

INDCs lower projected warming to 2.7°C: significant progress but still above 2°C

Climate Action Tracker Update

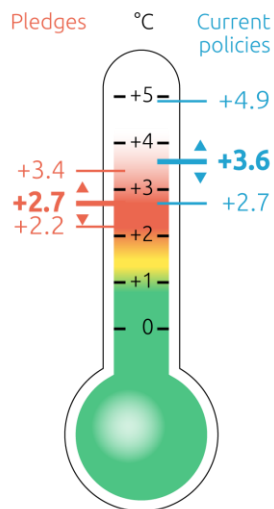
Johannes Gütschow, Louise Jeffery, Ryan Alexander
Potsdam Institute for Climate Impact Research

Bill Hare, Michiel Schaeffer, Marcia Rocha
Climate Analytics

Niklas Höhne, Hanna Fekete
NewClimate Institute

Pieter van Breevoort, Kornelis Blok
Ecofys

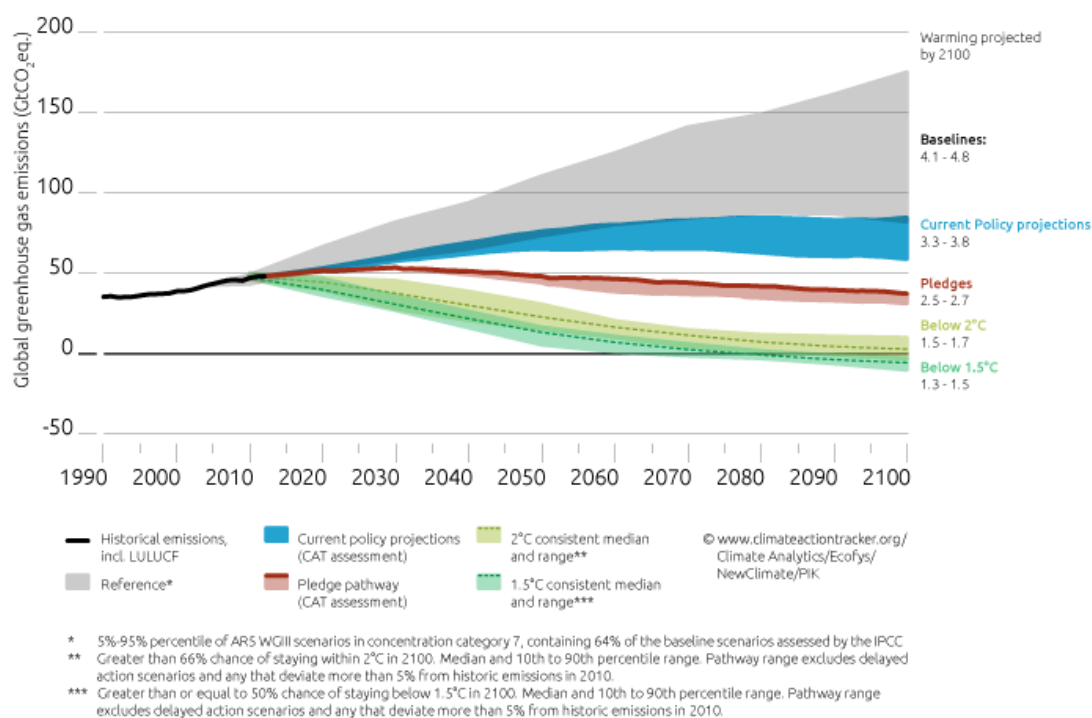
1st October 2015



Summary

- The UNFCCC set a deadline of October 1, 2015 for Intended Nationally Determined Contributions (INDCs) to be included in its synthesis document. While more INDCs may come in over the day, as of 11am 108 INDCs representing 135 countries have been registered with the UNFCCC, covering about 78% of global emissions.
- The INDC process has led to a significant improvement in promised action compared to earlier pledges of action and informal announcements.
- If fully implemented, the submitted INDCs for 2025 and 2030 are projected to lead to a warming of around 2.7°C by 2100 reflecting a 0.4°C improvement on the situation in December 2014, where only announcements for 2030 and pledges for 2020 were available.
- Compared to the 3.6°C by 2100 warming that is projected to result from current policies the INDCs submitted lower warming by about 0.9°C
- There is still a large emissions gap in 2025 and, to stay below 2°C, the gap is 11-13 GtCO₂e. For 1.5°C the 2025 gap is 14-16 GtCO₂e and would therefore require significant improvement in the level of mitigation ambition.
- With current INDCs, the emissions gap is set to grow rapidly towards 2030.
- There is a major risk that if current INDCs are locked in for 2030 and not reviewed and strengthened every five years, starting in 2020, that achievement of the 1.5°C goal called for by all the most vulnerable countries may be locked out, and achievement of the 2°C goal fundamentally threatened.
- Of the 19 INDCs rated by the CAT, covering about 71% of global emissions, 17 have not been rated as "sufficient." Instead, we rated eight, which cover 56% of global emissions, "medium," and eight, which cover 14% of global emissions as "inadequate." Two are sufficient but cover only 0.4% of global emissions, and one is not rated due to insufficient information.
- Based on the climate action promised under the INDCs it is now clear that governments at the Paris climate conference need to consider a formal acknowledgement that there is an insufficient level of mitigation ambition for 2025 and 2030 to limit warming below 2°C. A rapid review of the INDCs at the latest by 2020 for the post-2025 period, backed by continuous efforts before the entry into force of the Agreement is needed to catalyse action and ensure the Agreement has a running start.

What warming would result from INDCs submitted as of 1 October 2015?



The intended nationally determined contributions (INDCs) submitted to the UNFCCC by 1 October, and assessed by the Climate Action Tracker¹, if fully implemented, are projected to lead to a global warming of around 2.7°C (2.5 to 2.7°C²; medians of low and high end of pledges) by 2100, an improvement of 0.4°C since December 2014, before any INDCs were formally submitted (December 2014).

The temperature estimates the CAT made at the Lima talks included informal announcements by the European Union, the USA, and China that were later confirmed and stated more precisely in their formal INDCs. The temperature calculated in Lima already showed significant improvement (0.2-0.4°C) on previous pledges.

With 77% of global emissions covered by INDCs assessed by the CAT, including the likely Indian INDC measures, the likely total aggregate effort of all INDCs shows a clear deviation from scenarios before the INDC process began.

The INDCs submitted would yield a substantial reduction in warming of about 0.5°C to 1°C from currently implemented policies, as many governments have not yet implemented policies sufficient to meet their INDC. Current policies are projected to lead to warming of about 3.6°C (3.3 to 3.8°C; medians of low and high end of policy projections) by 2100.

¹ The CAT will not assess all INDCs. The CAT will assess around 35 INDCs this year, covering 82% of global emissions. For this update, the Climate Action Tracker has assessed 19 of all submitted INDCs (Australia, Brazil, Canada, China, Ethiopia, European Union, Gabon, Indonesia, Japan, Mexico, Morocco, New Zealand, Norway, Russian Federation, Singapore, South Africa, South Korea, Switzerland, United States of America), and has a best estimate for India's INDC based on media announcements. The 19 INDCs assessed by the CAT account for 71% of global emissions and with India 77%. The 108 INDCs submitted so far cover 78% of global emissions, and with India 84%, so it is safe to say that our current assessment captures the global trend. For the remaining CAT countries that have submitted an INDC that are currently being assessed by the CAT (Bhutan, Chile, Costa Rica, Gambia, Kazakhstan, Peru, Turkey, Ukraine) and for the CAT countries that have not yet submitted an INDC (Argentina, Nepal, Philippines, Saudi Arabia, United Arab Emirates), we have accounted for the 2020 pledges where available and proposed actions. For countries not assessed by the CAT, we currently assume that the emissions of these countries will follow a 'business-as-usual' (BAU) pathway.

² The range in estimates of warming under pledges results from a combinations of ranges in the original pledges, uncertainties in quantifying the pledges, and the consideration of conditional and unconditional pledges.

What are the major contributing factors behind the temperature improvement?

When considering INDCs and pledges, we assume that if emissions are reduced prior to 2030 then this pattern of lower emissions can be expected to continue, reflecting a continued and comparable level of effort through the rest of the century. In this context, if emissions under INDCs and pledges to 2030 are lowered then we find a lower projected warming by 2100.

Developed country INDCs and pledges have not contributed to the improved temperature outlook since Lima. In calculating the effects of their INDCs and pledges, we assume that most of these countries will achieve their long-term targets (e.g. EU reducing to 80 to 90% below 1990 in 2050, or USA reducing 83% below 2005 in 2050). The 2025 and 2030 INDC emissions levels of developed countries are generally consistent with the long-term targets and so haven't affected our temperature estimate.

For developing countries, the situation is different, and reductions in their INDC and pledge emissions in the period 2020-2030 flow over into lower projections for the post-2030 period.

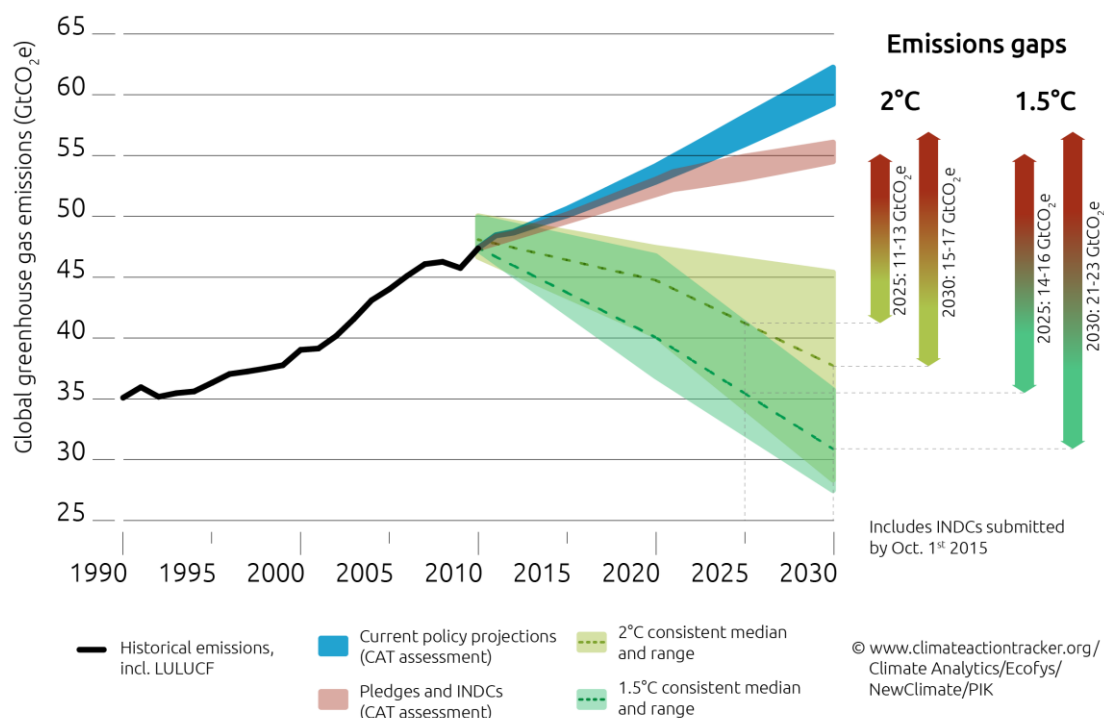
In this context a major change since Lima has been China's INDC and the related policies it has adopted, which we project will result in a peaking of carbon dioxide emissions in the late 2020s, will have substantial consequences for post-2030 emissions, resulting in lower overall global warming.

The CAT finds that different elements in China's INDC, if considered separately, lead to different emission levels, which are illustrated on the [CAT country page](#). We assume that China will only achieve its INDC if all elements (intensity + peaking + 20% non-fossil) are reached together, which results in larger overall emission reductions than when measures are considered independently. We find that China's non-fossil fuel share target leads to the lowest emission levels, with the remaining sectors following the current policies projections (13.6 GtCO₂e/a in 2030).

The CAT estimates made in Lima (December 2014), included the preliminary announcement of China's post 2020 targets, which already included the non-fossil target as it is in the submitted INDC. Nevertheless, the final emission level resulting from this scenario also depends on the composition of the remaining share of the fossil energy, the total energy consumed, and the development of non-energy related emissions. Since last December, the CAT has added important Chinese policies to its calculations; specifically we now assume the implementation of a cap on coal. This leads to a reduction in the projected energy related emissions of 1.1 GtCO₂e in 2030, compared to last year's projections.

While India's INDC was not submitted at the time of this report (1 October 2015), significant information in the public domain on the most important likely elements of the INDC have permitted a calculation of a likely range for this report. In addition, further measures have been put forward in India domestically since the Lima Update. Taking these factors into account, our estimates of India's current policy and pledge trajectories to 2030 have also decreased since the Lima update, by ~1 GtCO₂e in 2030. Together with China and other INDCs from the Asia region, India's current trajectory lowers expected total emissions through the century from this region and hence also results in a lower projected warming level.

How far are the INDCs from holding warming below 2°C, and bringing it back to 1.5°C by 2100?



There is a substantial gap between the INDC levels of emissions in 2025 and 2030 projected and the lower levels needed to hold warming below 2°C with a likely probability.

With the INDCs submitted to date, the CAT projects that total global emissions would be 52-54 GtCO₂e in 2025 and 53-55 GtCO₂e in 2030, significantly above present emissions of about 48 GtCO₂e. We therefore estimate the emissions gap at **11-13 GtCO₂e in 2025**, growing to about **15-17 GtCO₂e in 2030**.

The emissions gap for the 1.5°C pathway is about 3 GtCO₂ higher than the 2°C gap in 2025 and 6 GtCO₂ higher in 2030.

Closing the emissions gap requires significant improvement in the level of ambition from the governments that have already submitted INDCs as well as outstanding efforts from the remainder.

The INDCs still produce a global warming well above the 2°C limit (2.7°C) set by the global community. This reflects the less than sufficient climate targets submitted by many governments. The 2.7°C estimate is a median estimate and, to limit warming to below 2°C with a likely (greater than or equal to 66%) probability, the median temperature would need to be below 2°C.

Emissions in Policy Case (GtCO ₂ e)	2025	2030
Current Policy Projections ³	55–59	58–61
Pledges including INDCs ⁴	52–54	53–55
Below 2°C compatible pathway ⁵	39–43 ⁶ (37–45) ⁷	36–40 ⁶ (32–44) ⁷
Emission gap for 2°C compatible pathway	11–13	15–17
Below 1.5°C by 2100 compatible pathway ⁸	38 (35–40) ⁹	32 (29–36) ⁹
Emission gap for 1.5°C compatible pathway	14–16	21–23

Table 1: Current policy projections and pledges (incl. INDCs) compared with global emission benchmark ranges consistent with limiting warming to 1.5 and 2°C above pre-industrial.

How many governments have submitted sufficient INDCs? What about the others?

As of 11 am on 1 October, 108 INDCs have been submitted to the UNFCCC, covering about 78% of global emissions.¹⁰ The Climate Action Tracker has so far assessed 19 of those INDCs, covering 71%. Most, 17 out of 19 INDC submissions covering about 70.3% of global emissions, we have not rated as “sufficient”. Instead 8 are rated “medium” covering 56% of global emissions, and 8 rated as “inadequate” covering 14% of global emissions.

- **Eight submitted INDCs covering 14% of global emissions are rated inadequate;** Australia, Canada, Japan, New Zealand, Singapore, South Africa, South Korea and Russia’s INDCs are not considered to be a fair contribution to limiting warming to 2°C - from almost any perspective.
- **Eight submitted INDCs covering 56% of global emissions are rated medium,** which is within the upper and least ambitious end of what could be considered as fair. If all countries put forward a similar level of ambition, warming would exceed 2°C. The INDCs submitted by Brazil, China, the EU, Indonesia, Mexico, Norway, Switzerland and the USA are consistent with 2°C, according to some perspectives on their fair-share contribution, but they still rely on others to have more ambitious targets in order for the world to hold warming to below 2°C.
- **Two submitted INDCs covering 0.3% of global emissions are rated sufficient;** only two of the countries assessed by the CAT - Ethiopia and Morocco - have so far put forward an INDC that is in line with the below 2°C goal.
- **No submitted INDCs are ranked in the Role Model category.**

³ Range results from different projection scenarios, uncertainties in policy effectiveness, and assumptions regarding the completeness of policy implementation in the underlying country analyses.

⁴ Includes INDCs submitted by 31 August 2015

⁵ 2020 “Pledge Gap” closed - least cost-action from 2010 that leads to 2°C compatible emissions in 2020.

⁶ Low end represents median of scenarios that assume negative emission technology is not available in the 21st century and high end represents median of scenarios that assume it is.

⁷ 20th to 80th percentile range of scenarios. Low end represents low end of scenarios that assume negative emission technology is not available in the 21st century and high end represents high end of scenarios that assume it is.

⁸ 2020 “Pledge Gap” closed - least cost-action from 2010 that leads to 1.5°C compatible emissions in 2020 - limits warming below 2°C in the 21st century and has at least a 50% chance of returning warming to below 1.5°C by 2100. Assumes negative emissions technology is available.

⁹ 20th to 80th percentile range of scenarios. As higher emissions in the near term have to be compensated by deeper reductions later, following 80th percentile benchmarks over the near term would need to be followed by 20th percentile benchmarks in the second half of the century.

¹⁰ The 19 INDCs assessed by the CAT account for 71% of global emissions and with India 77%. The 108 INDCs submitted so far cover 78% of global emissions, and with India 84%, so it is safe to say that our current assessment captures the global trend. For the remaining CAT countries that have submitted an INDC that are currently being assessed by the CAT (Bhutan, Chile, Costa Rica, Gambia, Kazakhstan, Peru, Turkey, Ukraine) and for the CAT countries that have not yet submitted an INDC (Argentina, Nepal, Philippines, Saudi Arabia, United Arab Emirates), we have accounted for the 2020 pledges where available and proposed actions. For countries not assessed by the CAT, we currently assume that the emissions of these countries will follow a ‘business-as-usual’ (BAU) pathway.

In the current analysis, we have also included a best estimate of recent announcements in the media made by India. We assumed India's INDC to contain an emission intensity target of GDP of 35-45% below 2005 levels. This target would not result in emissions savings compared to our current policy projections. Additionally, we expect India's INDC to contain a renewable energy capacity target of 350 GW from solar and wind by 2030. The emission mitigation resulting from achieving this target is taken into account in the pledge pathway. While we have included this in our global pathway, we have not yet formally rated India because its INDC has not yet been submitted.

How do the countries that submitted INDCs stack up in terms of strength of climate action?

Countries that have so far submitted INDCs assessed by the CAT account for 71% of emissions (excluding land use change and forestry)¹¹ and have a patchy record in terms of the ambition of their INDCs.

Country	Rating	Share of Global Emissions
China	Medium	24,03%
United States	Medium	15,54%
European Union	Medium	10,78%
Russia	Inadequate	4,89%
Japan	Inadequate	2,88%
Brazil	Medium	2,13%
Indonesia	Medium	1,60%
Canada	Inadequate	1,53%
Mexico	Medium	1,42%
South Korea	Inadequate	1,42%
South Africa	Inadequate	1,24%
Australia	Inadequate	1,21%
Ethiopia	Sufficient	0,20%
New Zealand	Inadequate	0,17%
Morocco	Sufficient	0,15%
Switzerland	Medium	0,12%
Norway	Medium	0,11%
Singapore	Inadequate	0,06%
Gabon	Not rated	0,01%

¹¹ Including land use change and forestry submitted INDCs assessed by the CAT account for 66% of global emissions.

If INDCs for 2025 and 2030 are not ambitious enough, will it be possible to catch up later?

Based on the available and published scientific literature, it may be possible to catch up from the INDC emission levels in 2025, and still limit warming below 2°C. Given the smaller number of models and scenarios that have explored holding warming below 1.5°C as a long-term global goal there is increasing uncertainty as to the technical and economical options to achieve this goal from projected 2025 INDC levels.

Given the wide gap between current policies and the INDCs, it is clear that there will need to be major increases in action by most governments, starting very soon. This underlines the importance of frequent—and regular—monitoring and reviewing of progress.

In order to keep the 2°C and 1.5°C goals in sight, the Paris agreement will need to adopt a very strong, and legally binding, review process, so that within five years (by 2020 at the latest) a formal evaluation of progress can be completed and new commitments made for the post 2025 period.

The need to fill the gap between the projected INDC emissions levels in 2025 and the levels necessary to limit global warming to below 2°C means significantly more rapid, and costly, action would be needed compared to a situation where more ambitious targets for 2025 were adopted and where governments took immediate action now to achieve them.

From projected 2030 INDC emission levels, it may not be possible to catch up to a below 2°C consistent pathway and an even greater level of difficulty would apply to limiting warming below to 1.5°C by 2100.

The scientific literature shows that when higher emission reduction rates are required to meet climate goals there is a higher probability that the required actions may not be technically possible, increases and that if achieved will be increasingly costly. Annual decarbonisation rates of 3-4%, which would be needed to catch up from 2025 INDC levels, are feasible, but the available modelling results indicate that such a reduction would result in much higher costs, more disruption, and more challenges than if action starts now and continues in a smooth way.

The Climate Action Tracker is an independent science-based assessment that tracks the emission commitments and actions of countries. It is a joint project of the following organisations:

Climate Analytics

Climate Analytics is a non-profit institute based in Berlin, Germany, with offices in Lomé, Togo and New York, USA, that brings together inter-disciplinary expertise in the scientific and policy aspects of climate change with the vision of supporting science-based policy to prevent dangerous climate change, enabling sustainable development. 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, +49 160 908 62463

www.climateanalytics.org

Ecofys – Experts in Energy

Established in 1984 with the mission of achieving “sustainable energy for everyone”, Ecofys has become the leading expert in renewable energy, energy & carbon efficiency, energy systems & markets as well as energy & climate policy. The unique synergy between those areas of expertise is the key to its success. Ecofys creates smart, effective, practical and sustainable solutions for and with public and corporate clients all over the world. With offices in Belgium, the Netherlands, Germany, the United Kingdom, China and the US, Ecofys employs over 250 experts dedicated to solving energy and climate challenges. Contact: Prof. Kornelis Blok, +31 6 558 667 36

www.ecofys.com

Potsdam Institute for Climate Impact Research (PIK)

The PIK conducts research into global climate change and issues of sustainable development. Set up in 1992, the Institute is regarded as a pioneer in interdisciplinary research and as one of the world's leading establishments in this field. Scientists, economists and social scientists work together, investigating how the earth is changing as a system, studying the ecological, economic and social consequences of climate change, and assessing which strategies are appropriate for sustainable development. Contact: Dr. Louise Jeffery, louise.jeffery@pik-potsdam.de

www.pik-potsdam.de

NewClimate Institute

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: Dr. Niklas Höhne, +49 173 715 2279

www.newclimate.org