partial fuel switch to charcoal and/or hydrogen or biogas should be considered in existing conventional plants. The hydrogen production route should reach between at least 15-30% market share by 2050, requiring investments in large-scale demonstration projects today to support maturing of the technology.

Buildings

Emissions intensity of the building stock in $kgCO_2/m^2$ converges close to zero by 2040, and 2050 at the latest. This target can be reached through either lowering energy demand or zero carbon energy, or both. The transition to get to zero varies by country and depends on both current emissions and the energy needs of the country, particularly their climatic zone.

Given the long lifetime of the building stock, from now on, all new buildings in all countries need to be of a high standard and equipped with heating and cooling technologies that either are or can be zero emissions, such as heat pumps, solar thermal water heaters and high thermal building standards. For existing buildings, renovation rates need to increase to the order of 3.5% per year and also transition to zero carbon heating and cooling technologies.

Authors

Climate Analytics

Claire Stockwell
Andreas Geiges
Deborah Ramalope
Matthew Gidden
Bill Hare

NewClimate Institute

Hanna Fekete
Sofia Gonzales-Zuñiga
Frederic Hans
Niklas Höhne

Editing and Design
Cindy Baxter
Dilara Arslan
Matt Beer

The Consortium

The Climate Action Tracker (CAT) is an independent scientific analysis produced by two research organisations tracking climate action since 2009. We track progress towards the globally agreed aim of holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C.

climateactiontracker.org

Climate Analytics is a non-profit climate science and policy institute based in Berlin, Germany with offices in New York, USA, Lomé, Togo and Perth, Australia, which brings together interdisciplinary expertise in the scientific and policy aspects of climate change. Climate Analytics aims to synthesise and advance scientific knowledge in the area of climate, and by linking scientific and policy analysis provide state-of-the-art solutions to global and national climate change policy challenges.

Contact: Dr. h.c. Bill Hare, +61 468 372 179

climateanalytics.org

NewClimate Institute is a non-profit institute established in 2014. NewClimate Institute supports research and implementation of action against climate change around the globe, covering the topics international climate negotiations, tracking climate action, climate and development, climate finance and carbon market mechanisms. NewClimate Institute aims at connecting up-to-date research with the real world decision making processes.

Contact: Prof. Dr. Niklas Höhne, +49 173 715 2279

newclimate.org