

Greenhouse gas mitigation scenarios for major emitting countries

Analysis of current climate policies and mitigation commitments:
2021 update

Executive Summary

October 2021



National GHG emissions and NDC targets

Emissions remain above 2005 levels in most countries analysed

Absolute emissions levels vary considerably across the countries analysed. In this report, we present emissions projections using 2005 as a base year for reporting and comparability reasons. Economy-wide GHG emissions in the 26 countries as a group are expected to increase between 8% and 25% between 2005 and 2030 under current policies. Emissions are projected to remain above 2005 levels in the majority of countries (16) analysed and range from a decrease of 51% between 2005 and 2030 to an increase of 140% in the same period (Figure 1).

Countries with 2030 emissions projections significantly below 2005 levels are mostly Annex I countries, the only exception is Brazil. The UK, the EU27, Japan and the USA all have projected GHG emissions in 2030 more than 20% below 2005 values. These countries have multiple climate-relevant policies in place and emissions are on a declining trend. Brazil also presents low 2030 emissions level in comparison to 2005. This is due to the high, deforestation-induced historical emissions. The post-2020 emissions trends in Brazil are highly unclear due to uncertainty in the implementation and enforcement of land-use related policies. Emissions excluding LULUCF remain on a slightly upwards trend until 2030.

Sixteen countries have emissions in 2030 above 2005 values. In 2019, these countries were responsible for half of global emissions (FAOSTAT, 2021; Olivier & Peters, 2020). Considering the upwards emissions trend, these countries will likely represent an even higher share of emissions in 2030. Significant additional policies are required to curb their emissions. Emissions in India, Saudi Arabia and Viet Nam are expected to more than double by 2030 in comparison to 2005.

Per capita emissions under current policies are projected to be slightly lower than under NDC targets in 2030 in the group of countries analysed, even though there is significant overlap between the ranges (Figure 2). The median per capita emissions in 2030 under of the 26 NDC targets analysed is expected to be approximately 7.3 tCO₂e per capita (range: 2.4 to 26.2 tCO₂e). Under current policies, this value is 6.8 tCO₂e (range: 1.3 to 25 tCO₂e).

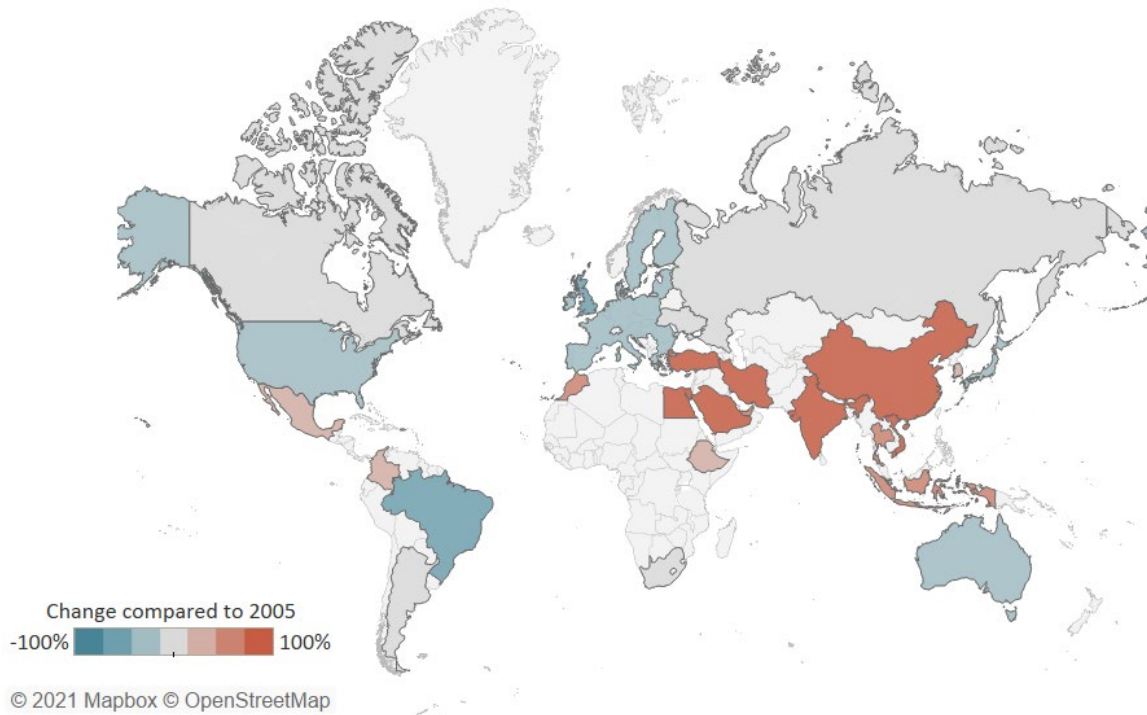


Figure 1: 2030 emissions under current policies, including the effect of COVID-19, compared to 2005 levels. The sector coverage for GHG emissions is consistent with the NDC targets.

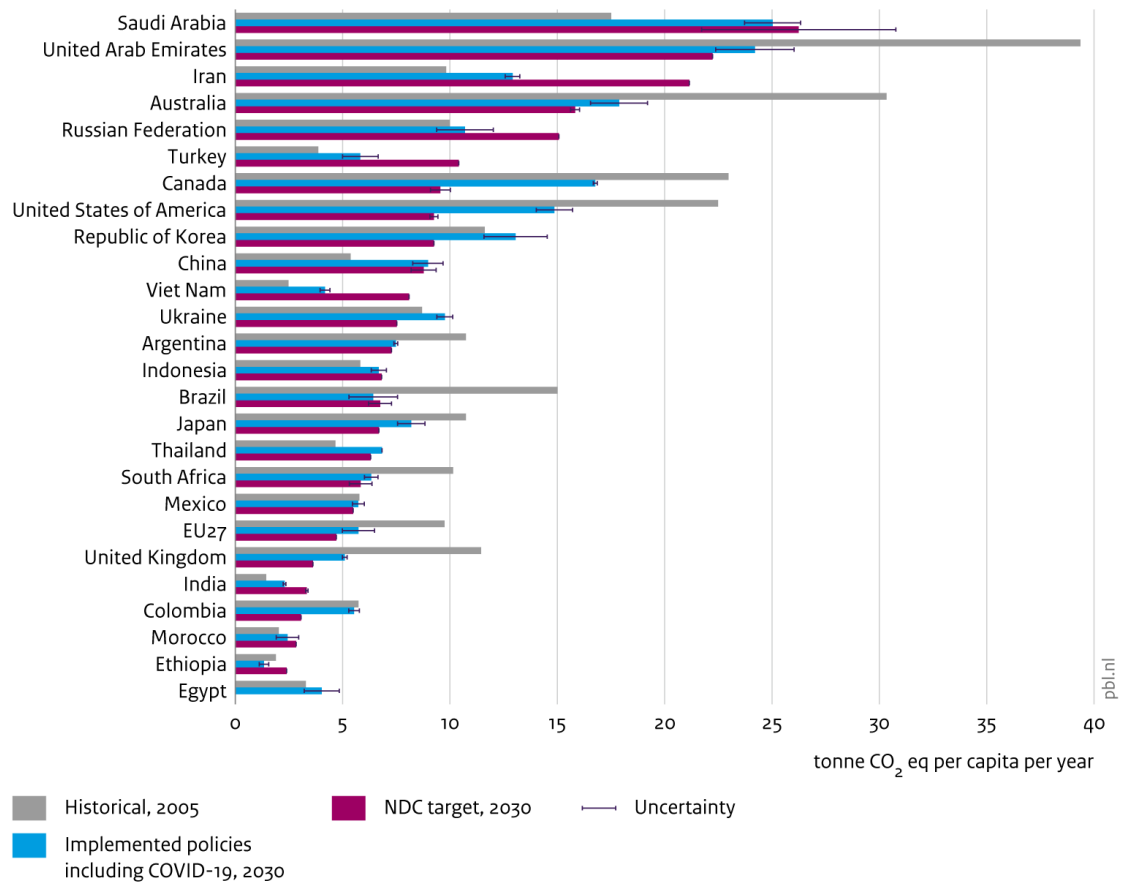


Figure 2: Per capita GHG emissions in 2030 under current policies (adopted up until November 2020) and NDC scenarios, sorted by NDC values and compared to 2005 levels. The NDC target figures refer to unconditional target.

NDC updates affect progress towards emissions targets and only ten countries are on track to meet their current targets

Several countries analysed updated their NDCs between 2020 and 2021 (Table 1). A country that was off-track to meet their original NDC target will be further off-track once it has set itself a more ambitious target, though full implementation of current policies and possible enhanced policies should close this gap over time. Our analysis indicates that further action is required in several major emitters analysed.

Out of the 26 countries analysed, sixteen are on track or close to meet their previous NDCs

Eight of these sixteen countries have used this update round to submit more ambitious NDCs. Argentina, the EU27, Morocco, South Africa, Ukraine and Viet Nam are on track to meet the previous targets and have submitted targets that lead to overall lower emissions in 2030. China and Japan have proposed more ambitious targets but are still to submit them to the UNFCCC.

The remaining eight countries, that are on track or close to meet their previous targets, have not yet submitted targets that lead to lower 2030 emissions. The Russian Federation and Indonesia are both on track to meet their original targets but submitted an update that led to absolute emissions levels within the range of the previous one. Brazil and Mexico are close to meet their previous targets and have updated the reference to their NDC targets, which results in higher emissions in 2030. India, Iran, Saudi Arabia and Turkey are on track to meet their targets and are still to submit updated NDCs.

Out of the 26 countries analysed, ten are on track to meet their updated NDCs, eleven are off-track and five are still to submit updated NDCs

Ten countries are on track to meet their NDCs targets. Emissions under currently implemented policies in Brazil, China, Ethiopia, Indonesia, Morocco, Russian Federation, South Africa, Viet Nam are below NDC targets levels in 2030.

Brazil is now on track to meet its unconditional NDC target as a result of the revision of its NDC reference, but significant uncertainty about its land use emissions remains. Morocco was off track in our previous analysis (Kuramochi et al., 2019). However, a downwards revision on its emissions inventory in combination with the effect of COVID-19 and consideration of additional policies in the emissions quantification has put the country under way to meet both its previous and current NDC targets. Argentina and Mexico are very close to meet their NDC targets, especially because of the effect of the pandemic on GHG emissions.

Eleven countries look set to miss their NDC targets: Australia, Canada, Colombia, the EU27, Japan, Republic of Korea, Thailand, Ukraine, the UAE, the UK and the USA.

In some countries, missing the NDC target is a result of increased ambition. This is the case for Japan, the EU27 and Ukraine. These countries are on track to meet their previous targets but would miss their update NDCs since they lead to lower emissions in comparison to the previous one. The remaining countries are expected to miss both their previous and current NDC. They require considerably more stringent policies to meet their self-determined targets.

Five countries have yet to submit updated NDCs. India, Iran, Saudi Arabia and Turkey are on track to meet their original targets and could enhance their NDCs without implementation of additional policies. Egypt has not yet submitted an updated NDC and the current NDC does not present any quantifiable target.

Table 1: Progress towards meeting previous and current unconditional NDC targets in comparison to the ambition progression of NDC updates (as of September 2021). 'N/A' indicates that no target is available.

| | Updated NDC | | On track to meet previous NDC | On track to meet updated NDC |
|----------------------|-------------|---|-------------------------------|------------------------------|
| Argentina | Yes | Submitted target leads to lower 2030 emissions | ✓ | Close |
| Australia | Yes | Submitted target leads to same 2030 emissions | ✗ | ✗ |
| Brazil | Yes | Submitted target leads to higher 2030 emissions | Close | ✓ |
| Canada | Yes | Submitted target leads to lower 2030 emissions | ✗ | ✗ |
| China * | No | Proposed target leads to lower 2030 emissions | ✓ | ✓ |
| Colombia | Yes | Submitted target leads to lower 2030 emissions | ✗ | ✗ |
| Egypt ** | No | N/A | N/A | N/A |
| Ethiopia *** | Yes | Submitted target leads to lower 2030 emissions | ✗ | ✓ |
| EU27 | Yes | Submitted target leads to lower 2030 emissions | ✓ | ✗ |
| India | No | N/A | ✓ | N/A |
| Indonesia | Yes | Submitted target leads to same 2030 emissions | ✓ | ✓ |
| Iran | No | N/A | ✓ | N/A |
| Japan * | Yes | Proposed target leads to lower 2030 emissions | ✓ | ✗ |
| Mexico | Yes | Submitted target leads to higher 2030 emissions | Close | Close |
| Morocco | Yes | Submitted target leads to lower 2030 emissions | ✓ | ✓ |
| Republic of Korea * | Yes | Proposed target leads to lower 2030 emissions | ✗ | ✗ |
| Russian Federation | Yes | Submitted target leads to similar 2030 emissions | ✓ | ✓ |
| Saudi Arabia | No | N/A | ✓ | N/A |
| South Africa | Yes | Submitted target leads to lower 2030 emissions | ✓ | ✓ |
| Thailand | Yes | Submitted target leads to same 2030 emissions | ✗ | ✗ |
| Turkey | No | N/A | ✓ | N/A |
| Ukraine | Yes | Submitted target leads to lower 2030 emissions | ✓ | ✗ |
| United Arab Emirates | Yes | Submitted emissions target for the first time | N/A | ✗ |
| United Kingdom | Yes | Submitted target leads to lower 2030 emissions | N/A | ✗ |
| USA | Yes | Submitted target leads to lower 2030 emissions | ✗ | ✗ |
| Viet Nam | Yes | Submitted target leads to lower 2030 emissions | ✓ | ✓ |

* These countries have proposed updated 2030 GHG targets. Even though the new 2030 targets have not been submitted to the UNFCCC, we consider them the current national target.

** Egypt's NDC does not present a quantifiable target.

*** Ethiopia remains off-track to meet its conditional target but has now submitted an unconditional target, which the country is on track to meet.

COVID-19 emissions impact

The COVID-19 pandemic presents an enormous global challenge, with ramifications way beyond public health. The short-term reduction of energy-related activities and the economic downturn impact current climate mitigation efforts and future GHG emissions pathways (Climate Action Tracker, 2020a; Dafnomilis et al., 2020).

The pandemic's effect on GHG emissions is significant in the short term. It induced a drop in energy-related CO₂ emissions of approximately 7% (range: 6% to 13%) in 2020 (Friedlingstein et al., 2020; Le Quéré et al., 2020). However, more recent analyses indicate that energy-related CO₂ emissions are almost back to pre-pandemic levels (IEA, 2021a, 2021b). The short-term effect of the pandemic on land use emissions is more unclear and the outcomes vary due to differences in national circumstances (Amador-Jiménez et al., 2020; FAO, 2020a; López-Feldman et al., 2020; Rondeau et al., 2020; Vale et al., 2021). As of August 2021, there are no comprehensive emissions statistics available that indicate the change in land-use emissions in 2020.

The effect of COVID-19 on emissions up to 2030 is very uncertain. First, the depth and duration of restrictive measures and respective short-term economic effects have not fully played out. Second, future emissions will be largely affected by the extent to which low-carbon measures are integrated in economic responses (Climate Action Tracker, 2020c; Kuramochi et al., 2020, 2021; Moisisio et al., 2020).

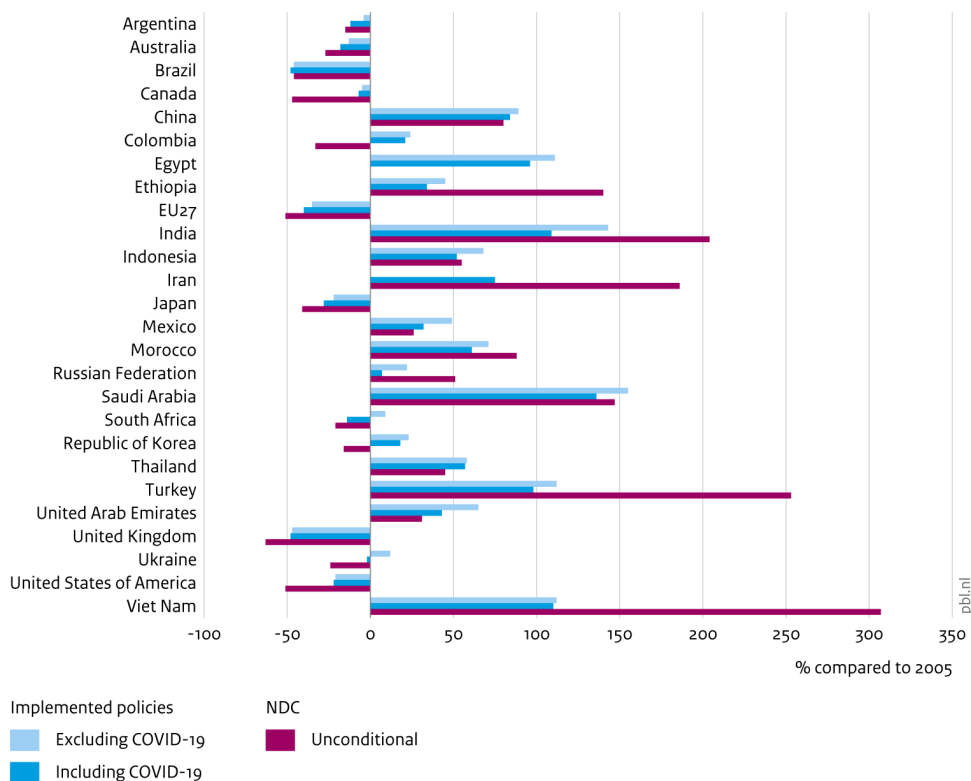
In this report we explore the effect of the pandemic on the timeframe towards 2030 (). We evaluate scenarios excluding and including COVID-19 to assess whether it has implications for the countries analysed in terms of their ability to meet NDC targets. The 'excluding COVID-19' scenario includes all policies implemented before the cut-off date of this report but does not account for the effect of the pandemic on the GDP or activity levels. The effect of the pandemic is considered in the 'including COVID-19' scenario. This scenario includes the 2020 drop and the long-term macroeconomic impact but does not consider the effect of recovery measures – especially those implemented after the cut-off date of this report. We compare emissions using a base year to allow for comparison of trends across countries. We also present individual country projections in the main report.

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In this report we explore the effect of the pandemic on the timeframe towards 2030 (Figure 3). We evaluate scenarios excluding and including COVID-19 to assess whether it has implications for the countries analysed in terms of their ability to meet NDC targets. The 'excluding COVID-19' scenario includes all policies implemented before the cut-off date of this report but does not account for the effect of the pandemic on the GDP or activity levels. The effect of the pandemic is considered in the 'including COVID-19' scenario. This scenario includes the 2020 drop and the long-term macroeconomic impact but does not consider the effect of recovery measures – especially those implemented after the cut-off date of this report. We compare emissions using a base year to allow for comparison of trends across countries. We also present individual country projections in the main report.

COVID-19 is projected to result in 2030 emissions estimates (including LULUCF) that are 7% lower (median estimate with a 10th to 90th percentile range of 1% to 12%) than projections excluding COVID-19. Emissions projections for China and Thailand are very similar to projections excluding COVID-19 in 2030. However, in all other countries, the pandemic is projected to result in lower 2030 emissions. Despite this effect, emissions in two thirds of the countries analysed are projected to remain above 2005 levels.

Impact of implemented policies on greenhouse gas emissions in major emitting countries, 2005 – 2030



Source: PBL FAIR/TIMER model; NewClimate Institute calculations

Figure 3: 2030 emissions projections (incl. LULUCF) compared to 2005 levels. Negative values represent emissions below 2005. The 'excluding COVID-19' scenario shows the result of quantification based on recently implemented policies alone. The 'including COVID-19' scenario shows the combined effect of these policies and the economic downturn resulting from the COVID-19 pandemic. Chart based on average for clarity. Scenario projections 'excluding COVID-19' are not presented for Iran (uncertainty on future economic growth related to economic sanctions). Egypt does not have a quantifiable NDC.

The effect of COVID-19 is expected to lower emissions and bring countries closer to their NDC targets. However, countries that have insufficient policies to meet their NDCs remain off track to meet their targets, once COVID-19 is considered. Only Indonesia is now on track to meet its NDC target due to emissions reductions resulting from the pandemic. The effect of rescue and recovery measures is not fully reflected in our estimates since the cut-off date of our projections limits their inclusion. Whether the pandemic recovery will trigger sufficient new and additional policies to set countries on track to meet their self-determined targets therefore remains unclear.

Uncertainty in the emissions projections

GHG emissions projections are inherently uncertain since future political and economic circumstances are often difficult to evaluate. These are compounded by methodological differences across countries on the treatment of some sectors. In this report, we highlight that:

- The Biden administration has brought the USA back into international climate negotiations. New national policies will probably reverse many rollbacks adopted by the Trump administration. The updated NDC proposes cuts of 50-52% below 2005 by 2030. The proposed American Jobs Plan aims to invest more than USD 2 trillion in infrastructure until 2030 – a large part of the plan

targets low-carbon infrastructure and RD&D. The effect of these latest developments is not yet reflected in our projections.

- China and India have pledges indexed to economic growth, implying that the absolute emissions levels under their targets are highly uncertain. Emissions projections of other fast-growing economies are also uncertain due to economic growth expectations, especially considering the ongoing pandemic.
- Emissions from land use, land-use change, and forestry (LULUCF) strongly influence total emissions projections. This is especially the case for countries with high share of LULUCF emissions, such as Argentina, Brazil, Colombia, Ethiopia and Indonesia.

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