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Analysis of the impact and ambition of the new NDCs for 2035: Paris climate goal is further out of reach

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Research Article

Keywords: Climate change mitigation, Climate policy, NDC, greenhouse gas emissions scenario, Paris Agreement, Integrated Assessment Models

Posted Date: May 21st, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9464868/v1

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Analysis of the impact and ambition of the new NDCs for 2035: Paris climate goal is further out of reach

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Abstract. In 2025, almost 130 countries submitted new national climate plans, known as nationally determined contributions (NDCs), outlining mitigation targets for 2035. This study evaluates their impact on emissions for all countries and assesses their ambition levels, with a main focus on the G20 economies. Full implementation of unconditional and conditional NDCs would reduce projected median global greenhouse gas emissions in 2035 by approximately 7% and 11% respectively, compared to 2019 levels—still falling short of the reductions needed to align with below 2°C and 1.5°C pathways. Among the G20, four economies—Australia, the EU, Japan, and the United Kingdom—have set new NDC targets on a linear path to net-zero emissions. In contrast, Brazil, Canada, the Russian Federation, and South Africa have NDCs misaligned with their net-zero targets. For the remaining G20 economies that have yet to peak—China, Indonesia, Mexico, the Republic of Korea, and Türkiye—transitioning to net-zero emissions must occur within 15 to 35 years, a timeline significantly shorter than the 37 to over 60 years required by those that have already peaked, underscoring the urgency for rapid decarbonization after 2035. Lastly, the majority of G20 economies do not meet 2035 reduction targets derived from Paris-aligned equity-based effort-sharing approaches.

Key words: Climate change mitigation, Climate policy, NDC, greenhouse gas emissions scenario; Paris Agreement, Integrated Assessment Models

1 Acknowledgements

This work was supported by the H2020 European Institute of Innovation and Technology (grant agreement no. 101056873 (ELEVATE)). Takeshi Kuramochi acknowledges support from Tara Climate Foundation (grant no. G202501-02242).

2 Author contributions

All authors contributed to parts of the research and analysis. Michel den Elzen and Elena Hooijschuur conceived the study, and performed the analysis and generated the figures. Michel den Elzen wrote the first draft of the manuscript. All authors contributed to the

writing of the manuscript. All authors read and approved the final manuscript. Elena Hooijschuur collected the NDCs and data. Arthur Beusen and Michel den Elzen developed the PBL Climate Pledge NDC tool.

2.1 Funding

This work was supported by the European Union's Horizon 2020 research and innovation programme (grant agreement no. 101056873: ELEVATE). The authors declare they have no financial interests that are directly or indirectly related to the work submitted for publication.

2.2 Declarations

Ethics approval and consent to participate Not applicable. This study did not involve human participants or animals.

Consent for publication Not applicable. This manuscript does not contain any individual person's data in any form.

Competing interests. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data reported in the Figures can be found in the Source Data. The spreadsheet about the NDC status associated with the NDC analysis about the underlying data about the main characteristics for all countries, can be found as Supplementary Information of this paper (spreadsheet NDC status). The Climate Pledge NDC tool showing emissions per country resulting from the current policies and new NDC targets, is also available as Supplementary Information (spreadsheet NDC analysis). The equity outcomes of the Carbon Budget explorer is available at: https://www.carbonbudgetexplorer.eu/.

Abstract. In 2025, almost 130 countries submitted new national climate plans, known as nationally determined contributions (NDCs), outlining mitigation targets for 2035. This study evaluates their impact on emissions for all countries and assesses their ambition levels, with a main focus on the G20 economies. Full implementation of unconditional and conditional NDCs would reduce projected median global greenhouse gas emissions in 2035 by approximately 7% and 11% respectively, compared to 2019 levels—still falling short of the reductions needed to align with below 2°C and 1.5°C pathways. Among the G20, four economies—Australia, the EU, Japan, and the United Kingdom—have set new NDC targets on a linear path to net-zero emissions. In contrast, Brazil, Canada, the Russian Federation, and South Africa have NDCs misaligned with their net-zero targets. For the remaining G20 economies that have yet to peak—China, Indonesia, Mexico, the Republic of Korea, and Türkiye—transitioning to net-zero emissions must occur within 15 to 35 years, a timeline significantly shorter than the 37 to over 60 years required by those that have already peaked, underscoring the urgency for rapid decarbonization after 2035. Lastly, the majority of G20 economies do not meet 2035 reduction targets derived from Paris-aligned equity-based effort-sharing approaches.

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3 Introduction

A key element of the Paris Agreement is the Nationally Determined Contributions (NDCs), in which nations commit to ten-year climate action targets (UNFCCC, 2026). These commitments ought to be in line with the Paris Agreement (UNFCCC, 2015) notion of "common but differentiated obligations and distinct capabilities" taking into account the particular circumstances of each country. The Paris Agreement encourages countries to set ambitious targets, reflecting their highest possible efforts to meet the global climate goal to keep the increase in global temperatures well below 2°C, while pursuing efforts to limit the increase to 1.5°C. The Global Stocktake (GST) is a process established under the Paris Agreement that systematically collects, assesses, and synthesizes the status of global climate policy, with a particular focus on collaborative efforts to achieve the long-term temperature targets. The outcome of the first GST, in 2023, encourages Parties to align their NDCs with 1.5°C, “as informed by science, in the light of different national circumstances.” It also notes the importance of aligning them with long-term, low-emissions development strategies, which in turn are to be “towards just transitions to net-zero emissions.” Every five years, three years before the GST, countries are asked to submit and raise the ambition of their NDCs. As the next GST is planned for 2028, by 2025 countries needed to submit updated NDCs setting emission reduction targets for 2035, ideally alongside strengthened targets for 2030.

As of end of March 2026, 130 countries (104 Parties[1]) accounting for about 70% of global emissions[2] had submitted new NDCs containing greenhouse gas mitigation targets for 2035 (UNFCCC, 2025b, 2026). Only approximately 15 countries, which collectively contribute to about 1% of global emissions, have strengthened their 2030 targets in the recent submissions (ClimateWatch, 2026). Thirteen G20 members[3] have submitted a new NDC (Table 1), but none of them has formally updated its 2030 NDC target. The "new NDCs" refers to NDCs included in the UNFCCC's NDC 3.0 list (UNFCCC, 2025b, 2026). The term "most recent NDCs" encompasses the active NDCs in the UNFCCC registry of each party to the Paris Agreement, irrespective of a "new" NDC. Currently, 180 Parties have active NDCs, counting the European Union and its member states as one because they submit a common NDC (UNFCCC, 2026).

This study analyses the emissions impact and ambition of the mitigation targets for 2035 of the new NDCs, as the mitigation targets for 2030 for most of them have not changed. We focus on two fundamental questions concerning the ambition of efforts to reach the goals set by the Paris Agreement. First, there is the critical issue of whether the collective efforts of countries are ambitious enough to meet the global climate goal of the Paris Agreement (Climate Action Tracker, 2025b; Talberg et al., 2026; UNEP, 2025).

Second, there is the question of whether the proposals by individual countries to reduce greenhouse gas emissions after 2020 are ambitious in terms of equity, given the differences in national circumstances (e.g., Höhne et al., 2018). These issues are particularly important, as the Paris Agreement calls for regular reviews of national contributions, with the expectation that countries will raise their ambition over time, respecting common but differentiated responsibilities. While both issues have already been discussed in the literature, so far there are no studies that have analysed the ambition of the new NDCs for the G20 economies based on different approaches. This study offers a comprehensive assessment of the ambition of new NDCs of the G20 economies by evaluating: (i) their alignment with net-zero targets through a comparison with linear pathways to net-zero, (ii) their alignment with the 1.5°C pathway through a comparison with globally least-cost 1.5°C and 2°C scenarios, and (iii) their alignment with 1.5°C pathway through a comparison with 1.5°C and 2°C scenarios based on equity principles. We focus on the G20 economies[4] and address the following research questions: (i) What are the emission projections for new NDC submissions both nationally[5] and globally? (ii) Will the fully implemented new NDCs

[1] Including the European Union 27. In the analysis, we consider the European Union and its 27 individual Member States as one member.
[2] Based on country-reported GHG emissions from PRIMAP-hist dataset version 2.7 (Gütschow et al., 2025)
[3] Noting that France, Germany and Italy are only assessed as part of the European Union.
[4] The G20 includes the African Union, but as the African Union has neither a collective NDC nor a net-zero target, this study does not include commitments by the African Union as a whole.
[5] An analyses for all countries are provided in the Supplementary Information.

sufficiently reduce global emissions to meet the Paris Agreement climate goals? (iii) How ambitious are the new NDCs according to various independent criteria?

4 Methods to quantify the emissions impact of new NDCs

Based on the new NDC submissions, this study presents GHG emissions projections in CO_2 equivalent terms[6], including Land Use, Land Use Change and Forestry (LULUCF) emissions.[7] In this section, we outline the methodology employed to analyse the 2035 NDC targets of all countries, with Table 1 focussing on the G20 economies and Supplementary Information[8] covering all countries. The methodology consists of two elements: i) quantifying NDCs on a country level, and ii) assessing the global impact by aggregating the quantified NDCs with other global emissions.

[6] GHG emissions are expressed using the 100-year global warming potentials (GWPs) from the Sixth Assessment Report (AR6) of the Intergovernmental Panel on Climate Change (IPCC). Country-level emissions include territorial emissions unless stated otherwise.

[7] The analysis of the contribution of the land use accounting rules is being described in Supplementary Text 5.

[8] The Supplementary information (spreadsheet) provides an overview detailing various aspects of all countries' NDCs associated with the NDC analysis including the underlying data about the main characteristics for all countries. These includes their emission reduction targets, base years, emission levels during those base years, emission levels from business-as-usual (BAU) projections, targeted emission levels, and the accounting approaches and methodologies that countries will use to account for land use, land-use change, and forestry (LULUCF).

Table 1 Summary of greenhouse gas mitigation pledges for 2030 and 2035 from previous and new NDCs by G20 economies (excluding EU Member States), as of 30 March 2026 (ClimateWatch, 2026; UNFCCC, 2026).

G20 member	2030 target	2035 target
Argentina	Cap 2030 net emissions at 349 $MtCO_2eq$ (unconditional)	No new NDC submitted, or mitigation pledge announced by the cut-off date
Australia	Reduce GHG emissions by 43 per cent from 2005 levels by 2030	Reduce GHG emissions by 62–70 per cent from 2005 levels by 2035
Brazil	Reduce net GHG emissions by 53 per cent from 2005 levels by 2030	Reduction in the net range of 59–67 per cent compared to 2005 emissions by 2035
Canada [a)]	Reduce GHG emissions by 40–45 per cent from 2005 levels by 2030	Reduce GHG emissions by 45–50 per cent from 2005 levels by 2035
China	Peak CO_2 emissions before 2030 Reduce CO_2/GDP by 65 per cent from 2005 levels by 2030 Increase share of non-fossil fuels in primary energy consumption to around 25 per cent in 2030 Increase forest stock volume by around 6 billion cubic meters in 2030 Increase the installed capacity of wind and solar power to 1,200 GW by 2030	By 2035, reduce economy-wide net greenhouse gas emissions by 7–10 per cent from peak levels, striving to do better; Increase the share of non-fossil fuels in total energy consumption to over 30 per cent; Expand the installed capacity of wind and solar power to over six times the 2020 levels, striving to bring the total to 3,600 gigawatts; Scale up the total forest stock volume to over 24 billion cubic meters
European Union [b)]	Reduce net GHG emissions by at least 55 per cent from 1990 levels by 2030	Reduce net GHG emissions by 66.25–72.5 per cent from 1990 levels by 2035
India	Reduce GHG/GDP by 45 per cent from 2005 levels by 2030 Increase in the share of non-fossil energy in total power capacity to around 40 per cent by 2030 (conditional, depending on finance) Increase the carbon sink volume with 2.5 to 3 $GtCO_2eq$	Announced mitigation pledge: Reduce GHG/GDP by 47 per cent from 2005 levels by 2035 Increase in the share of non-fossil energy in installed power capacity to around 60 per cent by 2035 (conditional, depending on finance) Increase the carbon sink volume up to 4 $GtCO_2e$ from 2005 levels
Indonesia	Reduce GHG emissions by 32 per cent (unconditional) and 43 per cent (conditional) relative to BAU by 2030	Reduce GHG emissions to 1787 $MtCO_2eq$ by 2035 (unconditional) or 1258-1489 $MtCO_2eq$ by 2035 (conditional) [c)]
Japan [d)]	Reduce GHG emissions by 46 per cent from 2013 levels by 2030	Reduce GHG emissions by 60 per cent from 2013 levels by 2035
Mexico	Reduce GHG emissions by 35 per cent (unconditional) and 40 per cent (conditional) from BAU by 2030	Net absolute emissions in the range of 404–364 $MtCO_2eq$ in 2035 (unconditional). Net absolute emissions in the range of 363 to 332 $MtCO_2eq$ in 2035 (conditional).
Republic of Korea	Reduce GHG emissions by 40 per cent from 2018 levels by 2030	Reduce GHG emissions by 53–61 per cent from 2018 levels by 2035
Russian Federation	Limit GHG emissions to 70 per cent of 1990 level by 2030	Reduce GHG emissions to 65–67 per cent of 1990 levels by 2035
South Africa	Limit 2030 emissions to 350–420 $MtCO_2eq$	Limit 2030 emissions to 320–380 $MtCO_2eq$ by 2035
Saudi Arabia	Reduce emissions by 278 $MtCO_2eq$ annually by 2030, with 2019 as the base year	The new NDC included only a target for 2040, not 2035.[e)]
Türkiye	41 per cent reduction in GHG emissions from the BAU level by 2030	Reduce GHG emissions to 643 $MtCO_2eq$ by 2035

United Kingdom	Reduce GHG emissions by at least 68 per cent from 1990 levels by 2030	Reduce GHG emissions by at least 81 per cent from 1990 levels by 2035
United States of America [f)]	No active NDC under the UNFCCC	No active NDC under the UNFCCC

Notes: (i) "Net" greenhouse gas emissions refer to total greenhouse gases emissions minus the quantity of GHGs removed or offset. (ii) The African Union is not listed as it does not have a collective mitigation target.
a) Canada does not account for the LULUCF sector in the base year emissions, but additional reductions in this sector are considered in achieving the targeted emission level.
b) The EU has also set an economy-wide net emissions reduction target of 90 per cent below 1990 levels by 2040 compared to 1990, including an adequate contribution of high-quality international credits under Article 6 of the Paris Agreement. The higher end of the reduction range of the NDC is linked to the EU's proposed target of cutting emissions by 90 per cent below 1990 levels by 2040.
c) Under the Low Carbon scenario in the Second National Communication of Indonesia, Indonesia is expected to achieve its peak emissions by 2030, with estimated emission levels of 1,346 $MtCO_2eq$ under the Low Carbon – Low scenario and 1,492 $MtCO_2eq$ under the Low Carbon – High scenario. Compared to the reference scenario, which projects emissions of 1,632 $MtCO_2eq$ in 2030 and 1787 $MtCO_2e$ in 2035, Indonesia's emissions are expected to be 8–17.5 per cent lower.
d) This country also communicated a 2040 target.
e) Aims to reduce emissions by 335 million tons of CO_2eq annually reached by 2040, on the basis of a dynamic baseline, with the year 2019 designated as the base year for this NDC.
f) The Biden Administration already published its new NDC back in December 2024, setting a 2035 target of reducing GHG emissions by 61–66 per cent below 2005 levels (Government of United States of America, 2024). The implication of the US withdrawal from the Paris Agreement is that since the withdrawal took effect (on January 27, 2026) (Government of United States of America, 2025), the NDC and the U.S.' long-term strategy of reaching net-zero GHG emissions by 2050 is no longer operative.

4.1 Quantifying NDCs on a country level

The analysis includes NDC emission targets for 2030 and 2035, provided that the new NDCs are submitted to the UNFCCC by the end of March 2026 (the cutoff date for NDC analysis for this study). By March 2026, the government of India announced its Nationally Determined Contributions (NDC), which is included in our analysis although it was not officially submitted yet.

For 2030, the quantification of NDC emission targets is based on the methodology by den Elzen et al. (2022; 2023). Some of the targets were updated, for instance when countries reported updated reference emission levels or 2030 targets in their new NDC. Additionally, 2030 emission estimates for China and India were updated to account for recent current policies emissions projection (Dafnomilis et al., 2025) based on the integrated assessment model IMAGE (Supplementary Text 1 and Text 2). If non-fossil targets are achieved historically or in the IMAGE baseline scenario (Van Vuuren et al., 2021), we assume that they do not lead to additional reductions relative to emissions levels resulting from the intensity targets.

For 2035, 74 countries reported emission levels directly in their new NDCs, 8 countries (including Australia, Canada, and the European Union) additionally required historical emissions data from national inventories (UNFCCC, 2025a), and for 23 countries (including China, India, Malaysia, Georgia and Bolivia) the information necessary to calculate economy-wide emission levels is not available, as for instance the business-as-usual (BAU)

or peak emissions levels are not specified (see Supplementary Information). Among the latter, calculations are only conducted for China and India. This means that emission levels in 2035 were either directly taken or estimated for 82 Parties (representing 73% of global emissions[9]) of 105 Parties (representing 76% of global emissions).

The mitigation components of the new NDCs represent several types of targets, which can be base-year targets, baseline scenario targets, fixed emissions level targets, intensity targets and trajectory targets (see Supplementary Information). Among the 82 NDCs considered in this study, 34 have 2035 targets formulated as reduction targets relative to a historical base year level. Moreover, 36 NDCs are formulated as a reduction target relative to BAU or baseline emissions scenario projections. This includes NDCs that report both a reduction compared to a base year or BAU emission level and a specified emission level. Nine countries formulate their targets as specified emission levels, such as Indonesia and Mexico. Finally, three countries formulate their 2035 targets in an alternative manner: Uzbekistan and India use emission intensity (GHG per unit of GDP) as their mitigation target, while China has a trajectory target.

More specifically, China defines its 2035 emissions target as a 7–10% reduction compared to an unspecified peak emission level. For our quantification, we assume that China's emissions peaked in 2024, at the level of about 200 $MtCO_2eq$ (Gütschow et al., 2025) above the 2023 emissions[10,11]. Furthermore, China's new NDC includes non-fossil fuel and renewable capacity targets (Table 1). However, these targets are already met in the IMAGE baseline scenario without any additional policies (Van Vuuren et al., 2021), and lead to emissions higher than the emissions calculated from China's reduction target. Therefore, in our analysis, they are not expected to result in further emission reductions. In its recently announced new NDC, India formulates emission intensity targets, non-fossil fuel power capacity targets, and a cumulative carbon sink target. The impact of the intensity target is assessed based on 2005 emissions and GDP levels, along with historical GDP projections from the World Bank (World Bank, 2024), and the IMF World Economic Outlook (IMF, 2023), supplemented with the GDP growth projections underlying the SSP2 Shared Socio-economic Pathway (Van Vuuren et al., 2021) from 2025 onwards. The non-fossil fuel electricity capacity target is already met in the IMAGE baseline scenario without additional policies, which projects India's non-fossil capacity to reach 66% by 2035 under higher emission levels than those resulting from its intensity target. Therefore, we assume that this capacity target does not lead to further emission reductions. The cumulative carbon sink

[9] Including LULUCF.
[10] Emissions including land-use based on the country-reported data until 2023 as collected in Dafnomilis et al. (2025).
[11] For the uncertainty range, we use the 2035 emissions range of the UNEP (2025), which was estimated based on the peak emission levels from the seven current policies scenarios reviewed, multiplied by the reduction rates.

from LULUCF is also already close to being met based on India's inventory data (Dafnomilis et al., 2025).

Supplementary Information details how we quantified countries' emission levels for all included new NDCs and the respective 2035 targets. Supplementary Text 3 shows the 2030 and 2035 emissions levels resulting from the full implementation of the new NDCs for the G20 economies.

4.2 Assessing the global impact of new NDCs

For estimating global GHG emissions, the quantified NDC emission levels are first compared to the harmonised current policies scenario[12] (Dafnomilis et al., (2025). If already under current policies countries overachieve their NDC target (in 2030 or 2035), emission levels from the current policies scenario are applied. Subsequently, global emissions projections for the NDC are calculated by adding (i) emissions from international aviation and international shipping on the stated policies scenario of International Energy Agency (IEA, 2025), and (ii) remaining LULUCF emissions (emissions and removals related to the land use, land use change and forestry sector, such as afforestation and reforestation) for the countries that submitted an NDC excluding LULUCF emissions, which is about 0.6 $GtCO_2eq$ by 2035. For 2030, these LULUCF emissions are based on Forsell et al. (2024). For 2035, they are based on NDCs themselves when included, and on 2030 levels when unavailable. The projected emissions from international aviation and international shipping amount to around 1.6 $GtCO_2eq$ by 2035 (IEA, 2025). For countries with no new NDC submission (and therefore no 2035 target), emissions remain at the same level of 2030. This is a conservative choice for most countries that have peaked or will peak by 2030, yet a more ambitious one for others. Nonetheless, it is the most transparent option until new NDCs are submitted.

Recent literature has highlighted significant differences in anthropogenic LULUCF estimates between the approach undertaken by countries in their reporting to the UNFCCC ('national inventory approach') and the global modelling approach ('bookkeeping approach') pioneered in the scientific community and used in the IPCC Assessment Reports (Grassi et al., 2023; Roman-Cuesta et al., 2025). In this study a harmonization procedure has been implemented, similar as the procedure of UNEP (2025), to ensure comparability between globally aggregated NDC estimates and integrated assessment model emission pathways consistent with keeping global warming below 2°C and 1.5°C.[13]

[12] Dafnomilis et al. (2025) presents a current policies scenario developed with the IMAGE model (Stehfest et al., 2014) (Supplementary Text 1) and a range of emission projections for current policies based on the IMAGE model and the Climate Action Tracker (2025a).

[13] For harmonizing LULUCF emissions, we consider the difference in 2023 global LULUCF net emissions: UNEP (2025) reports +3.5 $GtCO_2eq$ from bookkeeping data, while our calculations show -3.1 $GtCO_2eq$ in GHG inventories. For GHG

5 Three approaches for analysing the ambition of the new NDCs

In this section we outline three approaches to assess how strategies towards net-zero GHG emissions and the 1.5°C climate target are reflected in the new NDCs: (i) comparison with linear pathways to net-zero targets; (ii) comparison with least-cost 1.5°C and below 2°C pathways; and (iii) comparison with equity emission reduction targets aligned with the Paris Agreement goal.

The principle of common but differentiated responsibilities and respective capabilities acknowledges that national circumstances may lead to variations among countries in peaking and achieving net-zero emissions (UNEP, 2024). Both the Paris Agreement and its first GST outcome explicitly anticipate this variation, noting that peaking "will take longer for developing countries" and "may be influenced by sustainable development, needs and equity in line with different national circumstances." (UNEP, 2024). Therefore, whether a country is above or below the linear path might give some idea of ambition, but it should be noted that for some countries a fair emission pathway may still allow increasing emissions after 2035 (thus following a pathway that will only at a later point of time start decreasing to the net-zero target). Similarly, following the least-cost pathway is not necessarily just. In fact, based on the common but differentiated responsibilities principle most low-income countries could be expected to follow an emission trajectory above the least-cost pathway. By definition, however, this means that high-income countries could be expected to be significantly below this pathway. In this context, this study provides a framework with multiple approaches, where we also evaluate ambition in light of equity.

5.1 Comparison with linear pathways to net-zero targets, i.e. the alignment with net-zero targets

Under the Paris Agreement, countries agreed to achieve global net zero greenhouse gas emissions "in the second half of this century." As of the end of March 2026, 107 countries (about 72% of global emissions) have committed to reaching net-zero emissions by mid-century. The new NDCs set emissions targets for 2035, which are crucial for aligning short-term actions with long-term objectives, serving as a midpoint between when most countries began implementing their NDCs in 2020 and their pledged net-zero years. In this first approach, we compare the 2035 emissions levels from the new NDCs with a linear path between 2030 emission levels from the NDCs and the net-zero targets. The net-zero targets and their characteristics, such as coverage of GHGs, were provided by the assessment of net-zero targets of the net zero tracker (Lang et al., 2025). For countries with unspecified GHG coverage (such as China, India, and Indonesia), we calculated two scenarios: a 'low'

emissions excluding LULUCF, we use the discrepancy between country-reported and independent emissions from PRIMAP version 2.7. We also account for the expected impact of the CO_2 fertilisation effect on the future strength of the land sink, based on Gidden et al. (2023).

scenario, where we assume net-zero GHG emissions, and a 'high' scenario, where the net-zero target covers only CO_2. For the 'high' scenario, the remaining non-CO_2 emissions are quantified using the most recent historical share from PRIMAP (Gütschow et al., 2025), applied to the GHG emission levels resulting from the new NDCs. Finally, we calculate the annual decarbonization rate required, concentrating on the rate of change from 2019 to 2030/2035, as indicated by the new NDC targets, and from 2030/2035 to the net-zero year, to meet the net-zero targets.

5.2 Comparison with global least-cost 1.5°C and below 2°C scenarios

Least-cost scenarios are pathways that demonstrate how emission reductions to achieve a certain climate goal (e.g. 1.5°C and below 2°C) can be distributed over time, across regions, sectors and greenhouse gases, at the lowest possible costs globally. The IPCC AR6 (Riahi et al., 2022) establishes different climate categories: C1 (limit 2100 global warming to 1.5°C with at least 50% probability, with limited overshoot, and a likelihood of limiting peak global warming below 2°C of 90%), C2 (limit 2100 global warming to 1.5°C with at least 50% probability, with high overshoot, and a likelihood of limiting peak global warming below 2°C of 90%) and C3 (limit 2100 global peak warming below 2°C throughout the 21st century with at least 67% probability and a likelihood of limiting peak global warming below 2°C of 67%).

In this study, we use Hooijschuur et al. (2025), which selected least-cost 1.5°C and below 2°C scenarios from the IPCC AR6 scenario database (Byers et al., 2022), downscaled them from the regional to the national level and harmonised emissions with national inventory data. This methodology provides robust emissions projections of the median and 10^{th}–90^{th} percentile ranges for the six major emitting countries in the analysis: China, the European Union, India, Japan and the United States of America. For other G20 economies, C1 ranges are based on the 1.5°C national pathway explorer (Climate Analytics, 2025), and C3 ranges are based on the results of the integrated assessment models IMAGE and POLES, covering Australia, Brazil, Canada, Chile, Indonesia, Republic of Korea, Mexico, Russia, South Africa, Türkiye, Ukraine and the United Kingdom. These scenarios were based on Roelfsema et al. (2026) (IMAGE) and Keramidas et al. (2025) (POLES). They were subsequently harmonised with country reported data by correcting for the absolute difference between modelled data and country reported historical data in 2015. An important difference between the IPCC AR6 database scenarios and the scenarios by IMAGE and POLES is that the latter has mitigation starting in 2025, whereas the IPCC AR6 database scenarios start mitigation from historical emission levels in 2015/2020.

5.3 Comparison with equity emission reduction targets aligned with the Paris goals

Countries are requested to submit new NDCs that include targets for 2035 in alignment with the Paris Agreement and, therefore, the principle of common-but-differentiated-

responsibilities. This principle not only calls for increased ambition but also emphasizes the importance of considering equity. There are several ways to integrate equity into international climate policy, one of which involves countries adjusting their reduction targets. However, it is important to note that reduction targets based on equity principles depend on normative decisions and interpretations regarding the design of these principles, which need to be clearly articulated to transparently inform the political process (Dooley et al., 2021). Additionally, there may be differing perspectives on what is feasible in terms of implementing these equity-based targets.

A wide range of equity approaches has been developed in the literature (Climate Action Tracker, 2025a; Dekker et al., 2025b; Rajamani et al., 2021; Robiou du Pont et al., 2025; Robiou du Pont et al., 2017; van den Berg et al., 2020). Here, we use the Carbon Budget Explorer[14] by Dekker et al (2025a) to allocate global emissions and reduction targets to individual countries. We use equity principles to determine 'fair' ambition levels to achieving the 1.5°C and below 2°C pathways, while considering a wide range of assumptions and uncertainties. Our focus is on three equity principles frequently discussed in the literature: historical responsibility (e.g., those who emitted more in the past must now reduce more), capability (e.g., those with higher per capita income levels should reduce more), and equality (i.e., equal emission allowances per capita). For each of these three equity principles, specific allocation rules have been proposed. Dekker et al. (2025b) examined three distinct approaches: per capita convergence ('PCC'), income-based allocation (ability to pay or 'AP'), and allocation accounting for historical emissions (equal cumulative per capita distribution or 'ECPC'). For per capita convergence, Dekker et al. considered three convergence years for global emissions: 2040, 2050, and 2080. For the ECPC rule, different starting years are used to account for historical responsibility: 1850, 1950, and 1990. The calculations for potential targets assume mitigation efforts begin in 2021. Additionally, to address a range of socio-economic developments, Dekker et al. incorporated the five Shared Socio-economic Pathways (SSPs) projections as factors of uncertainty. Calculations were conducted for three climate categories: *1.5°C with limited overshoot* (C1) and *high-overshoot* (C2) and *below 2°C* (C3).

6 Impact of new NDCs on global and national emissions

6.1 Projected global GHG emission levels by 2030 and 2035 if all new NDCs are implemented

Global emissions are projected to peak by 2025 and reach approximately 4% and 7% below 2019 levels by 2030 if the unconditional and conditional new NDCs are fully implemented (Figure 1). In contrast, a 20% reduction (range: 9–31%) is needed for 2030 emissions to be

[14] The equity outcomes of the Carbon Budget explorer is available at: https://www.carbonbudgetexplorer.eu/.

aligned with the IPCC AR6 *below 2°C* pathways (C3) and a 44% reduction (range: 36–53%) for the IPCC AR6 *1.5°C with limited overshoot* (C1) pathways. The full implementation of unconditional and conditional new NDCs would reduce expected emissions in 2035 by about 8–9% and 11–12%, respectively, compared to 2019 levels. These pledged reductions are significantly smaller than the 33% (range: 27–43%) and 59% (range: 52–65%) reductions below 2019 levels by 2035 needed to align with the IPCC AR6 *below 2°C* (C3) and *1.5°C with limited overshoot* (C1) pathways, respectively. The new unconditional and conditional NDCs result in lower emission levels than what is projected in the current policies scenario: 4–5% and 7–8% lower than current policies in 2030, respectively, and 2% and 5% in 2035.

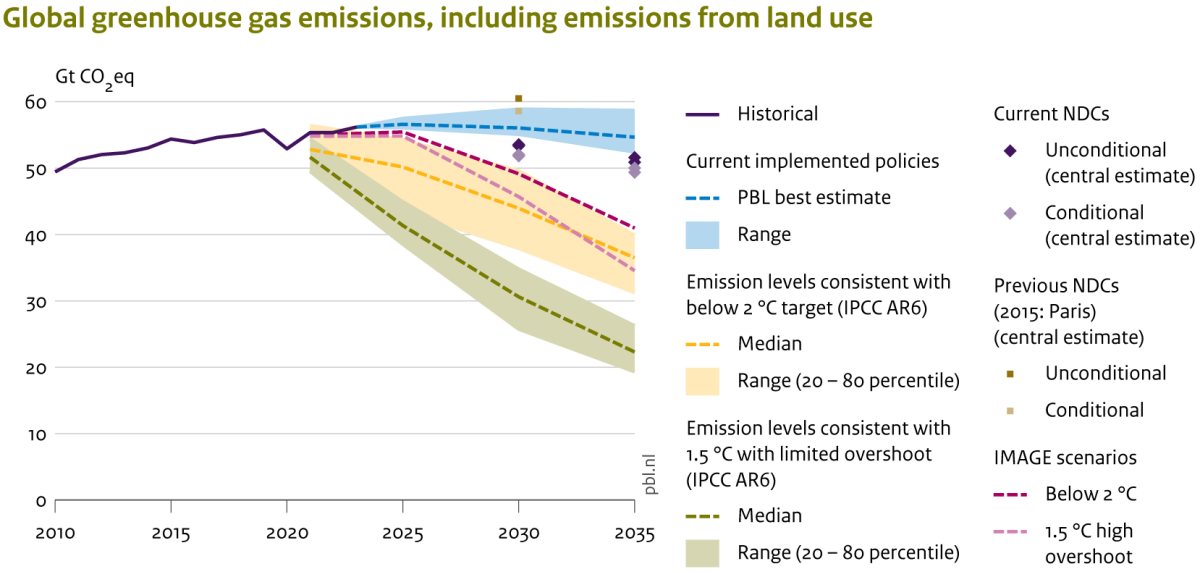


Figure 1. Impact of the implementation of the NDCs and current policies on greenhouse gas emission projections and on narrowing the emission gap in 2035. Source: Current policies scenarios (Dafnomilis et al., 2025), historical emissions from PRIMAP (Gütschow et al., 2025), 1.5°C and below 2°C scenarios from the IPCC AR6 scenario database (Byers et al., 2022) and the IMAGE model (Roelfsema et al., 2026).

The IPCC AR6 database scenarios, however, start emission reductions in 2020. When measured against updated scenarios from IMAGE where recent developments in emission trajectories are taken into account, and mitigation action starts in 2025, the reductions needed to align with IMAGE *below 2°C* (C3) and *1.5°C high overshoot* scenarios (C2) are 25% and 37% by 2035 respectively. Consequently, full implementation of the unconditional and conditional new NDCs results in an emissions gap of approximately 10 $GtCO_2eq$ and 8.5 $GtCO_2eq$ for the IMAGE *below 2°C* scenario (C3), and approximately 16 $GtCO_2eq$ and 15 $GtCO_2eq$ for the *IMAGE 1.5°C high overshoot* scenario (C2).

The total emission reduction in our estimation of the new NDCs is higher than the simple aggregation of NDCs due to the fact that our methodology favours current policies based

reductions for countries that are likely to overachieve their NDC targets (i.e. countries where current policies lead to more emission reductions than the submitted NDC target). The overachievement of the new unconditional and conditional NDCs results in approximately 6.0–6.8 $GtCO_2eq$ and 5.6–6.4 $GtCO_2eq$ lower global emissions projections by 2035, respectively. The majority of the overachievement comes from China, India, the Russian Federation and Saudi Arabia (see Figure 3, Section 4.3). The remaining comes from the non-G20 economies without a new NDC, particularly Iran and Pakistan.

The global GHG emissions reduction resulting from the full implementation of all conditional and unconditional new NDCs is about 2.2 $GtCO_2eq$ (range: 1.9–2.5 $GtCO_2eq$) and 2.2 $GtCO_2eq$ (range: 2.0–2.5 $GtCO_2eq$) by 2035 respectively, below 2030 emissions level of the respective NDC scenarios (Figure 1).

6.2 Impact of new NDCs on emissions for the G20 economies compared with 2030 levels

This section analyses how the new or updated NDCs affect national emission projections for the G20 economies for 2035, compared with estimated 2030 emissions levels from the NDC submissions (Figure 2, see also Supplementarty Text 3).[15] For all fourteen G20 economies with new NDC submissions, the total aggregated emission reduction from the full implementation of the unconditional NDC targets in 2035 are estimated to be about 2.6 $GtCO_2eq$ (range: [2.1–3.2] $GtCO_2eq$) below 2030 levels (bottom panel of Figure 2). The conditional NDC targets show about the same reduction. The largest contributor to the emission reductions from 2030 is the EU (about 25%), China (about 15%), followed by Mexico. India's announced NDC is the only one leading to an increase emissions compared to 2030 levels.

If all the G20 members are considered collectively, total G20 emissions in 2035 are estimated to be approximately 2.8 $GtCO_2eq$ (range: [2.2–3.6] $GtCO_2eq$) below 2030 levels. The emissions of the G20 economies without updated NDCs (Saudi Arabia, and Argentina) are assumed to remain constant at 2030 NDC levels through 2035. Meanwhile, the United States of America is projected to continue decreasing its emissions up to 2035 compared to 2030 levels, although the decline is much slower due to the cancellation of climate policies by the Trump Administration. The additional impact on the G20 economies compared to those with updated NDCs is primarily the additional reduction from the US.

The reductions for the G20 aggregate emissions are similar to the total reductions found for the global emissions, suggesting that non-G20 economies' new NDCs do not lead to further reduction below 2030 levels. The total aggregated emissions for the non-G20 economies

[15] The other Supplementary information (spreadsheet) shows the projected emissions per country resulting from the current policies and new NDC targets (spreadsheet NDC analysis).

with new unconditional and conditional NDCs show a limited additional reduction of only 0.2 $GtCO_2eq$ and 0.1 $GtCO_2eq$ compared to 2030 levels. The remaining non-G20 emissions and also the international bunker emissions both show a minor increase relative to their 2030 emissions.

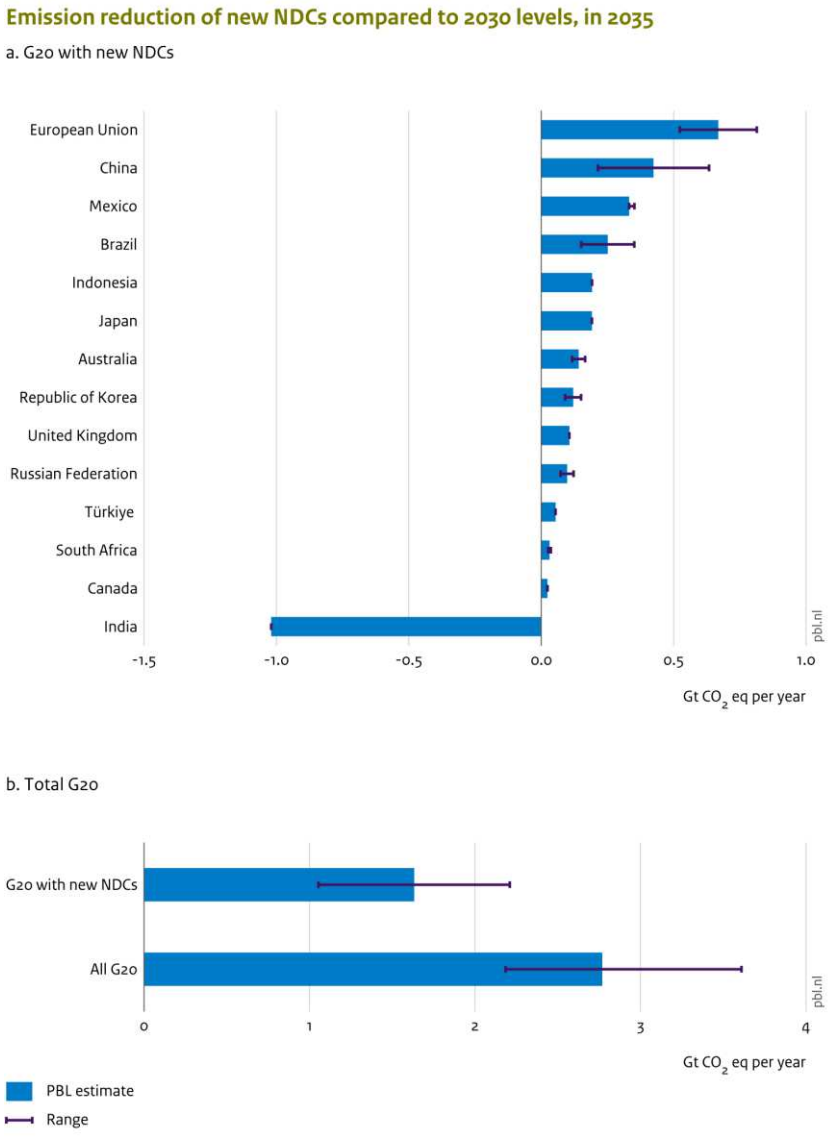


Figure 2. Emission reductions in 2035 implied by the new unconditional NDCs of G20 economies compared with 2030 emissions levels from the 2030 NDC targets, individually (upper figure) and collectively (lower figure).

6.3 Emission reductions of new NDCs for the G20 economies compared to current policies

For the G20 economies, this section compares NDC targets with GHG emission projections under the IMAGE current domestic climate policies up to 2035. This comparison allows assessing whether the new G20 NDCs represent increased mitigation ambition beyond what would result from policies already in place. This metric is key to assessing the ambition-

raising mechanism of the Paris Agreement (Nascimento et al., 2024). The emission target levels under the new NDC targets for several countries (among which China, Russian Federation, Indonesia, Türkiye) are projected to be above the estimated current policies scenario levels. These countries are expected to overachieve their new NDC targets with current policies.

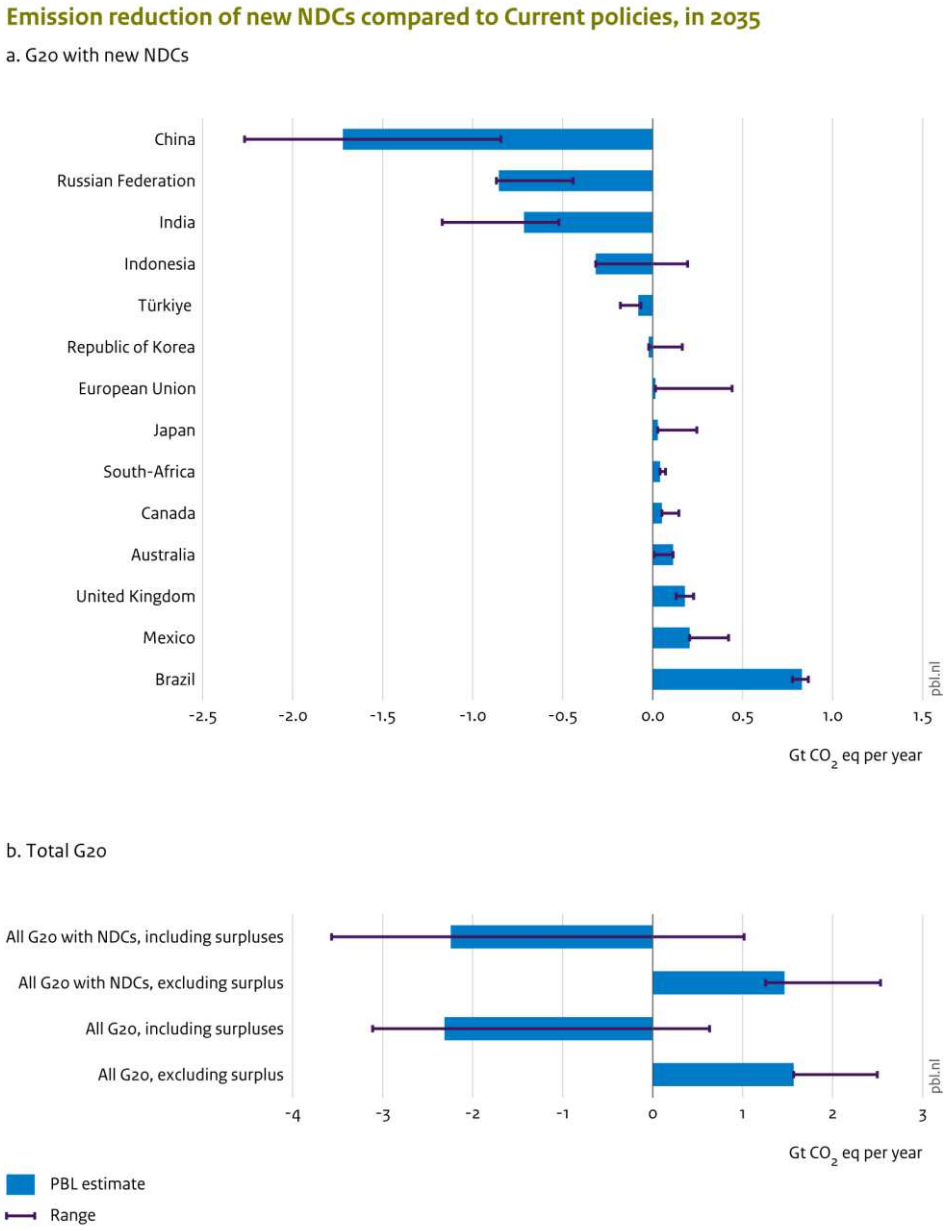


Figure 3. Emission reductions in 2035 implied by the new unconditional NDCs of G20 members compared with current policies projections, individually (upper figure) and collectively (lower figure).

However, this assessment is subject to considerable uncertainty, as indicated by the large uncertainty range around the median estimate for China. Our assessment of total

aggregated emissions of the G20 economies with new NDCs considers two cases: including and excluding surplus emissions allowances. In the first case, we assume these countries adhere to their NDC targets despite overachievement, resulting in a net increase in aggregated G20 emissions of about 2.2 $GtCO_2eq$/year (range: [-1.0– 3.6] $GtCO_2eq$) compared to current policy projections. In the second case, we assumed that these countries follow their current policies emission trajectory and overachieve their NDCs, leading to additional net reductions at the aggregated G20 level of about 1.5 $GtCO_2eq$/year (range: [1.3–2.5] $GtCO_2eq$) lower than current policy projections (Figure 3).

The new NDC targets of Brazil, Mexico, United Kingdom, Australia, and Canada make up the largest contribution to the estimated total, while the new NDC targets of several G20 members (the European Union, Japan, South-Africa and Canada) are close to or even less ambitious than expected emissions based on policies currently in place. This leads to total surpluses for the G20 economies with new NDCs by 2035 of 3.7 $GtCO_2eq$/year (range: [1.8–4.8] $GtCO_2eq$/year), mainly coming from China, India and Russia. For the conditional NDC targets the surpluses for the G20 economies with new NDCs are about to 0.4 $GtCO_2eq$/year lower.

Figure 3 also shows that the total estimated emissions of all G20 economies 2035, assuming that the G20 economies without updated NDCs (Saudi Arabia and Argentina) are assumed to remain constant at 2030 NDC levels through 2035. This would further increase the total reductions of the G20 economies for the second case to 1.6 $GtCO_2eq$/year (range: [1.6–2.5] $GtCO_2eq$) lower than current policy projections.

6.4 Per capita emissions of new NDCs for the G20 economies

All countries must undergo a transition where at some point GHG emissions per capita peak and then decline. The Paris Agreement calls for the peaking of national emissions as soon as possible. Projected per capita emissions trends between 2023 and 2035 are considerably different between G20 members whose emissions have peaked and those whose emissions have not yet peaked (Table 2, Supplementary Text 3). China's NDC target indicates that its per capita emissions will be almost 50% above the world average by 2035. The EU reduces its per capita emissions by 45% between 2015 and 2030, reaching 50% below the world average.

Table 2 Overview of G20 member status and progress, including on NDC targets

Country	Share of global GHG emissions in 2023[1)]	Per capita GHG emissions in 2023[a)]	Projected per capita GHG emissions under the new NDC in 2035 (tCO_2eq/cap)	Change from 2023 levels
		($tCO_2eq.capita$)	Unconditional NDCs (2035) ($tCO_2eq.capita$)	%-relative to 2023 levels
Argentina	0.8%	8.7	No new NDC	
Australia	0.9%	16.2	6.4−8.4	-49% – -60%
Brazil	4.5%	9.9	3.8–4.7	-53% – -62%
Canada	1.5%	18.5	10.1–11.0	-41% – -46%
China	28.9%	9.5	8.9–9.2	-4%– -7%
European Union	6.1%	6.6	2.9–3.6	-46% – -56%
India	6.8%	2.2	3.2	43%
Indonesia	3.0%	5.1	6.0	16%
Japan	2.2%	8.3	4.9	-40%
Mexico	1.3%	4.9	2.6–2.9	-41% – -47%
Republic of Korea	1.2%	4.4	2.6–2.9	-40% – -50%
Russian Federation	1.8%	6.0	11.2–11.6	89%– 94%
Saudi Arabia	1.6%	19.8	No new NDC	
South Africa	0.9%	7.5	5.0–6.0	-20% – -33%
Türkiye	1.0%	5.6	7.0	25%
United Kingdom	0.8%	5.8	2.2	-62%
United States of America	11.3%	15.9	Withdrawal NDC	

a) the population estimates from the SSP2 UN World Population Prospects 2022 (United Nations Department of Economic and Social Affairs: Population Division, 2022).

7 Analysis of the ambition of NDCs

7.1 Alignment with net-zero targets through a comparison with a linear path to net-zero

The alignment of a NDC with the long-term pledge is defined as the positioning of the NDC target with respect to a linear path of emission reductions from the current year to each country's respective net-zero year (Figure 4) (van Vuuren et al., 2025). As such, alignment of an NDC target with a net-zero target is not an indication of whether a country is currently on track to achieve its long-term target, but rather whether the NDC target puts the country in question on a linear emissions pathway to meet its net-zero goal. Therefore alignment with the net-zero target highly depends on whether the emissions of the countries have peaked, and the decline of emissions towards net-zero has started. We therefore classify G20 members with new NDC submissions into two categories: those whose net emissions have peaked —defined as having reached their maximum emissions at least five years prior to the most recent year for which inventory data is available (eight G20 economies, i.e. Australia, Brazil, Canada, EU, Japan, the Russian Federation, South Africa and the United Kingdom) — and those whose net emissions have not yet peaked (six economies, i.e. China,

India, Indonesia, Mexico, Republic of Korea and Türkiye). Among these later G20 members, three countries—Indonesia, Mexico, and the Republic of Korea—have stated in their NDCs that they intend to peak GHG emissions by 2030, while China's NDC commits to peaking its CO_2 emissions before 2030 (UNEP, 2024). Türkiye aims to peak its emissions by 2038.

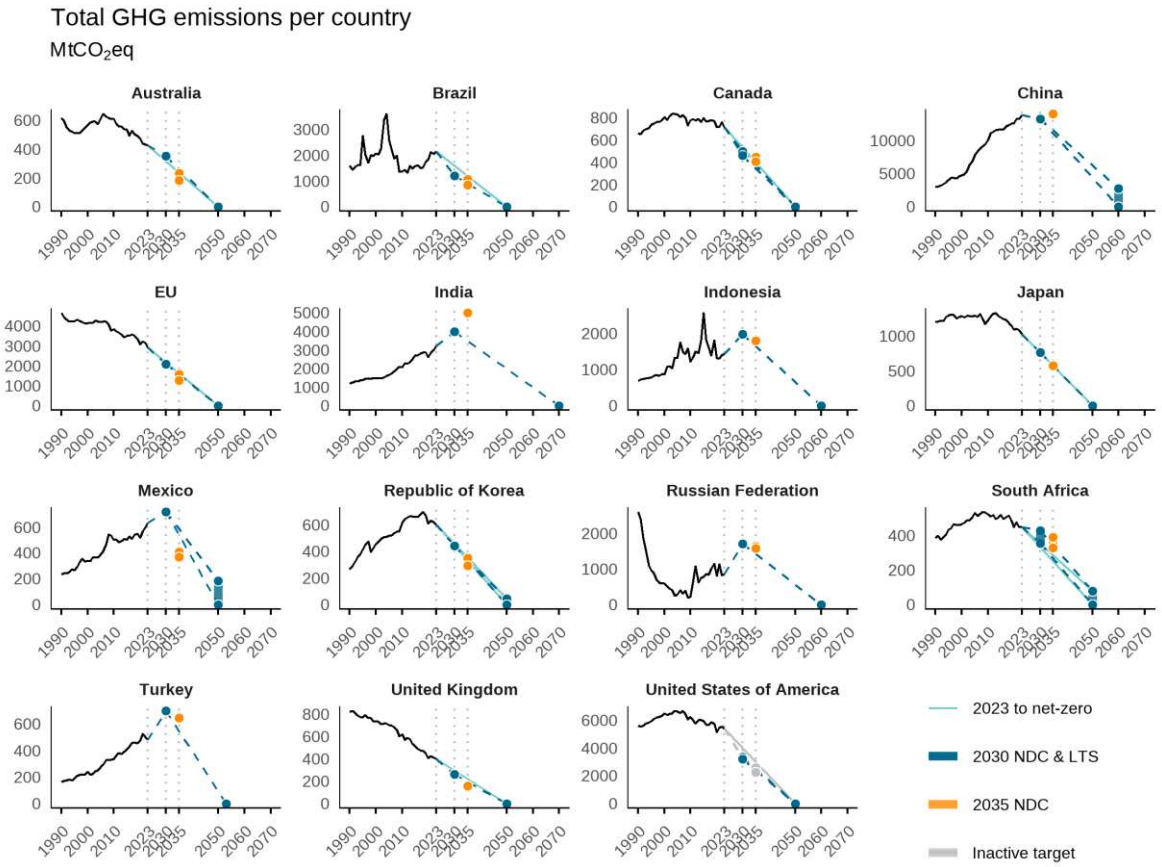


Figure 4. Linear emissions trajectories between the 2030 emissions levels of the unconditional NDC targets and net-zero targets of thirteen selected major emitters' countries with new NDC targets, compared with the GHG emissions levels by 2030 and 2035 corresponding to the NDC levels. For the countries that have already peaked their emissions, the linear GHG emission pathways between emission levels in 2023 and their net-zero targets are also included (light blue lines). For details, see Supplementary Text 6.

Post-peak countries: The four G20 economies that have peaked their emissions — Australia, the EU, Japan and the United Kingdom —could be on a linear path to achieve their 2050 net-zero targets under current policies, as their emissions have been on a downwards trajectory for the past ten to twenty-five years. Additionally, their NDC targets for 2030 and 2035 are well aligned with their net-zero targets (Figure 4). If they would meet their 2035 target, and continue the same pace of decarbonization, they can achieve their net-zero targets. Therefore, these four countries have set reduction targets for 2030 and 2035 that align well with their net-zero goals (Figure 4).

The other four G20 economies that have already peaked—Brazil, Canada, the Russian Federation, and South Africa— need to accelerate their decarbonization rate after 2035 to achieve their net-zero targets, as their new NDC targets are not well aligned with their net-zero targets (Figure 4). For Brazil and Canada, the lower range of their new NDC targets is on a linear path to their net-zero target. The Russian Federation, with emissions currently on the rise despite having peaked in 1990, must fully reverse this trajectory to meet its net-zero target. Under existing policies, South Africa is currently not on a linear path with its net-zero target and would need to increase ambition to do so. Regarding its NDC alignment with its net-zero target, the significant range of emission levels in its 2030 NDC introduces major uncertainty. The lower range could put the country on an emissions pathway compatible with its net-zero target, but the upper range suggests a plateauing of emissions at their current level.

Pre-peak countries: For China, India, Indonesia, Mexico, the Republic of Korea, and Türkiye, whose net emissions hadn't peaked five years before the most recent reporting year (2023), Figure 4 shows that they must transition from peak to net-zero emissions within 15 to 35 years. This is significantly shorter compared to the 37 to over 60 years required by countries that have already peaked. Rapid decarbonization rates will be crucial after 2035 to achieve net-zero emissions. China, India, Indonesia and Türkiye are not on a linear path between their 2030 target and net-zero pledge, indicating that accelerated decarbonization after 2030 will be needed to meet these goals. Current policies suggest that China can overachieve its 2030 and 2035 NDC targets, potentially setting the country on a linear path to its net-zero goal. Finally, given that India, Indonesia and Türkiye still show an increase in their current emissions, alignment with the announced net-zero target would require a more substantial reduction from current policies trend.

7.2 Alignment with least-cost 1.5°C and below 2°C scenarios

Figure 5 indicates that the new NDC targets of most G20 economies fall short of the medians of projected reductions for the least-costs scenarios for 1.5°C with limited overshoot (C1), except for those of the EU and the United Kingdom[16].

[16] The earlier NDC target of the United States of America also aligned with the median of projected reductions of scenarios for 1.5°C with no or limited overshoot (C1).

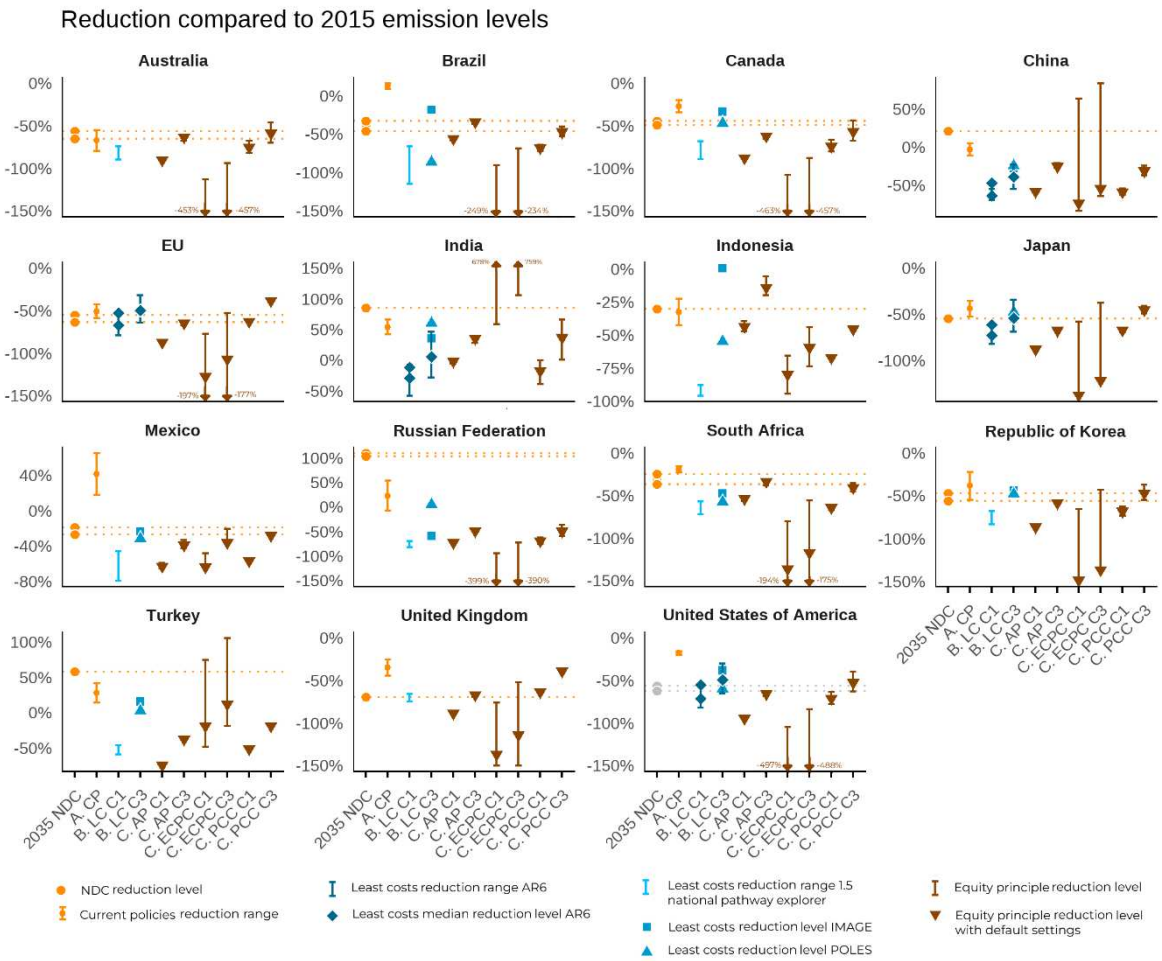


Figure 5. Emissions targets by 2035, as implied by NDCs relative to 2015 levels for thirteen selected major emitters' countries with new NDC targets, are compared with 2035 emissions levels from various scenarios: the current policies scenario (A. CP), the least-costs 1.5°C and below 2°C scenarios (B. LC C1/B. LC C3), and the 1.5°C and 2°C-aligned equity-based outcomes. Emissions allocations are based on the equity principles — capability, equality and responsibility— using the effort-sharing approaches, such as Ability to Pay (C. AP C1/C. AP C3), Per Capita Convergence (C. PCC C1/C. PCC C3) and Equal Cumulative Per Capita (C. ECPC C1/C. ECPC C3). The markers on each emissions allocations range indicate the default settings as in Dekker et al (2025a). For details, see Supplementary Text 6.

Besides the EU and the United Kingdom, four other G20 economies—Canada, Japan, Mexico, and Republic of Korea—have NDC targets that are within the range of least-cost *below 2°C* scenarios.

For the other G20 economies, the new NDCs do not align with least-cost *below 2°C* and *1.5°C with no or limited overshoot*. However, it should be noted that national reduction targets are typically based on fairness considerations (Section 5.3).

7.3 Alignment with 1.5°C and 2°C equity-based emission reductions

For most of the G20 economies, the new NDC targets fall short of the emission reductions estimated for Paris-aligned effort-sharing pathways based on equity principles (Figure 5). For limiting global warming to *1.5°C with limited overshoot* (C1)[17], only the EU, India and the United Kingdom have new NDC targets aligned with the emission reductions expected from an equity principle – the principle of equality (based on the per capita convergence approach) for the EU and the United Kingdom, and the principle of responsibility (based on the equal cumulative per capita approach) for India.

For staying below 2°C (C2), six G20 economies, namely Australia, Brazil, the EU, Republic of Korea, South-Africa and the United Kingdom, have new NDC targets aligned with two equity principles: capability (based on the ability to pay) and equality. Furthermore, four G20 economies have new NDCs that align with at least one equity principle: India (responsibility), Indonesia (capability), and Japan and Mexico (equality). The same would apply to the United States of America (equality), if their NDC was still active.

For the high-income G20 economies, such as the EU, Japan and the United States of America, the *1.5°C with limited overshoot* (C1) scenarios under the three equity principles considered in this study imply higher median emission reduction targets ranging from about 60% to 150% compared to 2015 levels, with the highest reductions tied to historical responsibility. For the below 2°C scenarios, median reduction targets would be around 40% to 125%.

The new NDC targets of the remaining G20 economies with —namely Canada, China, Russian Federation and Türkiye — do not align with the median equity-based emission reductions for both climate targets. However, it should be noted that the allocation based on equity principles (especially the allocation based on historical responsibility) is highly sensitive to its parameter assumptions (Dekker et al., 2025b). Therefore, for countries like China and Türkiye the 2035 targets could be aligned with equity-based (responsibility) targets.

8 Conclusions

This paper analyses the national and global emissions impact and the ambition level of new NDCs, focusing on G20 economies, based on three approaches: (i) comparison with linear pathways to net-zero targets, (ii) comparison with global least-cost 1.5°C and below 2°C pathways, and (iii) comparison with 1.5°C and 2°C pathways aligned with different equity principles.

[17] Results for 1.5°C with the high overshoot (C2) are presented in the Supplementary Information.

The new NDCs narrow the emissions gap in 2035, but the emissions gap with 1.5°C and below 2°C emission pathways remains large. The full implementation of unconditional and conditional new NDCs would reduce expected median global GHG emissions in 2035 by about 8–9% and 11–12% respectively, compared with 2019 levels. However, these are much smaller than median reductions of 33% and 59%, which are needed to align with *1.5°C with limited overshoot* and *below 2°C* pathways. For some countries, like China, India, and the Russian Federation, current policies are expected to result in the overachievement of the NDC targets, leading to approximately 5.2–6.0 $GtCO_2eq$ (unconditional) and 4.9–5.7 $GtCO_2eq$ (conditional) lower global emissions projections by 2035. Most of the overachievement comes from the G20 economies.

Four G20 economies that have peaked their emissions—Australia, the EU, Japan and the United Kingdom—have new NDC targets that follow a linear trajectory toward their net-zero targets. This implies that if they succeed in reaching their NDCs and maintain the same rate of emission reductions thereafter, they could achieve their net-zero goals. In contrast, the other four G20 economies that have already peaked—Brazil, Canada, the Russian Federation, and South Africa—are not yet on a linear path towards their net-zero targets, implying that further mitigation is needed to achieve such goals.

For the remaining G20 economies, namely China, India, Indonesia, Mexico, the Republic of Korea, and Türkiye, which had not peaked their net emissions five years prior to the latest reporting year (2023), a transition from peak to net-zero emissions is necessary within a span of 15 to 35 years. This timeframe is significantly shorter than the 37 to over 60 years required by countries that have already peaked. Rapid decarbonization rates will be crucial after 2035 to meet their net-zero emissions objectives.

The new NDC targets of the EU and the United Kingdom are comparable to the median projected reductions by 2030 for the least-costs scenarios for limiting global warming to *1.5°C with limited overshoot*. For least-cost *below 2°C* scenarios, the new NDC targets of Canada, Japan, Mexico, and Republic of Korea are also aligned. For the other G20 economies, the NDCs do not align with least-cost 1.5°C and below 2°C scenarios.

While least-cost scenarios serve as a relevant benchmark, they do not take into account fairness considerations which are crucial for defining national reduction targets. Therefore, this study also evaluates the new NDCs by comparing their targets with a range of emission reductions derived from different equity principles and the global climate targets. **The majority of G20 economies have submitted targets for 2035 that do not meet the emission reduction targets estimated for the Paris-aligned pathways based on different equity principles, especially when compared to the *1.5°C with limited overshoot* pathways**. For limiting global warming to *below 2°C*, there are nine G20 economies that are aligned with one or two equity principles. Different equity principles result in different

outcomes, with the responsibility principle favouring emerging economies while showing the largest sensitivity to the initial assumptions.

Concluding, we recommend that countries substantially raise the ambition in their revised NDC submissions to ensure the climate goals of the Paris Agreement remain attainable.

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