

Summary

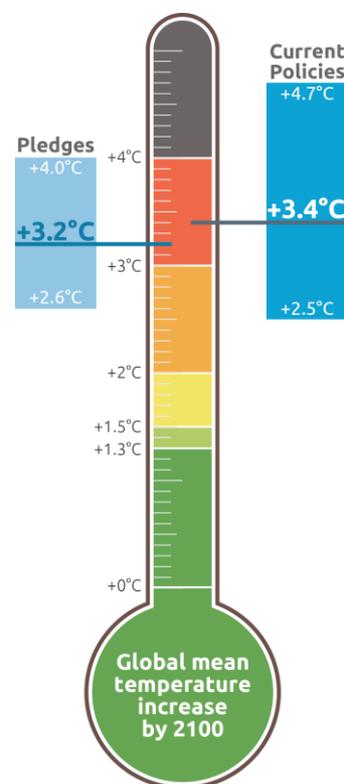
The Climate Action Tracker (CAT) with this paper is pleased to have the opportunity to provide input to the Talanoa Dialogue. Climate Action Tracker assesses countries' mitigation targets and actions and aggregates them at the global level. This submission focuses on global results, country level information is available on our website www.climateactiontracker.org.

“Where are we” compared to “where do we want to go”?

- **The majority of NDCs assessed by the CAT are not in line with a fair contribution to meet the Paris Agreement’s long-term warming limit:**
 - The CAT assessment covers 32 countries, which are collectively responsible for about 80% of global GHG emissions.
 - 24 governments have set insufficient targets; of these, 16 governments have implemented policies that will not even result in achievement of their targets.
 - Only seven governments have implemented 1.5°C or 2°C compatible targets and of these, four are not backed up by sufficient policy action.
 - The size of the gap between current policy pathways and the Paris Agreement-compatible benchmark is estimated to be 24–27 GtCO₂e in 2030.
 - Unless NDCs and policies are strengthened, the Paris Agreement long-term temperature goal will be out of reach.

- **Global GHG emissions need to peak around 2020 to meet the Paris Agreement’s 1.5°C warming limits.**
 - Although some large emitters have either reduced—or slowed—their GHG emissions growth rate, currently implemented policies are expected to result in a further growth of global GHG emissions by about 9–13% between 2020–2030.
 - As reported by the International Energy Agency, global energy-related CO₂ emissions were stable in the period 2014–2016 but grew by 1.4% in 2017 reaching a historic high of 32.5 Gt. In other words, 2017 saw a resumption of emissions growth after three years of remaining flat, illustrating the need for additional policies to achieve emissions peaking around 2020.

- **The full implementation of current Paris Agreement commitments (NDCs) would lead to median global temperature increase in 2100 of 3.2°C, and the currently implemented national policies lead to a temperature increase in 2100 of 3.4 °C.**
 - If all governments fully implemented their Nationally Determined Contributions (NDCs or pledges) there would be a median global **temperature increase of 3.2°C (3.16° C) above pre-industrial levels in 2100**. The warming estimate, in probabilistic terms, represents a likely (66% or greater) chance of being 3.5°C or below.



- The currently implemented national policies lead to 3.4 °C in 2100.
- Factoring in planned, but not yet implemented policies, and a continuation of recent developments, projected emissions would be 4.1 GtCO_{2e} lower in 2030 compared to last year, leading to a warming estimate of 3.1°C.

“How do we get there?”

- **All key sectors—energy generation, road transport, buildings, industry, forestry and land use, and commercial agriculture—have to begin major efforts to cut emissions so that total global emissions start to decline by, latest, 2020.** By 2025 they should have accelerated these efforts in order to reach globally aggregated zero carbon dioxide emissions by mid-century, and zero greenhouse gas emissions overall roughly in the 2060s.
- **The electricity sector needs to undertake the fastest transformation and must be fully decarbonised by 2050.**
 - No new coal-fired power plants can be built under a 1.5°C pathway, and global emissions from coal must come down by 30% by 2025—and 65% by 2030.
 - Similarly, the future of natural gas in the power sector is limited in a Paris Agreement-compatible world, even as a bridge fuel, and remaining emissions would need to be compensated by negative emissions by 2050. Higher reliance on gas, even with carbon capture and storage, implies higher reliance on negative emissions technologies
 - The past growth rate of renewable power options needs to be maintained and power systems prepared for their integration to reach a full decarbonisation.
- In the transportation sector **zero-emission passenger vehicles need to reach a dominant fleet share** by around 2035 and all new sales must be zero-emissions by then, for the world to meet the Paris Agreement’s lower warming limit of 1.5°C.
- Short-term steps in the building sector include that **all new buildings be fossil-free and near-zero energy by 2020 and that building renovation rates are increased from less than 1% in 2015 to 3-5% by 2020.**
- The industry sector needs to shift to the most efficient and least emissions-intensive production methods, with **all new installations** built with the best available low carbon technology standards **from 2020 onwards.**
- For the agriculture sector reducing emissions through changes in farming practices alone will not be enough to limit global warming to 1.5°C, but **changing our diets and reducing food waste could make significant additional reductions, which calls for a much more holistic approach.**

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Introduction

The Talanoa Dialogue provides a critical opportunity to take stock of collective efforts of Parties and provide scientific and policy analysis that informs Parties' consideration of the need for greater mitigation ambition consistent with the 1.5°C warming limit in the Paris Agreement. The Climate Action Tracker (CAT) is grateful for the opportunity to share its analysis as an input to the Talanoa Dialogue and looks forward to engaging further in the process through 2018. Our input addresses all three questions: Where are we? Where do we want to go? How do we get there?

The Climate Action Tracker (CAT) is an independent scientific analysis produced by three 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 by quantifying the aggregate effects of current policies (i.e. policies that are already implemented at national levels) on global GHG emissions. Since 2015, CAT evaluates the commitments put forward by governments in the Nationally Determined Contributions (NDCs), under the Paris Agreement. CAT then compares these with the emissions levels consistent with both the Paris-compatible 1.5°C limit and the earlier 2°C temperature increase limit at different time periods (2025 and 2030).¹

CAT has evolved to the point where it is now a standard source of such information. The analysis is a major input to, and project team members are regular authors of, the UNEP Emissions Gap reports. The CAT has published results in *Nature*, and is regularly quoted by media, e.g. [New York Times](#).

Following the agreed language of the Talanoa dialogue, we structure this input/briefing along the questions: “Where are we?”, “Where do we want to go?” and “How do we get there?”.

“Where are we” in comparison to “where do we want to go”?

Are all Parties preparing, communicating and implementing successive nationally determined contributions?

The CAT rates government climate action compared to the efforts needed to reach the Paris Agreement’s 1.5°C long-term temperature increase limit. Our six rating categories are used to help highlight the adequacy and fairness of governments’ targets to mitigate climate change.

These categories are: Role model, 1.5°C Paris Agreement Compatible, 2°C Compatible, Insufficient, Highly Insufficient and Critically Insufficient. The implication of each rating in terms of a “fair” contribution to meeting the temperature increase objective of the Paris Agreement is laid out in Annex 2.

The CAT’s September 2017 Briefing (Climate Action Tracker, 2017a) focussed on rating NDCs, i.e. *what governments propose to do*. However, a target-based rating system does not give an indication of *what governments are actually doing* to meet these targets through the implementation of policies. In our November briefing for COP23, we therefore applied the CAT’s rating system to both, implemented climate policies and NDCs.²

¹ A new and more diverse set of scenarios that limit warming to 1.5°C or below are being developed by the scientific community and feed into the upcoming IPCC Special Report on 1.5°C (October 2018). The underlying peer-reviewed papers and data are expected to become publicly available in the course of 2018. Using such data, the CAT will update its Paris Agreement benchmark scenarios in 2018 to reflect the most recent available scientific literature.

² The CAT rating is based on the concept of effort sharing, which distributes the necessary global mitigation efforts to countries based on their historical responsibility, capability, and other principles. The outcomes of the effort sharing analysis are “emissions allowances” per country, rather than domestic emission level requirements. According to this concept, the “fair share” contribution could also be met by providing support to countries with a lower responsibility or capability, or by purchasing good emission reduction credits from other countries. Also, the effort sharing concept does not consider mitigation potentials or sectoral requirements to meet global warming goals. The comparison of policy scenarios against effort sharing results thus has methodological limitations. We have included it here to indicate how implemented policies in each country compare to the “fair share” level of climate action.

The vast majority of the countries assessed have not committed to an emissions target that is compatible with their fair share of the 1.5°C long-term Paris Agreement goal. Seven countries have set insufficient targets, which they can reach without implementing new policies. In addition, 17 governments have implemented policies that will not even result in achievement of their insufficient targets.

On the other hand, four governments assessed by the CAT have put forward 2° C or 1.5°C compatible targets, but do not back them up with sufficient policy action meet them. By setting such targets, these countries have taken an ambitious step forward, and they now need to quickly implement new policies to actually achieve it.

For more specific country level information please visit our website: www.climateactiontracker.org

When will emissions peak?

The Paris Agreement long-term goals require global greenhouse gas emissions to peak as soon as possible. It is therefore an important question whether this can be achieved by 2020.

Global *energy-related* CO₂ emissions were stable in the period 2014–2016 (IEA, 2017) but grew by 1.4% in 2017, reaching a historic high of 32.5 Gt in 2017, a resumption of growth after three years of remaining flat (IEA, 2018). Based on CAT data, we cannot yet conclude whether energy-related CO₂ emissions will peak, or whether they will continue to increase in 2018.

Regarding *all greenhouse gas* emissions (GHG), the developments in total GHG emissions from the world's largest emitters as analysed in CAT's current policy projections are expected to continue and will lead to slower growth of *total GHG* emissions in the period to 2030 than previously expected. However, we cannot yet speak of a peaking of *total GHG* emissions for the following reasons:

- The CAT estimates a high and a low range of emissions under current policies for its 32 countries that account for 80% of global emissions. CAT projections indicate that GHG emissions may soon begin to rise again. In 17 out of 32 countries analysed in the CAT, emissions are projected to grow more than 20% between 2020 and 2030 (Climate Action Tracker, 2017c). For global GHG emissions, we estimate a growth of about 9–13% for the period 2020–2030 (0.9–1.3% per year) for the low and high end of our current policy projections. Both projections are consistent with emissions growth still projected in some countries.
- An increase is still expected in greenhouse gas emissions from sectors other than energy, e.g. from agriculture, due to increased activity and only limited emissions-reduction policies.

What are the projected emissions and what is the estimated global GHG emissions gap between current progress and scenarios consistent with the long-term temperature goal?

The CAT assesses the expected absolute emissions in two milestone years: 2025, and 2030 and compares these with benchmark emissions pathways that are in line with the temperature increase goal of the Paris Agreement.

The benchmark emissions and the policy projections are given in Table 1 and shown in Figure 1.

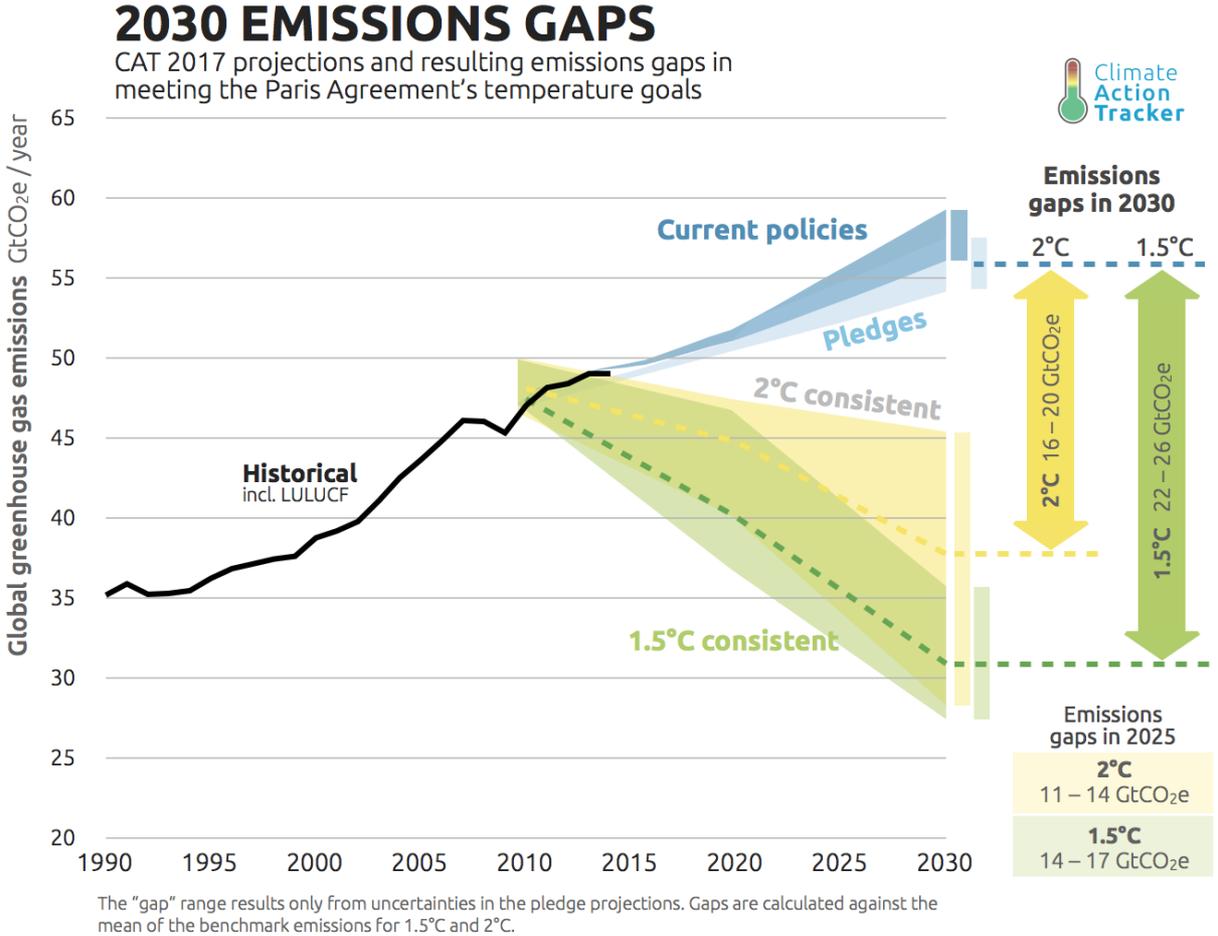


Figure 1: Emissions gap (GtCO_{2e}), based on CAT global pathways from current policy projections and pledges, and 2°C and 1.5°C benchmarks.

Currently implemented policies are not yet strong enough to achieve the pledges that governments have made under the Paris Agreement. These policies are estimated to result in emissions levels that are 1–2 GtCO_{2e} higher than the pledge pathway emissions last year in the benchmark years (see Table 1).

The CAT estimates from our May 2017 update were used as input into the UNEP Emissions Gap Report 2017 (UNEP, 2017). The gap estimate in this document is an update of our May analysis done for COP23 in November 2017.³ Because the Climate Action Tracker's 1.5°C scenario still allows for

³ Since its 2015 edition, the UNEP Emissions Gap Report is drawing on benchmarks from global emissions pathways that start globally coordinated emissions reductions after 2020 only. The Climate Action Tracker uses a different assumption for its

emissions reductions by 2020, our emission benchmarks for 2025 and 2030 are lower than those reported in the most recent UNEP Emissions Gap Report, and our reported emissions gap numbers are comparably larger. As time progresses, it will become clear which emissions reductions have been achieved by 2020, and CAT’s emissions benchmarks—as well as the 2025 and 2030 emissions gap numbers—will be updated subsequently.

Table 1: Emissions gap (Gt CO_{2e}), based on CAT global pathways from current policy projections and pledges, and 2°C and 1.5°C benchmarks.

GtCO _{2e}	2025		2030	
Scenario	Low	High	Low	High
Current policies	54	55	56	59
Pledges	52	55	54	58
2°C Benchmark	41		38	
2°C Gap (Pledge)	11	14	16	20
1.5°C Benchmark	38		32	
1.5°C Gap (Pledge)	14	17	22	26
1.5°C Gap (Current policies)	16	17	24	27

1.5°C and 2°C pathways, starting globally coordinated mitigation action in 2010 and assuming that some mitigation before 2020 can still be achieved.

What is the projected increase in global average temperatures above pre-industrial levels based on current progress?

The CAT estimates that if governments were to fully implement their Nationally Determined Contributions (NDCs), global temperature increase would reach 3.2°C (3.16°C) in 2100 (range of 2.6–4.0°C due to uncertainty in carbon-cycle and climate modelling). This means that in aggregate, government pledges are completely inconsistent with the Paris Agreement. The “central” (median) estimate of 3.2°C is consistent with a likely (66% or greater chance) of a global average temperature increase below 3.5°C in 2100.

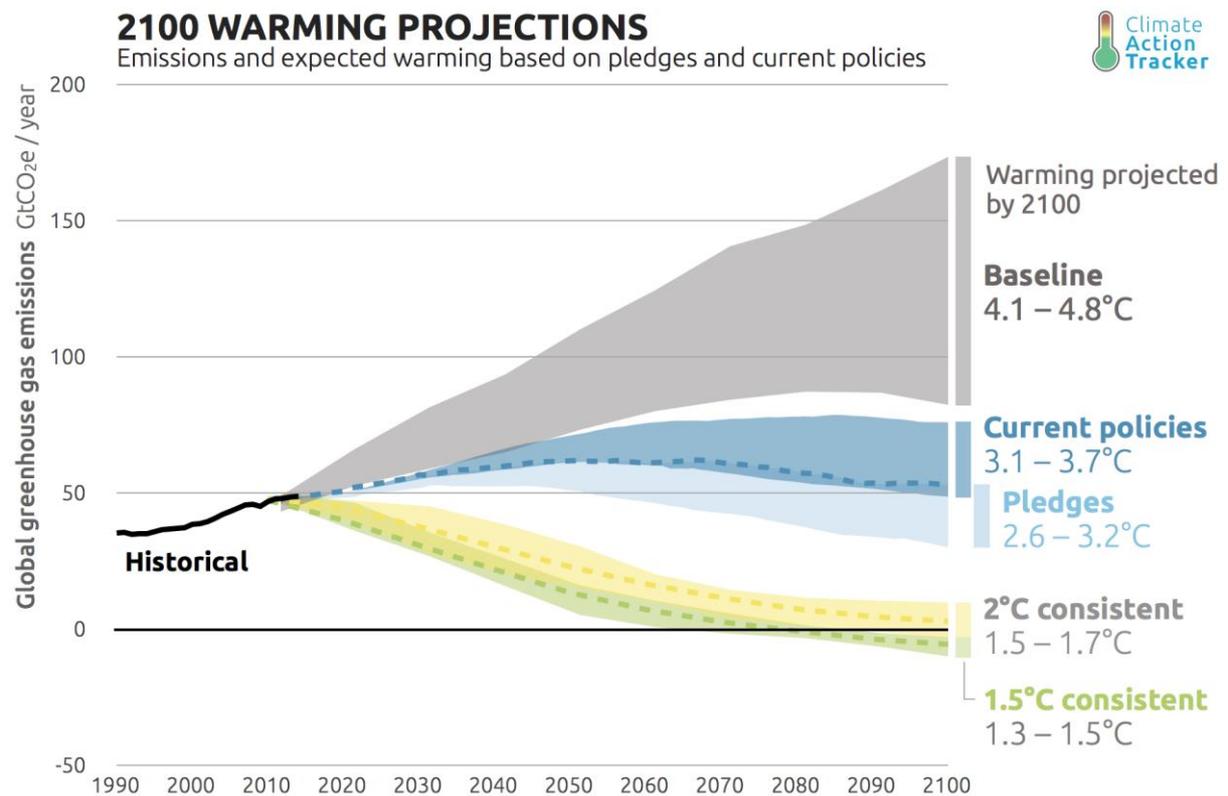


Figure 2: Global greenhouse gas emissions under different scenarios and related global temperature increase above pre-industrial levels by 2100.

Climate policies are improving but are not yet in line with climate pledges: currently implemented policies translate into a temperature increase of 3.4°C (low and high end of policy projections resulting in median warming of 3.1°C and 3.7°C, respectively) in 2100—almost 2°C above the Paris Agreement’s 1.5°C warming limit.

How do we get there?

What sectoral actions are required for the low-carbon transition necessary for the Paris Agreement?

All key sectors—energy generation, road transport, buildings, industry, forestry and land use, and commercial agriculture—have to begin major efforts to cut emissions so that global emissions start to decline by, latest, 2020. By 2025 all sectors should have accelerated these efforts in order to reach globally aggregated zero carbon dioxide emissions by mid-century, and zero greenhouse gas emissions overall roughly in the 2060s.

In today's carbon-constrained world, if one sector were to do less, particularly the energy, industry and transport sectors, they would leave a high-emissions legacy for several decades as other sectors will likely not be able to compensate. Lack of action could also result in a failure to set in motion the system changes needed to achieve the required long-term transformation.

For more information see:

- *Climate Action Tracker (2016b). The ten most important short-term steps to limit warming to 1.5°C.*
- *Takeshi Kuramochi, Niklas Höhne, Michiel Schaeffer, Jasmin Cantzler, Bill Hare, Yvonne Deng, Sebastian Sterl, Markus Hagemann, Marcia Rocha, Paola Andrea Yanguas-Parra, Goher-Ur-Rehman Mir, Lindee Wong, Tarik El-Laboudy, Karlien Wouters, Delphine Deryng & Kornelis Blok (2017) Ten key short-term sectoral benchmarks to limit warming to 1.5°C, Climate Policy, 18:3, 287-305, DOI: 10.1080/14693062.2017.1397495*
- *For sector specific publications please consult publication referenced in the respective sections below.*

Electricity generation

The first and most important sector identified by the CAT is the power sector, which makes up one quarter of global emissions. It needs to undertake the fastest transformation and must be fully decarbonised by 2050.

Renewables are the lowest carbon option in the electricity sector and show the most promise; their current growth rate needs to be maintained until 2025 to reach 100% share by 2050. At the same time no new coal-fired power plants can be built under a 1.5°C pathway, and emissions from coal must decrease by 30% by 2025—and 65% by 2030.

Similarly, the future of natural gas is limited, even as a bridging fuel. We foresee a dwindling role for natural gas in the power sector toward the middle of the century, not only to meet the Paris Agreement goals, but also due to increasing competition from renewables. Natural gas only has a very short “bridge” to renewables. Even if coupled with carbon capture and storage, current evidence suggests significant emissions would still occur which would require additional abatement strategies or balancing with negative emissions technologies. This means a higher reliance on gas in the power sector requires larger-scale deployment of negative emissions technologies. Continued investments into the sector create the risk of breaching the Paris Agreement's long-term temperature goal and will result in stranded assets. There are also persistent issues with fugitive emissions during gas extraction and transport that mean that gas is not as low in emissions as often thought. Although the emissions from gas plants can be reduced by up to 90% with Carbon Capture and Storage (CCS), this is not sufficient for full decarbonisation. Even if these capture rates could be increased, ultimately, the cost of gas with CCS is unlikely to be competitive with renewables and a flexible grid.

For more information see:

- *Climate Action Tracker (2017b). Foot off the gas: increased reliance on natural gas in the power sector risks an emissions lock-in*

Transport

In the transportation sector zero-emission vehicles need to reach a dominant market share by around 2035 for the world to meet the Paris Agreement's lower warming limit of 1.5°C. This transformation of the passenger transport sector would also have to be accompanied by a decarbonisation of the power sector to ensure electric vehicles (EV) are truly emissions free.

Even a date of 2035 or so for the last new fossil-fuel powered passenger car could be late: the earlier we decarbonise the transport system, the less we will need to rely on negative emissions that largely require technologies still awaiting large-scale deployment.

If governments were to double fuel economy standards in new passenger cars by 2030, and achieve a 50% EV uptake by 2050, then most get close to—or even reach—a 2°C warming pathway. But a 1.5°C pathway requires more action. We see huge possibilities in this sector, where the uptake of electric vehicles in several countries has skyrocketed in recent years and is set to take off further. This stands in stark contrast to the aviation and shipping sectors, where there is no overall global vision yet on how to achieve zero emissions.

For more information see:

- *Climate Action Tracker (2016). The road ahead : how do we move to cleaner car fleets?*

Buildings

The buildings sector accounts for around 20% of climate-changing emissions, and its energy demand is likely to double by mid-century without action. Short-term steps for this sector include that all new buildings be fossil-free and near-zero energy by 2020 and that building renovation rates are increased from less than 1% in 2015 to 3% in non-OECD and 5% in OECD countries by 2020

While the technologies required to make new buildings zero-emissions are all available, the sector is not taking up those technologies as fast as it could, and renovation rates are low. Delayed action would put pressure on other sectors to cut emissions or require negative emissions to keep global warming within the Paris Agreement's temperature limit.

We have to start building 'Paris Agreement-proof' buildings today. Given the long lifetimes of buildings, rapid action is especially important in this sector. Any inefficient buildings we construct today will have to be renovated at greater cost later, adding to the challenge we are already facing in renovating the majority of the existing building stock.

For more information see:

- *Climate Action Tracker (2016a). Constructing the future: creating a Paris Agreement-proof building sector*

Industry

Industrial production is expected to grow significantly through to 2050. Its emissions already account for 40% of the global total, but need to be reduced by well over 50% by the middle of the century to meet the Paris Agreement's lower warming limit of 1.5°C.

The levers to achieve this transformation in the industry sector include (1) a shift to the most energy-efficient and the least emission intensive production methods, (2) increasing material efficiency through improved design, re-use and recycling and changes in the way end products are used, and (3) demand reduction through behavioural shifts. How these levers are implemented depends heavily on the subsector.

Two of the largest subsectors in terms of emissions, the production of steel and cement, could reduce their emissions by 30–50% through energy efficiency and decarbonisation of energy supply, which would require i.a. all new installations need to be built according to the best available low carbon technology standard from 2020 onwards. For the steelmaking sector, for example, this would exclude building conventional blast furnaces. To achieve even higher emission reductions a shift to innovative low-carbon technologies, product substitutions, circular production routes, and possible industrial scale deployment of CCS will be needed

For more information see:

- *Climate Action Tracker (2017d). Manufacturing a low-carbon society: How can we reduce emissions from cement and steel?*

Agriculture

Reducing emissions through changes in farming practices alone will not be enough to limit global warming to 1.5°C, but changing our diets and reducing food waste could make significant additional reductions, which calls for a much more holistic approach.

Agriculture accounts for roughly 10% of global greenhouse gas emissions, and as much as 50% of non-CO₂ emissions, at 5–6 GtCO₂e/year.

To limit warming to 2°C with a 66% likelihood, we need to reduce agricultural emissions by at least 1 GtCO₂e/year—an 11%–18% reduction by 2030 (and larger reductions thereafter), compared with a business-as-usual (BAU) scenario. However, to meet the Paris Agreement’s 1.5°C warming limit, that reduction would need to more than double to 2.7 GtCO₂e/year.

Changing farm practices could lead to a reduction of 0.6 GtCO₂e/year, but when combined with changing diets away from beef and dairy and reducing food waste, we could achieve a reduction of around 3 GtCO₂e/year, possibly enough to decarbonise the sector to a 1.5°C pathway. Further research needs to look at the interactions between these areas, to reduce the uncertainty in total reduction potential.

If warming is kept well below 2°C and below 1.5°C, adaptation in agriculture may be able to compensate for some climate impacts, and the faster global emissions are mitigated, and such impacts are avoided, the lower the burden of such adaptation.

For more information see:

- *Climate Action Tracker (2018). What's on the table? Mitigating agricultural emissions while achieving food security.*

Other

CAT summarised ten key short-term steps that sectors need to take to help the world achieve the Paris Agreement’s 1.5°C limit. Additionally to those mentioned in the sections above, further required steps are:

- Develop and agree on a 1.5°C-consistent vision for aviation and shipping;
- Reduce emissions from forestry and other land use to 95% below 2010 levels by 2030, stop net deforestation by 2025.
- Accelerate research and planning for negative emission technology deployment.

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Annex 1: Policy developments and impact on 2030 emissions throughout 2017

Over the last year, governments have made substantial steps in improving climate policies: for example, many are now actively moving away from coal given that renewable energy is becoming ever cheaper; electric mobility is gaining momentum.

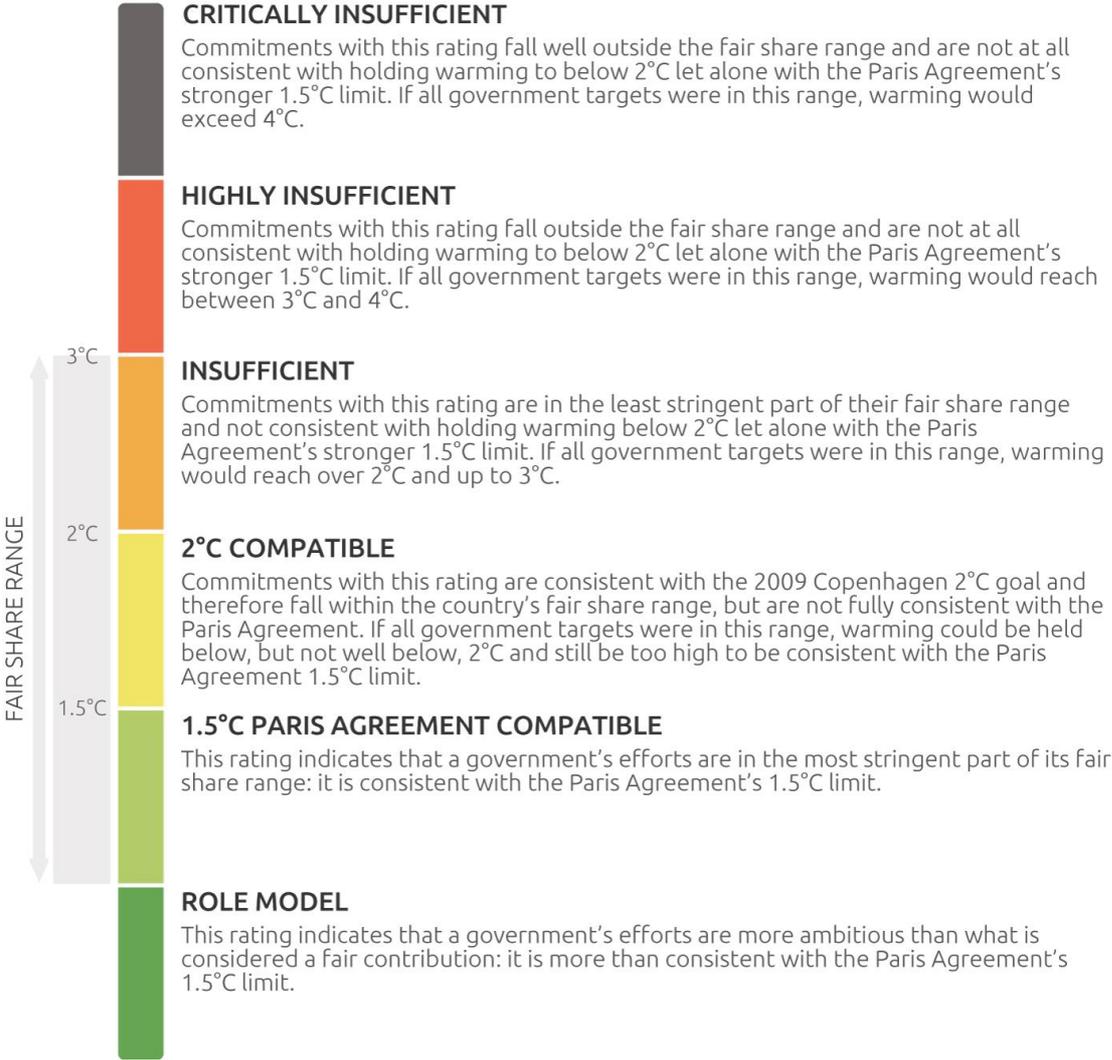
Our global current policy projections for 2030 are 1.7 GtCO₂e lower than last year, resulting from downward changes in emissions projections of the majority of the countries we assess.

Under the optimistic assumption that this positive trend continues, our global emissions estimate for 2030 would decrease instead by 4.1 GtCO₂e in 2030.

The impact of these positive policy developments far outweighs the impact of negative developments over the last year. Nevertheless, given the need for a fast, global transformation and peaking emissions as soon as possible to get on track for the Paris Agreement's temperature increase goal, any weakening of climate action is still a significant backwards step.

For more detailed country-level information please consult our website www.climateactiontracker.org

Annex 2: CAT Rating System





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

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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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