

CLIMATE ACTION TRACKER

2.7°C is not enough – we can get lower

Climate Action Tracker Update

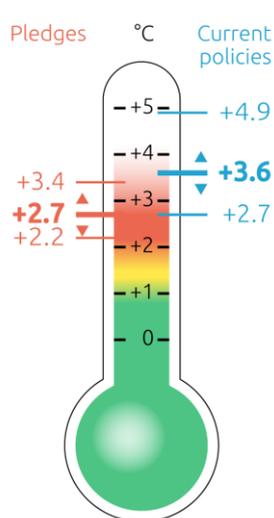
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Summary

- As of 8 December, 158 Intended Nationally Determined Contributions (INDCs) have been submitted to the UNFCCC, covering 185 countries and 94% of global emissions
- The CAT confirms its earlier estimate that, if the submitted INDCs are fully implemented and policies of similar strength are implemented after 2030, they would lead to a median warming of around 2.7°C by 2100 (a full range of 2.2- 3.4°C, which means there is a likely chance of holding warming below 3°C).
- Compared to the 3.6°C by 2100 warming that is projected to result from current policies, the climate pledges submitted in the INDCs lower warming by about 0.9°C – but only if all governments fully implement their pledges.
- Both current policies and INDCs are projected to lead to warming that far exceeds either the 1.5 or 2°C limits under discussion in Paris.
- Of the 32 INDCs rated by the CAT, covering around 81% of global emissions, we have rated only five as “sufficient” covering only 0.4% of global emissions, i.e. 17 are not sufficient. We have rated 11, covering 62% of global emissions as “medium,” and 15, covering 19% of global emissions as “inadequate.”
- Conditional elements of INDCs would lead to closing the emissions gap between INDCs and 1.5 and 2°C by roughly 2.8 GtCO₂e (12-17%), if conditions are met.
- Taking into consideration the co-benefits of reducing air pollution, INDCs could be much more ambitious (4.6-7.8 GtCO₂e, or 24-45% in 2030) at a cost that would be balanced by co-benefits. For limiting warming to 1.5°C, the larger emissions gap of around 23 GtCO₂e could be closed by 20-34%.
- Cancelling all announced and pre-permitted coal-fired power plants could reduce the policy gap—the gap between current policy projections and INDCs—by 1.9-2.3 GtCO₂e in 2030.
- The Paris Agreement can raise efforts by including a long-term warming limit, an associated long-term operationalization in terms of deep emissions reductions by mid century, and regular reviews of action that lead to actually getting on track for the long-term limit.

CAT analysed impact of INDCs on more than 80% of global emissions

Under the UNFCCC, all governments “in a position to do so” were asked to submit an “intended nationally determined contribution” (INDC) of climate action to the Paris climate agreement. As of 9 AM on 5 December, 158 INDCs have been submitted to the UNFCCC, covering about 94% of global emissions.¹

The Climate Action Tracker has analysed 32 INDCs in depth, reflecting 59 countries, and covering 81.3% of global emissions in 2010.² Most, 26 out of 32 INDC submissions, covering about 81% of global emissions, we have not rated as “sufficient”. Instead 11 are rated “medium” covering 62% of global emissions, and 15 rated as “inadequate” covering 19% of global emissions.³

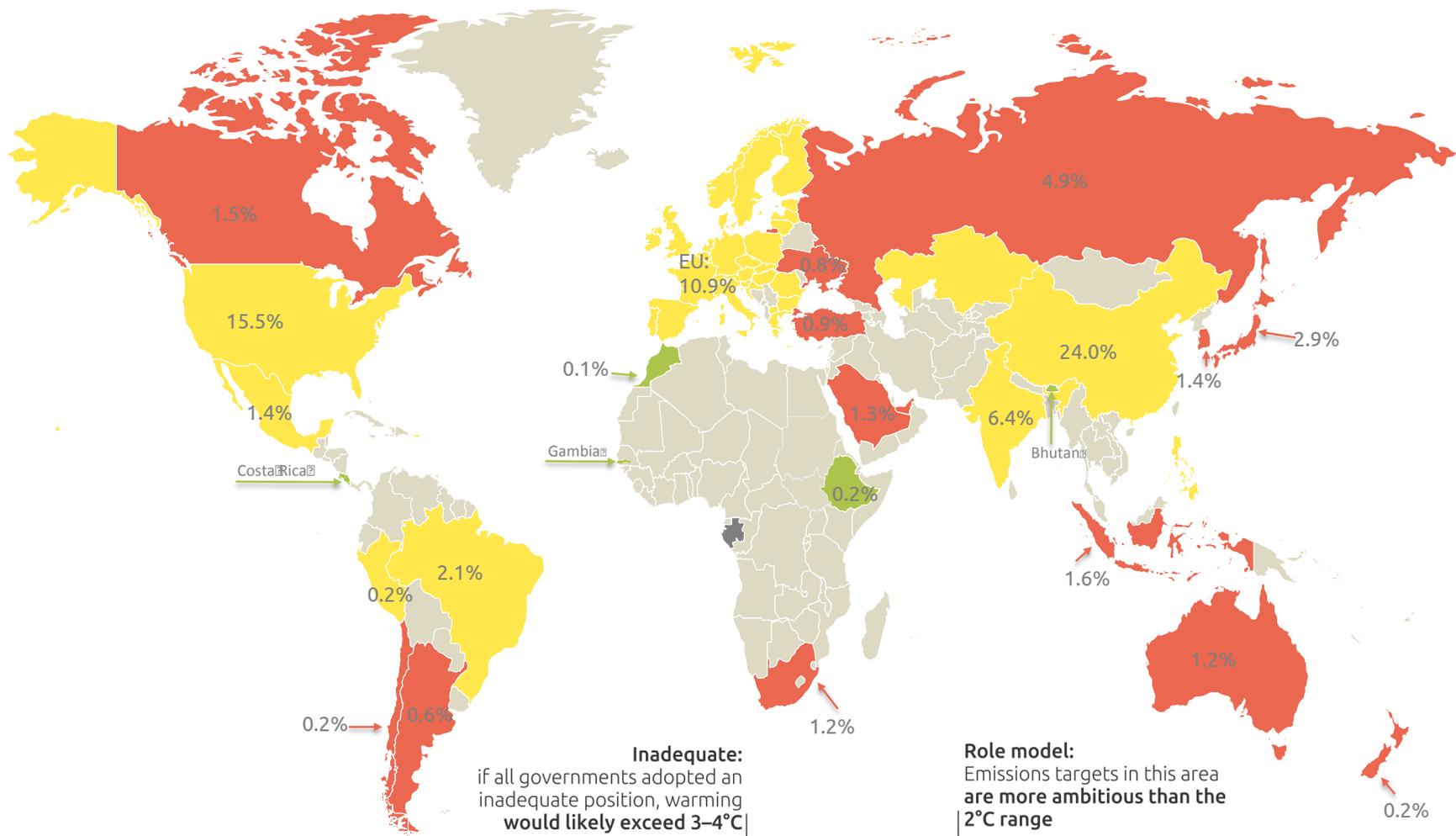
- **Fifteen submitted INDCs covering 19% of global emissions are rated inadequate;** INDCs of Argentina, Australia, Canada, Chile, Indonesia, Japan, New Zealand, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Turkey, United Arab Emirates and Ukraine are not considered to be a fair contribution to limiting warming to 2°C - from almost any perspective.
- **Eleven submitted INDCs covering 62% of global emissions are rated medium,** which is within the upper and least ambitious end of what could be considered as fair. If all governments proposed a similar level of effort, warming would exceed 2°C. The INDCs submitted by Brazil, China, EU, India, Kazakhstan, Mexico, Norway, Peru, Philippines, Switzerland and the United States are consistent with 2°C, according to a few perspectives on their fair-share contribution, but not according to most perspectives, and therefore still heavily rely on others to take more ambitious climate targets for the world to hold warming to below 2°C.
- **Five submitted INDCs covering 0.4% of global emissions are rated sufficient;** only five of the countries assessed by the CAT – Bhutan, Costa Rica, Ethiopia, Gambia and Morocco - have put forward an INDC in line with the below 2°C goal.
- **No submitted INDCs are ranked in the Role Model category.**⁴

¹ The 32 INDCs assessed by the CAT account for 81% of global emissions. The 158 INDCs submitted so far cover 94% of global emissions, so it is safe to say that our current assessment captures the global trend.

² The percentage is calculated excl. emissions from land use, land use change and forestry (LULUCF). If LULUCF were included, the share would be 76%

³ Gabon’s INDC has not been rated, due to insufficient information supporting Gabon’s calculation of emissions from the LULUCF sector

⁴ We previously rated Bhutan as “Role Model” but this was under a different methodology that included land use, land use change and forestry emissions. After adjusting our methodology, Bhutan’s rating changed, but the big forestry countries, such as Brazil, Indonesia, did not. See our explanation for this here <http://bit.ly/CAT-LULUCF>



Share of global emissions (in %) of selected countries

Inadequate:
if all governments adopted an inadequate position, warming would likely exceed 3–4°C

Role model:
Emissions targets in this area are more ambitious than the 2°C range

Medium:
if all governments adopted a medium position, warming would not likely be below 2°C

Sufficient:
if all governments are sufficient, warming would be limited below 2°C with a likely probability



What warming would result from INDCs submitted by COP21?

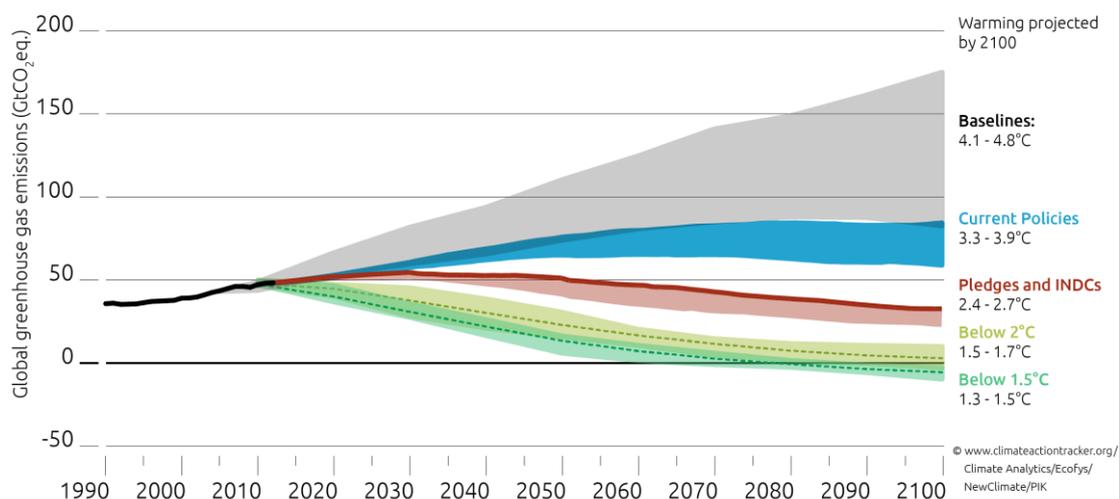


Figure 1: Emissions pathways and projected temperatures in 2100 under current policy and pledge scenarios. The range for baseline contains 64% of the baseline scenarios assessed by the IPCC (5%-95% percentile of AR5 WGIII scenarios in concentration category 7). The 2°C consistent range (greater than 66% chance of staying within 2°C in 2100, median and 10th to 90th percentile range) excludes delayed action scenarios and any that deviate more than 5% from historic emissions in 2010. The same applies to the 1.5°C consistent range (greater than or equal to 50% chance of staying below 1.5°C in 2100, median and 10th to 90th percentile range).

The **emissions reductions targets put forward in the INDCs** assessed by the CAT, if fully implemented, are projected to lead to a global warming of **around 2.7°C** [2.2-3.4°C⁵](or, in probabilistic terms, are likely to limit warming to below 3°C) by 2100⁶. This constitutes an improvement of 0.4°C since December 2014, before any INDCs were formally submitted.⁷ There has been no change in our temperature estimate since our last update on 1 October 2015.⁸

The likely total aggregate effort of all INDCs shows a clear deviation from scenarios before the INDC process began. However, the impact of these INDCs still falls substantially short of what is needed to limit warming to 1.5°C or below 2°C, particularly when we consider limiting warming with a likely probability (>66%).

The INDCs submitted put the world on a trajectory to 2030 emissions that are 3-6 GtCO₂e lower than 2030 emissions expected under current policies. We find that INDCs, together with mid-century reduction pledges of countries that put these forward, and continuing the level of effort achieved over 2020-2030 for other countries, are consistent with a reduction in warming of about 0.6°C to 1.1°C from currently implemented policies. Current policies are projected to lead to warming of about 3.6°C (3.3 to 3.9°C; medians of low and high end of policy projections) by 2100.

⁵ Uncertainty range based on the probability distribution generated by the carbon-cycle/climate model (MAGICC) when it takes into account uncertainties in our knowledge of climate sensitivity, the carbon cycle, and effects of greenhouse gases, aerosols, and other factors that are used to calculate the temperatures.

⁶ The median of the low end of INDCs is projected to lead, if all conditions are met, to warming of around 2.4°C [1.9-3.0°C⁵](or in probabilistic terms, likely limit warming to below 2.6°C) by 2100.

⁷ This assessment included the announced 2025 and 2030 targets of the USA, China, and the EU, which were found to make a significant impact on the global emissions trajectory.

⁸ For the temperature estimate, we assume that the INDCs are fully implemented by 2025 and 2030 and policies of similar strength are implemented after 2030. For a comparison to other temperature estimates resulting from the INDCs see <http://climateactiontracker.org/global/further-information.html>

Many governments have not yet implemented policies sufficient to meet their INDC (e.g. USA, Australia), and will need to develop and implement the necessary legislation and policies in the coming years. Other governments have been much more conservative in establishing their INDC and could (over-) achieve their INDC with little or no additional domestic legislation (e.g. Russia, India).

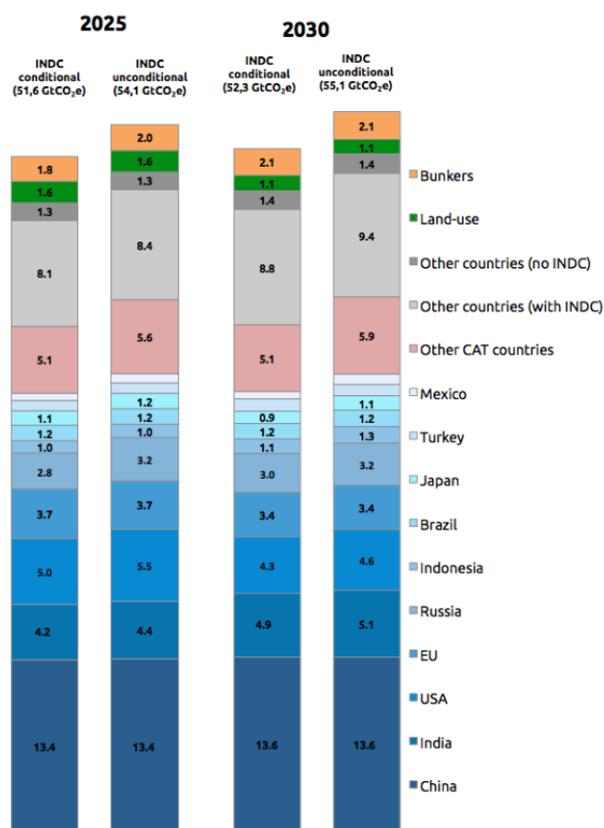
If all conditions were met, by how much could the gap be closed?

The CAT INDC scenario is a range between the unconditional, or high end, of emissions reductions pledges and a low end, including conditional targets and the more stringent end of governments' INDCs.

Some governments have put forward a target range rather than a single target value. For example, the USA has indicated a range between 26-28% below 2005 levels by 2025. A number of governments have submitted conditional INDCs (e.g. India, Philippines) while others have a component included in their INDCs that is conditional upon certain provisions (for example Indonesia, Thailand and Zambia).

Should these conditional contributions be realised, the aggregate effect would be significant. More than 70 INDCs include a conditional component, and those that can be quantified add up to approximately 2.8 GtCO₂e⁹ of extra emissions reductions and could close the emissions gap between INDCs in 2030 and 2°C by 17%, and the gap between INDCs and 1.5°C by 12%.

Global confidence in the success of INDCs to limit warming could be enhanced if all governments committed to the more ambitious end of their range of targets or provide the support requested by other governments to meet their conditional targets.



⁹ This includes accounting for land-use change and forestry emissions reductions where countries have included them in their targets.

How can we close the gap between INDCs and 1.5° and 2°C limits?

With no improvement on projected temperatures since our October 2015 update, the current effort levels of INDCs fall far short of what is needed for a robust commitment to limit warming 1.5°C and 2°C.

Substantial further reductions could be made at minimal cost when the co-benefits of air pollution reduction are taken into account.

In a **separate briefing**, we show that:

- Existing mitigation targets can be met, and in most cases strengthened, in a more cost-effective manner by properly accounting for the value of the benefits of reducing air pollution.
- The emissions gap in 2030 between governments' INDCs and a 2°C consistent pathway, currently around 17 GtCO₂e¹⁰, could be closed by **4.6–7.8 GtCO₂e or around 25-45%**¹¹, without imposing additional economic burdens over the next 15 years on the governments undertaking the additional effort.
- For limiting warming to 1.5°C, the larger emissions gap of around 23 GtCO₂e could be closed by 20-34%.

Our briefing focuses solely on adverse effects from air pollution, and doesn't take into account the many other co-benefits resulting from stronger climate policies, such as job creation and reduced dependence on fossil fuel imports. The actual costs of climate change, such as those due to sea level rise, extreme weather events, reduced crop yields and adaptation, are also not taken into account. If they were included, the cost-effectiveness of mitigation in many regions would likely become even more attractive.

How can we close the gap between current policies and INDCs?

Current policies still lead us on a trajectory to temperatures of ~3.6°C in 2100, significantly above that projected if governments fully implement their INDCs. A major challenge remaining is therefore to close the 'policy gap'—improve current policies so that 2030 emissions levels are, at most, those reflected by current INDCs. The policy gap to unconditional INDCs is currently 3-6 GtCO₂e.

Last week, [the CAT showed](#) that **cancelling all planned and announced coal-fired power plants could reduce emissions by up to 1.9-2.3 GtCO₂e below current policy projections.**

Cancelling planned and announced coal-fired power plants – and replacing production with zero-carbon technology or electricity savings - could therefore close the policy gap by up to 1.9 to 2.3 GtCO₂e, or by 40 to 65%.

The gap between current policies and 1.5 or 2°C pathways is much larger, and planned and announced coal-fired power plants would only close this gap by around 10-15%.

Taking action on coal-fired power plants is also necessary for moving to a pathway consistent with full decarbonisation of the energy sector between 2040 and 2060, a key characteristic of likely 2°C consistent scenarios. It would show clear commitment by governments that they intent on making progress toward a decarbonised economy.

¹⁰ This briefing and Climate Action Tracker, [INDCs lower projected warming to 2.7°C: significant progress but still above 2°C.](#)

¹¹ Note that these reductions are not additional to those identified in the conditional INDCs.

What are the temperature odds?

The temperatures on the CAT thermometer are 'median' warming estimates. This means that there is a 50% chance that the calculated temperature would be exceeded if the given emissions pathway were followed.

For example, our emissions pathway in the (unconditional) pledge scenario gives a 50% chance of warming being 2.7°C or higher in 2100. The 68 percentile range is 2.2 to 3.4°C.

The 'median' is based on the probability distribution generated by the climate model (MAGICC) when it takes into account uncertainties in our knowledge of climate sensitivity, the carbon cycle, and effect of greenhouse gases, aerosols, and other factors that are used to calculate the temperatures. The probability distribution enables us to provide more information for policy makers and stakeholders about the likelihood of goals being met, or specific temperatures being exceeded.

The emissions pledge pathway that includes INDCs has an ~90% probability of exceeding 2°C, and only a 'likely' (>66%) chance of remaining below 3°C this century. The current policy pathways have over 99% probability of exceeding 2°C.

In the CAT we assess current policy and pledge pathways against a likely (>66%) probability of holding warming below 2°C. A median 2°C pathway would give, in effect, only a 'toss of the coin' chance of limiting warming below this level. We assume that policy makers are interested in a higher probability of achieving this limit.

A higher probability of limiting warming below 2°C gives greater confidence that the emissions reduction efforts made will be successful in limiting warming to 2°C. This means, of course, that the median peak warming from a 2°C compatible pathway will be lower than 2°C - in the range of 1.5-1.7°C (see figure above and IPCC AR5 WGIII Ch6). This is one reason why our temperature thermometer still shows 'red' for 2°C, and a lower median warming is needed to get into the yellow or, even better, green range.

What has changed since the last update on October 1st?

Since our last update, 49 additional INDCs have been submitted and 7 additional INDCs (Argentina, Costa Rica, India, Philippines, Saudi Arabia, Turkey, United Arab Emirates) have now been assessed in depth by the CAT. We have also taken into account the INDCs of governments not assessed in depth by the CAT but with readily quantifiable targets.

Together, these additional INDCs have had minimal impact on the warming projected to result from unconditional INDCs and the projected temperature remains at 2.7°C.

India put forward a reduction of 33–35% in emissions intensity compared with 2005 in their INDC. The CAT estimates that India's emissions intensity will improve by 41% under current policies, exceeding this target. However, India's INDC also contains a contribution to increase the share of non-fossil based power generation capacity to 40% of installed electric power capacity by 2030. We find this component of the INDC to be the limiting factor and include it in our global assessment. CAT estimates this more ambitious component to be equivalent to a reduction of ~0.1 GtCO₂e below current policies in 2030¹².

India's INDC had not been submitted at the time of the October update, so we included our best estimate of India's INDC in the calculation of the global temperature. Based on media announcements, we expected India's INDC to contain a renewable energy capacity target of 350 GW from solar and wind by 2030. This target would be more ambitious than the actual 40% non-fossil capacity target that ultimately landed in the INDC. As a result, the 2030 emissions from India's INDC are 0.2–0.3 GtCO₂e higher in the current calculation of the global temperature, compared to the October update.

Saudi Arabia put forward a target to reduce annual emissions by 130 MtCO₂e by 2030 if the consequences of the Paris agreement do not impact its capacity to export oil. If it does, it reserves its right to reduce its mitigation amount between 2016–2020. This pledged abatement was applied to CAT's Saudi Arabian current policy projections, which were used in our INDC scenario in the absence of a baseline for the country, lowering 2030 emissions levels for the Middle East.

UAE describes qualitatively a number of measures targeting all sectors of the economy, emphasizing that it seeks to increase the share of clean energy to 24% of the total energy mix by 2021. Our current policy projection shows that the emissions would still be in the inadequate range in 2030. Considering the uncertainty in projections, this can lead to further lowering emissions in the Middle East by 7 to 163MtCO₂e.

The Philippines put forward a conditional emissions reduction target of 70% below business as usual (BAU) levels by 2030, including LULUCF. CAT estimates that this could, at best, result in emissions excluding LULUCF returning to 1990 levels. Compared to the October update, this lowers the conditional INDCs scenario by 209 to 250 MtCO₂e, partly offsetting the increase in India for the Asian region.

Argentina, Costa Rica, and Turkey lead jointly to a difference of about -20 MtCO₂e compared to the October update, hardly having any impact on temperature.

INDCs not fully assessed by CAT: In addition to updating and including new INDCs of CAT countries, we now also include an estimate of the impact of INDCs on the total emissions of non-CAT countries. Some of the increase in emissions from India is counter-balanced by a foreseen reduction relative to BAU in emissions from non-CAT countries under the INDCs.

We have surveyed the INDCs from non-CAT countries and identified those that have quantifiable INDCs and a significant impact on global emissions levels.¹³ Taken together, we estimate that emissions from these countries will be 56 MtCO₂e higher¹⁴ under the unconditional INDCs than under the previous BAU assumptions.

However, many non-CAT countries have put forward INDCs that are not quantifiable, or have very large uncertainties due to data issues and required assumptions and interpretations. These un-quantified INDCs include policy measures, or a reduction from BAU where the BAU is not given. Some important emitters in this category include Iran, Pakistan, Egypt, Malaysia, Algeria, Sudan, Qatar, and Myanmar, which are together responsible for 5% of current global emissions.

Additional measures put forward in these INDCs may contribute to lower temperatures, and it is important that all governments are engaged in the process. However, without quantifiable targets, the impact of these countries' contributions on global temperatures cannot be assessed and do not enhance confidence that emissions will be limited.

¹² Current policy projections are based on WEO 2014 and CAT assessment.

¹³ For more details on how the non-CAT INDC assessment was performed and incorporated into the global temperature update, please see our detailed methods [on the CAT website](#).

¹⁴ Depending on the assumptions taken regarding LULUCF, total emissions could be higher from those countries with quantifiable INDCs.

The Climate Action Tracker is an independent science-based assessment that tracks the emission commitments and actions of governments. 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

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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

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

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