



**Addendum to the synthesis report for the technical  
assessment component of the first global stocktake**

**Overall effect of Parties' NDCs and overall progress made by Parties  
towards the implementation of their NDCs, including the information  
referred to in Article 13, paragraph 7(b), of the Paris Agreement**

**Prepared by the secretariat under the guidance of the co-facilitators of the technical  
dialogue of the first global stocktake**

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## Abbreviations and acronyms

AR6	Sixth Assessment Report (IPCC)
CH <sub>4</sub>	methane
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
CO <sub>2</sub> eq	carbon dioxide equivalent
Gt	Gigatonne
GHG	Greenhouse gas
GST	Global Stocktake
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
LT-LEDS	long-term low-emission development strategy(ies)
LULUCF	land use, land-use change and forestry
N <sub>2</sub> O	nitrous oxide
NAPs	National Adaptation Plans
NDC	nationally determined contribution
PA	Paris Agreement
SSPs	Shared Socioeconomic Pathways
USD	United States Dollar

## I. Introduction and overview

1. By decision 19/CMA.1, paragraph 23(c), the CMA requested the secretariat, under the guidance of the co-facilitators, to prepare for the technical assessment of the global stocktake a synthesis report on the overall effect of the NDCs communicated by Parties summarizing the most recent information on the overall effect of NDCs and progress made by Parties towards the implementation of their NDCs, including the information referred to in Article 13, paragraph 7(b), of the Paris Agreement. Following this mandate, a synthesis report was published on 30 March 2022.<sup>1</sup>

2. Ahead of the third and final meeting of the first technical dialogue of the first GST, taking place in June 2023, this addendum aims to complement the synthesis report published in March 2022 by presenting updated key information at a collective level, based on more recent NDCs communicated by Parties and recorded in the NDC registry as at 23 September 2022. More detailed information is included in the annual update of the NDC synthesis report prepared in response to a different mandate, decision 1/CMA.3, paragraph 30.<sup>2</sup>

3. This report synthesizes information from the 166 latest available NDCs, representing 193<sup>3</sup> Parties to the Paris Agreement. These 166 NDCs comprise 142 new or updated NDCs<sup>4</sup> from 169 Parties and 24 NDCs from Parties that have not yet communicated new or updated NDCs in response to paragraphs 23–24 of decision 1/CP.21. A total of 32 Parties have to date communicated new or updated NDCs since 31 December 2021 (the cut-off date for submissions covered in the March 2022 synthesis report).

## II. Overall effect of NDCs

4. The 193 Parties referred to in paragraph 3 above cover 94.9 per cent of the total global emissions in 2019, which are estimated at 52.6 Gt CO<sub>2</sub> eq<sup>5</sup> without LULUCF and around 56.4 Gt CO<sub>2</sub> eq with LULUCF.<sup>6</sup>

5. Total global GHG emissions (without LULUCF) taking into account implementation of the latest NDCs are estimated to be around 53.4 (51.8–55.0) Gt CO<sub>2</sub> eq in 2025<sup>7</sup> and 52.4 (49.1–55.7) Gt CO<sub>2</sub> eq in 2030. The ranges provided indicate low and high emission estimates. The lower ranges assume or imply full implementation of NDCs including those targets whose implementation is dependent on access to enhanced financial resources, technology development and transfer, and capacity-building support; availability of market-based mechanisms; and absorptive capacity of forests and other ecosystems (hereinafter referred to as ‘conditional elements’). The upper range considers only the implementation of the NDCs presented, excluding conditional elements.

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<sup>1</sup> Available at <https://unfccc.int/documents/461517>.

<sup>2</sup> FCCC/PA/CMA/2022/4 (*Nationally determined contributions under the Paris Agreement. Synthesis report by the secretariat*) available at <https://unfccc.int/documents/619180>, and its corrigenda available at <https://unfccc.int/documents/624617> (Corr.1) and <https://unfccc.int/documents/624655> (Corr.2).

<sup>3</sup> The Holy See deposited its instrument of accession to the Paris Agreement on 4 September 2022 and, in accordance with Article 21, para. 3, of the Paris Agreement, it entered into force on 4 October 2022. As this was after 23 September 2022, the Holy See is not considered in this report.

<sup>4</sup> See the annex to this document for the list of Parties.

<sup>5</sup> Including emissions from countries that are not Parties to the Paris Agreement, a harmonization factor to ensure comparability with SSP scenarios assessed by the IPCC, and emissions from international aviation and maritime transport, which accounted for approximately 1.2 and 1.5 per cent, respectively, of total global emissions in 2019.

<sup>6</sup> In line with anthropogenic land-use emissions and removals in the scenarios assessed by the IPCC, although aggregate global net emissions estimated on the basis of national GHG inventories would be lower. The difference mainly reflects whether forest sinks in areas of managed land are defined as anthropogenic. Note that land-use emissions are generally subject to relatively large uncertainties.

<sup>7</sup> Unless otherwise noted, for this report GWP values with a 100-year time-horizon from the AR6 have been used. For NDCs that include estimates of GHG emissions calculated using other GWP values (e.g. from previous ARs), a conversion has been applied. For further information, including on estimation methods and approaches, see document FCCC/PA/CMA/2021/8/Add.3.

## A. Projected total global GHG emissions in 2025 and 2030 taking into account implementation of NDCs

6. For this report, projected emission levels resulting from implementation of the NDCs were compared with emission scenarios assessed by the IPCC, specifically categories of scenarios from the contribution of Working Group III to the AR6 (table SPM.2).

7. The projected total global GHG emission level for 2025 in line with the latest NDCs is:

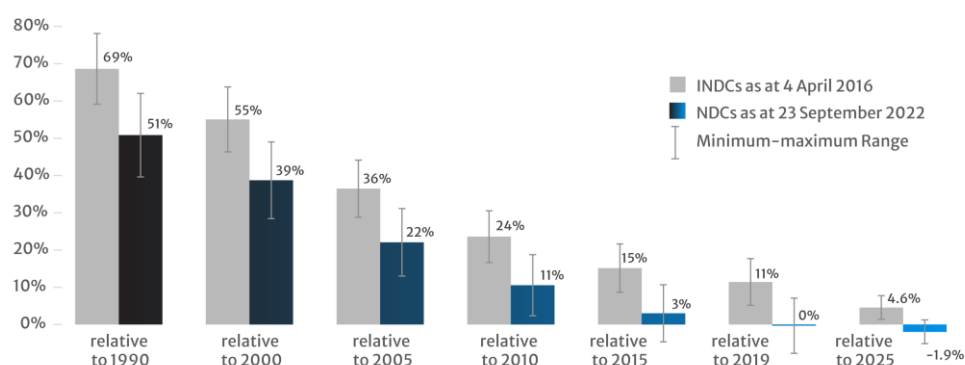
- (a) 53.7 (49.0–58.4) per cent higher than in 1990 (34.7 Gt CO<sub>2</sub> eq);
- (b) 41.3 (37.0–45.7) per cent higher than in 2000 (37.8 Gt CO<sub>2</sub> eq);
- (c) 24.4 (20.6–28.2) per cent higher than in 2005 (42.9 Gt CO<sub>2</sub> eq);
- (d) 12.6 (9.2–16.1) per cent higher than in 2010 (47.4 Gt CO<sub>2</sub> eq);
- (e) 5.0 (1.7–8.2) per cent higher than in 2015 (50.9 Gt CO<sub>2</sub> eq);
- (f) 1.6 per cent higher (with a range from 1.6 per cent lower to 4.7 per cent higher) than in 2019 (52.6 Gt CO<sub>2</sub> eq).

8. For 2030, the projected total global GHG emission level (see figure 1) in line with the latest NDCs is:

- (a) 50.8 (41.4–60.3) per cent higher than in 1990;
- (b) 38.7 (30.0–47.4) per cent higher than in 2000;
- (c) 22.1 (14.4–29.8) per cent higher than in 2005;
- (d) 10.6 (3.6–17.5) per cent higher than in 2010;
- (e) 3.0 per cent higher than in 2015 (ranging from 3.5 per cent lower to 9.5 per cent higher);
- (f) 0.3 per cent lower than 2019 (ranging from 6.6 per cent lower to 6.0 per cent higher);
- (g) 1.9 per cent lower than the projected emissions for 2025 (ranging from 5.1 per cent lower to 1.2 per cent higher).

Figure 1

### Projected total emission level in 2030 according to nationally determined contributions compared with historical levels and estimated 2025 level

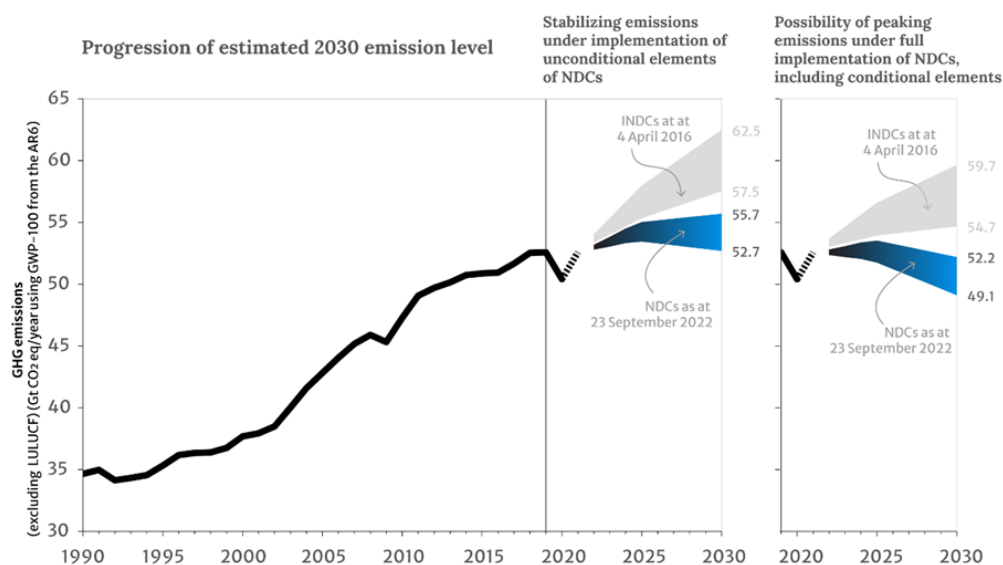


9. Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties (as per Article 4.1). When taking into account the full implementation of all latest NDCs (including implementation of all conditional elements), the projected total GHG emissions levels imply that global emissions could peak before 2030 (see figure 2), with the lower bound of the 2030 emission level (49.1 Gt CO<sub>2</sub> eq) estimated to be up to 6.6 per cent below the 2019 emission

level (52.6 Gt CO<sub>2</sub> eq) and 5.1 per cent below the lower bound of the estimated 2025 emission level (51.8 Gt CO<sub>2</sub> eq). However, in order to achieve that peaking, the conditional elements of the NDCs need to be implemented, which depends mostly on implementation of and access to enhanced support, including financial resources, technology transfer and technical cooperation, and capacity-building support; availability of market-based mechanisms; and absorptive capacity of forests and other ecosystems.

Figure 2

**Historical and projected total global emissions according to nationally determined contributions**



*Note:* For comparison, global emissions with LULUCF in 2030, when taking into account implementation of the new or updated NDCs (blue areas), are estimated to be 56.4 (54.9–57.9) Gt CO<sub>2</sub> eq considering unconditional elements and 52.8 (51.3–54.4) Gt CO<sub>2</sub> eq assuming full implementation.

**B. Projected total global GHG emissions in 2050 taking into account long-term low-emission development strategies**

10. In addition to communicating information on mitigation targets or plans for 2030, 44 per cent of Parties provided information on long-term mitigation visions, strategies or targets for up to and beyond 2050 including those that have already been communicated in the LT-LEDS.<sup>8</sup>

11. This paragraph summarizes information on projected collective emissions taking into account LT-LEDS and NDCs contained in a synthesis report on LT-LEDS<sup>9</sup> published by the secretariat on 26 October 2022, in response to decision 1/CMA.3, paragraph 32. On the basis of the information provided on long-term mitigation visions, strategies and targets in the NDCs and LT-LEDS, the total emissions in 2050 of the Parties with long-term targets are estimated at 14.2 (12.3–16.1) Gt CO<sub>2</sub> eq. Mindful of the inherent uncertainty of such long-term estimates, the information indicates that these Parties' total GHG emission level could be 64 (59–69) per cent lower in 2050, which is 61 (55–65) per cent lower than in 2010 and 64 (59–69) per cent lower than in 2019, if all the pledges are implemented in full and on time. The confidence in these emission estimates are affected by a certain lack of clarity on the scope and coverage of long-term mitigation goals as well as quantified levels of emissions and removals in communicated LT-LEDS and NDCs. Based on those Parties' NDCs,

<sup>8</sup> As at 23 September 2022, 53 LT-LEDS had been communicated, representing 62 Parties, 32 of which had communicated a new or updated NDC. In addition, 22 Parties communicated long-term mitigation visions, strategies or targets in their NDCs. For a list of communicated LT-LEDS, see <https://unfccc.int/process/the-paris-agreement/long-term-strategies>. For more details on LT-LEDS, see document FCCC/PA/CMA/2022/8.

<sup>9</sup> FCCC/PA/CMA/2022/8.

emissions are estimated to be 6 (2–11) per cent lower in 2030 than in 2019, which means that it is assumed that most of the emission reductions foreseen by 2050 will occur after 2030 (see figure 9 in LT-LEDS synthesis report for comparison with IPCC-assessed scenarios that limit warming to 1.5 °C (50 per cent chance) with no or low overshoot and that likely limit warming to below 2 °C (with over 67 per cent chance) with the start of mitigation action at 2020).

12. According to the latest NDCs, per capita emissions will equal 6.6 (6.4–6.8) t CO<sub>2</sub> eq in 2025 and, slightly lower, 6.2 (5.8–6.6) t CO<sub>2</sub> eq in 2030, which is, on average, 3.8 (0.8–6.7) per cent lower in 2025 and 9.5 (3.8–15.2) per cent lower in 2030 than in 2019.

## C. Carbon budgets

13. In the contribution of Working Group I to the AR6,<sup>10</sup> the remaining carbon budgets consistent with keeping warming below 1.5 and 2 °C are assessed. Global cumulative CO<sub>2</sub> emissions for 1850–2019 are estimated at 2,400±240 Gt CO<sub>2</sub> of which more than half (58 per cent) occurred between 1850 and 1989, and about 42 per cent occurred between 1990 and 2019. There is a near-linear relationship between cumulative CO<sub>2</sub> and temperature increase, and past emissions of CO<sub>2</sub> and non-CO<sub>2</sub> climate forcers led to observed warming of 1.07 °C (likely range of 0.8–1.3 °C). For a 50 per cent likelihood of limiting further warming to 0.43 °C (1.07 °C historical + 0.43 °C = 1.5 °C) relative to the 1850–1900 level, there is an estimated remaining carbon budget of 500 Gt CO<sub>2</sub> (see figure 3), and 400 Gt CO<sub>2</sub> for a two-thirds chance (67 per cent probability).

Figure 3

**Estimates of historical CO<sub>2</sub> emissions and remaining carbon budgets**

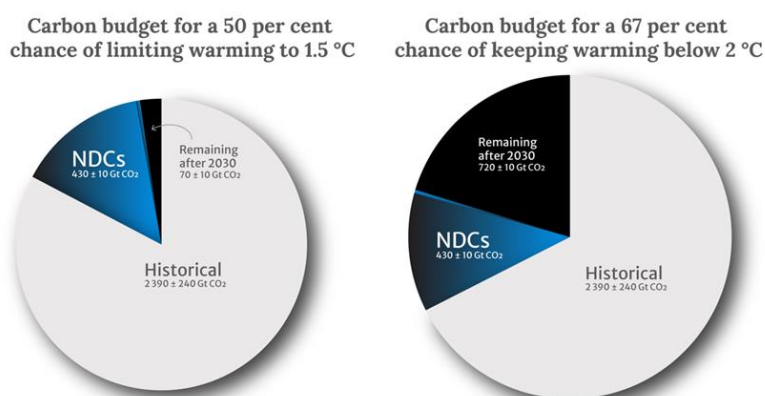
Global Warming Between 1850–1900 and 2010–2019 (°C)		Historical Cumulative CO <sub>2</sub> Emissions from 1850 to 2019 (GtCO <sub>2</sub> )					
1.07 (0.8–1.3; likely range)		2390 (± 240; likely range)					
Approximate global warming relative to 1850–1900 until temperature limit <sup>a</sup> (°C)	Additional global warming relative to 2010–2019 until temperature limit <sup>a</sup> (°C)	Estimated remaining carbon budgets from the beginning of 2020 (GtCO <sub>2</sub> )					Variations in reductions in non-CO <sub>2</sub> emissions <sup>c</sup>
		Likelihood of limiting global warming to temperature limit <sup>b</sup>					
		17%	33%	50%	67%	83%	
1.5	0.43	900	650	500	400	300	Higher or lower reductions in accompanying non-CO <sub>2</sub> emissions can increase or decrease the values on the left by 220 GtCO <sub>2</sub> or more
1.7	0.63	1450	1050	850	700	550	
2.0	0.93	2300	1700	1350	1150	900	

*Note:* This table is reproduced from the Summary for Policymakers of the Working Group I contribution to the AR6 of the IPCC. For references and footnotes to this table, see: <https://www.ipcc.ch/report/ar6/wg1/>.

14. Based on the latest NDCs, cumulative CO<sub>2</sub> emissions in 2020–2030 are estimated to be around 430 (420–440) Gt CO<sub>2</sub>. Compared with the carbon budget consistent with 50 per cent likelihood of limiting warming to 1.5 °C (500 Gt CO<sub>2</sub>), cumulative CO<sub>2</sub> emissions in 2020–2030 is equivalent to 86 per cent of the remaining carbon budget, leaving a post-2030 carbon budget of around 70 (60–80) Gt CO<sub>2</sub>, which is equivalent to approximately two years of projected global total CO<sub>2</sub> emissions by 2030. Similarly, in the context of the carbon budget consistent with a likely (67 per cent) chance of keeping warming below 2 °C (estimated by the IPCC to be 1,150 Gt CO<sub>2</sub> from 2020 onward), cumulative CO<sub>2</sub> emissions in 2020–2030 is equivalent to 37 per cent of the remaining carbon budget (figure 4).

<sup>10</sup> IPCC. 2021. *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. V Masson-Delmotte, P Zhai, A Pirani, et al. (eds.). Cambridge: Cambridge University Press. Available at [www.ipcc.ch/report/ar6/wg1/](https://www.ipcc.ch/report/ar6/wg1/).

Figure 4  
Carbon budgets



*Note:* The contribution of Working Group I to the AR6 provides an estimate of CO<sub>2</sub> emissions from 1850 to 2020 of 2,390 ± 240 Gt CO<sub>2</sub>. For staying below 1.5 °C warming relative to the 1850–1900 level, an estimated 500 Gt CO<sub>2</sub> can be emitted from 2020 onward. Under implementation of the NDCs as at 23 September 2022, CO<sub>2</sub> emissions from 2020 to 2030 would amount to 430 ± 10 Gt CO<sub>2</sub>, leaving the equivalent of approximately two years of emissions (70 ± 10 Gt CO<sub>2</sub>) for thereafter. In the case of having a likely (67 per cent) chance of keeping warming to below 2 °C, the remaining carbon budget is 1,150 Gt CO<sub>2</sub> and approximately 720 ± 10 Gt CO<sub>2</sub> would remain for thereafter.

#### D. Comparison with scenarios considered by the IPCC

15. According to the IPCC AR6 SYR SPM<sup>11</sup>, global modelled pathways that limit warming to 1.5°C (>50%) with no or limited overshoot or limit warming to 2°C (>67%) are characterized by deep, rapid and, in most cases, immediate GHG emissions reductions (see figure 5 below).

Figure 5  
Greenhouse gas and CO<sub>2</sub> emission reductions from 2019, median and 5–95 percentiles

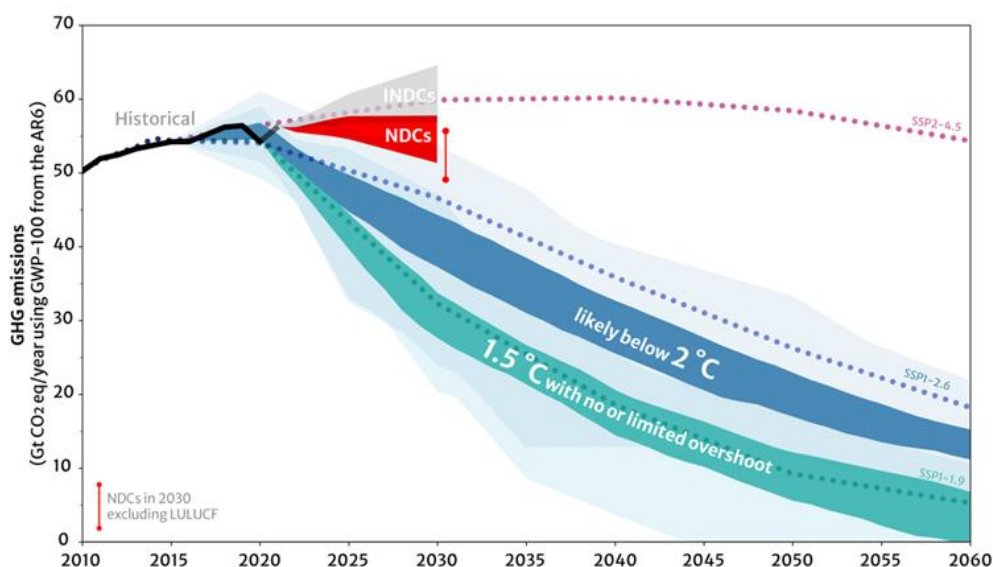
		Reductions from 2019 emission levels (%)			
		2030	2035	2040	2050
Limit warming to 1.5°C (>50%) with no or limited overshoot	GHG	43 [34-60]	60 [49-77]	69 [58-90]	84 [73-98]
	CO <sub>2</sub>	48 [36-69]	65 [50-96]	80 [61-109]	99 [79-119]
Limit warming to 2°C (>67%)	GHG	21 [1-42]	35 [22-55]	46 [34-63]	64 [53-77]
	CO <sub>2</sub>	22 [1-44]	37 [21-59]	51 [36-70]	73 [55-90]

*Note:* This table is reproduced from the Synthesis Report (SYR) of the IPCC Sixth Assessment Report.

16. As per the contribution of WGIII to the AR6, for the subgroup of scenarios in which net zero GHG emissions are also achieved this century in line with Article 4, paragraph 1, of the Paris Agreement, the emission reductions are slightly less, at 41 (31–59) per cent by 2030; and for the subgroup of scenarios in which net zero GHG emissions are not achieved this century, the near-term emission reductions by 2030 tend to be slightly stronger, at 48 (35–61) per cent (figure 6).

<sup>11</sup> Available at: [https://report.ipcc.ch/ar6syr/pdf/IPCC\\_AR6\\_SYR\\_SPM.pdf](https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf).

Figure 6  
**Comparison of scenarios assessed in the Intergovernmental Panel on Climate Change Sixth Assessment Report with projected total and per capita global emissions according to nationally determined contribution**



*Note:* The assessed global emissions (including LULUCF) for the scenarios assessed in the AR6 are provided for the medium (SSP2-4.5), low (SSP1-2.6) and very low (SSP1-1.9) scenarios of IPCC Working Group I (dotted lines). The IPCC scenario categories are shown with interquartile ranges (dark shading) and 5–95 per cent range (light shading). The two categories were assessed by the IPCC Working Group III to be consistent with a likely chance of staying below 2 °C (over 67 per cent chance) (category C3a; blue shading) and 1.5 °C warming (over 50 per cent chance by 2100) with net zero GHG emissions this century (category C1a; teal shading). The illustrative SSP scenarios were assessed by IPCC to feature end-of-century warming of 2.7 (2.1–3.5) °C for SSP2-4.5 (purple dots), 1.8 (1.3–2.4) °C for SSP1-2.6 (blue dots) and 1.4 (1.0–1.8) °C for SSP1-1.9 (teal dots) (see table SPM.1 in the contribution of Working Group I to the AR6). The level of GHG emissions by 2030 estimated to be in line with the NDCs is 52.4 (49.1–55.7) Gt CO<sub>2</sub> eq excluding LULUCF (red vertical bar) and 54.6 (51.3–57.9) Gt CO<sub>2</sub> eq when – in line with shown IPCC scenarios – including LULUCF.1).

17. The total GHG emission level in 2030 exceeds the emission level in the case of 2 °C scenarios by 14.2 (10.3–18.0) Gt CO<sub>2</sub>. Assuming all conditional elements of NDCs are implemented, the difference is reduced to 12.5 (8.5–15.9) Gt CO<sub>2</sub> eq. Without any implementation of conditional elements of NDCs, the gap is wider, at 16.0 (12.0–19.4) Gt CO<sub>2</sub> eq.

18. In the case of 1.5 °C scenarios that feature net zero GHG emissions this century, the gap is even wider at 22.6 (19.9–26.9) Gt CO<sub>2</sub> eq. Assuming all conditional elements of NDCs and support are implemented, the difference in relation to these 1.5 °C scenarios is somewhat narrowed to 20.3 (18.7–25.3) Gt CO<sub>2</sub> eq. Without implementation of any conditional elements, the difference amounts to 23.9 (22.2–28.8) Gt CO<sub>2</sub> eq.

19. Taking into account implementation of NDCs up until 2030, projected global mean temperatures are subject to significant uncertainty owing to the range of emission levels estimated for 2030 resulting from implementation of NDCs (including whether conditional elements are implemented or not), the range of illustrative emission extensions beyond 2030 and inherent climate system uncertainties. The best estimate of peak temperature in the twenty-first century (projected mostly for 2100 when temperature continues to rise) is in the range of 2.1–2.9 °C depending on the underlying assumptions. Without implementation of any conditional elements of NDCs, the best estimate of temperature change is 2.5–2.9 °C warming. Assuming full implementation of NDCs, including all conditional elements, the best estimate for peak global mean temperature is 2.1–2.4 °C.



20. At the adoption of the Cancun Agreements in 2010 the expected global temperature increase in 2100 was 3.7–4.8 °C.<sup>12</sup> In 2015, with the adoption of the Paris Agreement and commitments made through INDCs, the expected global warming reduced to 3.0–3.2 °C.<sup>13</sup> Further progress has been made under the Paris Agreement, as updated NDCs and long-term plans were announced. By COP 26 in 2021 a global temperature increase of 2.6–2.7 °C in 2100 was expected.<sup>14</sup> The Glasgow Climate Pact urged Parties that had not yet communicated new or updated NDCs to do so as soon as possible and to revisit and strengthen their 2030 targets to align with the global temperature goal. With further announcements in 2022 (COP 27) expected temperatures were reduced further, to 2.4–2.6 °C<sup>15</sup> with the possibility of 1.7–2.1 °C when taking into account the full implementation of long-term net zero targets.<sup>16</sup>

### **III. Overall progress made by Parties towards the implementation of their NDCs**

#### **A. Mitigation co-benefits resulting from adaptation actions and economic diversification plans**

21. About 43 per cent of Parties considered mitigation co-benefits resulting from their adaptation action and/or economic diversification plans, with 45 per cent of these Parties explaining how social and economic consequences of response measures were considered in preparing the NDC.

22. Parties that consider economic diversification as part of their national development plans and climate policies for boosting national resilience to climate change and the impacts of response measures provided additional plans such as fostering financial services to increase investment; promoting investment in forestry for sustainable logging and wood processing; and product diversification in the agriculture sector, as their economic diversification plans or actions that focused on high-emitting sectors and sectors of economic importance.

#### **B. Gender**

23. Seventy-five per cent of Parties provided information related to gender in their NDCs (compared to 70 per cent reported in the synthesis report). The number of Parties affirming that they will take gender into account in implementing their NDCs also augmented (38 per cent, whereas the previous estimate was 31 per cent). Of the Parties that referenced gender in their previous NDCs, 20 per cent elaborated more on the topic in their new or updated NDCs. Thirty-eight per cent of Parties (previously 30 per cent) included information on how gender had been or was planned to be mainstreamed in NDC implementation.

24. An increasing number of those Parties (60 per cent, whereas in the previous report, the estimate was 22 per cent) specifically referenced gender-sensitive consultations, referring to specific guidelines for ensuring gender sensitivity, such as during public consultations, and highlighting the inclusion of national gender machineries, gender and women's groups, or non-governmental organizations in the process.

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<sup>12</sup> IPCC. 2018: Climate Change 2014: Synthesis Report Summary for Policymakers, p.20. Available at [https://www.ipcc.ch/site/assets/uploads/2018/02/AR5\\_SYR\\_FINAL\\_SPM.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/AR5_SYR_FINAL_SPM.pdf).

<sup>13</sup> UNEP. 2016: Emissions Gap Report 2016, p.Xvii. Available at <https://www.unep.org/resources/emissions-gap-report-2016>.

<sup>14</sup> UNEP. 2021. Emissions Gap Report 2021, p.XXVI. Available at <https://www.unep.org/resources/emissions-gap-report-2021>.

<sup>15</sup> UNEP. 2022. Emissions Gap Report 2022, p.XVI. Available at <https://www.unep.org/resources/emissions-gap-report-2022>.

<sup>16</sup> Ibid, p.XXI, table 4.5.

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## C. Domestic mitigation measures

25. Under Article 4, paragraph 2, of the Paris Agreement, Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of their NDCs .

26. Ninety-seven per cent of Parties (previously 96 per cent) outlined in their NDCs domestic mitigation measures as key instruments for achieving mitigation targets for their NDCs and/or specific priority areas of national importance, which are often a subset of one or more IPCC sectors, including energy supply, transport, buildings, industry, agriculture, LULUCF and waste.

27. Seventy-four per cent of Parties communicated one or more quantitative mitigation targets specific to priority areas or sub-areas, which support and underpin their overall mitigation targets. Such quantitative mitigation targets were provided most frequently for energy supply (57 per cent), followed by LULUCF (43 per cent) and cross-cutting or other (42 per cent), and were much less frequently indicated for the other priority areas (5–19 per cent).

28. In 2019, according to the contribution of Working Group III to the AR6, approximately 34 per cent (20 Gt CO<sub>2</sub> eq) of global GHG emissions came from energy supply, 24 per cent (14 Gt CO<sub>2</sub> eq) from industry, 22 per cent (13 Gt CO<sub>2</sub> eq) from agriculture and LULUCF, 15 per cent (8.7 Gt CO<sub>2</sub> eq) from transport and 5.6 per cent (3.3 Gt CO<sub>2</sub> eq) from buildings. GHG emissions continuously increased in all sectors in 2010–2019, but most rapidly in transport and industry with average annual emission growth rates of about 2.0 and 1.4 per cent respectively.

29. Domestic mitigation measures for renewable energy generation were most frequently mentioned by 88 per cent of Parties (previously 87 per cent). 21 per cent of Parties (previously 22 per cent) communicated quantitative targets for the share (ranging from 15 to 100 per cent) of renewable energy in electricity generation by 2030; and many of those target shares (13 per cent) fall within or above the SR1.5 range of 47–65 per cent consistent with 1.5 °C pathways.

30. Parties identified mitigation options with high net emission reduction potential costing less than USD 20/t CO<sub>2</sub> eq, which are projected in the contribution of Working Group III to the AR6 to account for more than half of the total emission reduction potential required for being on 1.5 °C pathways by 2030, including (with estimated net emission reduction potential indicated in parentheses):

(a) Solar energy (3.3 Gt CO<sub>2</sub> eq/year), with 49 per cent of Parties communicating corresponding measures;

(b) Wind energy (3.08 Gt CO<sub>2</sub> eq/year), with 35 per cent of Parties indicating corresponding measures;

(c) Reduced conversion of forests and other ecosystems (2.28 Gt CO<sub>2</sub> eq/year), with 36 per cent of Parties reporting corresponding measures;

(d) Energy efficiency improvement in industry (1.14 Gt CO<sub>2</sub> eq/year), with 27 per cent of Parties identifying corresponding measures.

31. For the mitigation options with high mitigation potential costing USD 20/t CO<sub>2</sub> eq or less, Parties communicated measures for achieving conditional mitigation targets in their NDCs more frequently than measures for achieving unconditional mitigation targets by 69 per cent for wind energy, 67 per cent for geothermal energy, 65 per cent for efficient lighting, appliances and equipment, and 64 per cent for solar energy.

32. Parties also identified in their NDCs mitigation options relevant to those referred to in paragraphs 36–38 of the Glasgow Climate Pact, including:

(a) Phasing down unabated coal power generation, with 9 per cent of Parties (previously 8 per cent) indicating corresponding measures. Some of those Parties (3 per cent) mentioned the need and/or measures for a just transition for communities and workers dependent on coal;

(b) Phasing out inefficient fossil fuel subsidies and reforming fossil fuel subsidies, with 4 per cent of Parties (previously 3 per cent) identifying corresponding measures. Some of those Parties (1 per cent) mentioned provision of targeted support to the poorest and most vulnerable in line with national circumstances;

(c) Reducing CH<sub>4</sub> emissions from fossil fuel exploration, production and distribution, with 14 per cent of Parties communicating corresponding measures;

(d) Reducing CH<sub>4</sub> and N<sub>2</sub>O emissions in agriculture, with 37 per cent of Parties reporting corresponding measures;

(e) Ecosystem restoration, afforestation and reforestation, with 55 per cent of Parties communicating corresponding measures.

33. For mitigation options referred to in paragraph 32(a–e) above, Parties reported measures for achieving conditional mitigation targets in their NDCs more frequently than measures for achieving unconditional mitigation targets by 49 per cent in relation to reducing CH<sub>4</sub> and N<sub>2</sub>O emissions in agriculture, 32 per cent for ecosystem restoration, afforestation and reforestation, and 13 per cent for reducing CH<sub>4</sub> emissions from fossil fuel exploration, production and distribution.

34. Sixty-four per cent of Parties (previously 60 per cent) highlighted policy coherence and synergies between their domestic mitigation measures and development priorities, which include the SDGs and, for some that submitted new or updated NDCs, LT-LEDS and green recovery from the coronavirus disease 2019 pandemic.

#### **D. Information on the possible contribution of the LULUCF sector to the achievement of NDCs**

35. Fifty per cent of Parties (previously about 30 per cent) clarified how they intend to address emissions and subsequent removals due to natural disturbances on managed land if such events occur.

36. Thirty-two per cent (previously 30 per cent) stated that emissions and removals from harvested wood products will be accounted for as part of their NDCs.

#### **E. Information on participation in voluntary cooperation under Article 6 of the Paris Agreement in implementing NDCs**

37. Seventy-six per cent of Parties stated that they plan to or will possibly use at least one type of voluntary cooperation, with the use of cooperative approaches most frequently communicated. Of the Parties that communicated new or updated NDCs, the share that indicated planned or possible use of at least one type of voluntary cooperation has sharply increased from 49 to 82 per cent (previously 46 to 83 per cent) since their previous NDCs.

### **IV. Adaptation**

38. Eighty per cent of Parties included voluntary adaptation components in their NDCs, some (13 per cent, whereas in the previous report, the estimate was 10 per cent) of which were designated as adaptation communication. The adaptation information in the NDCs encompasses adaptation-related research, vulnerabilities, adaptation measures across sectors, adaptation strategies and policies such as NAPs, contingency measures, synergies with mitigation and other global frameworks, and monitoring and evaluation of adaptation.

39. The NDCs illustrate how Parties have advanced adaptation since the previous NDCs. For example, among those Parties who included adaptation component:

(a) An increasing number of Parties provided information on adaptation, indicating the importance attached to adaptation by Parties from all regions and groups;

(b) Of those submitting adaptation component, a higher proportion of Parties (68 per cent, whereas it was estimate at 60 per cent previously) described the status of their process to formulate and implement NAPs, illustrating the role of NAPs as their main national adaptation instrument and a key source of information for the NDCs;

(c) Parties have in general developed more integrated and comprehensive national frameworks for adaptation;

(d) Parties who included adaptation component, provided quantitative time-bound targets (32 per cent), in contrast to the qualitative and open-ended adaptation objectives provided previously, with 15 per cent of them providing the indicator frameworks for monitoring adaptation progress;

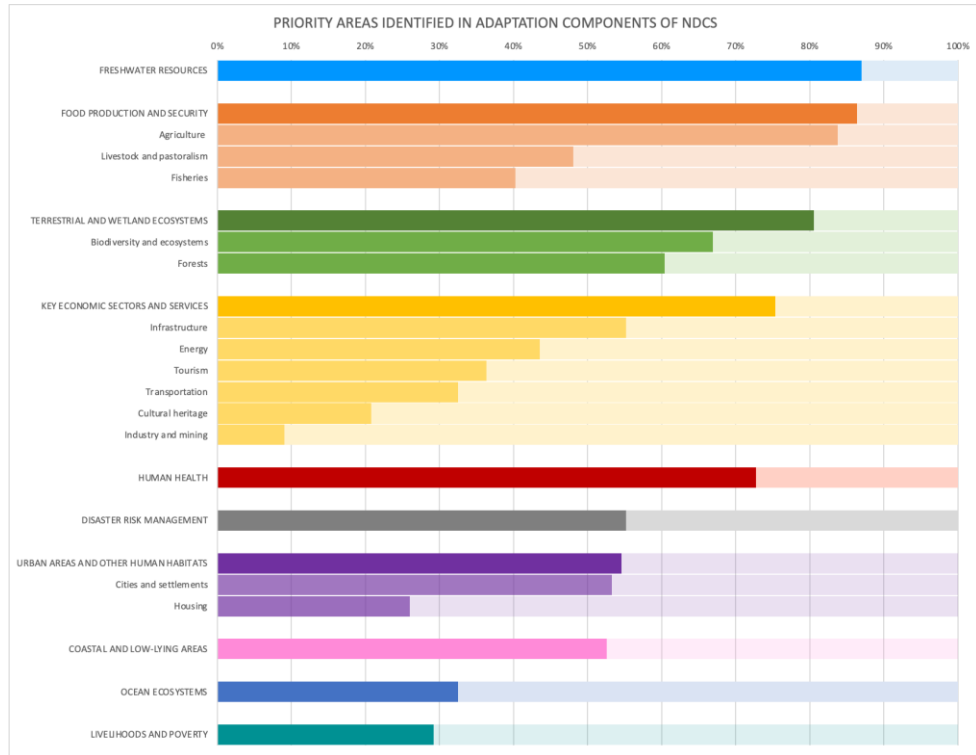
(e) Twenty-two per cent of Parties identified in their adaptation components synergies between adaptation and mitigation, as well as 25 per cent of them specified how adaptation in specific priority areas contributes to achieving individual SDGs.

40. Ninety-one per cent (previously 87 per cent) of the adaptation components described key climatic changes, referring to temperature increase, extreme temperatures, precipitation changes and sea level rise. These were identified as triggering various climate impacts, in particular extreme events (including rainfall events, storms and cyclones), flooding, drought, heatwaves, saltwater intrusion, ocean acidification, coral bleaching, erosion, landslides, fires and thawing ice and permafrost.

41. In terms of adaptation priorities (see figure 7), Parties continue to focus on freshwater resources, food production and security, terrestrial and wetland ecosystems, key economic sectors and services, human health, disaster risk management, urban areas and habitats, coastal and low-lying areas, ocean ecosystems, and livelihoods and poverty (see the annual NDC synthesis report<sup>17</sup> for examples of specific actions in priority sectors).

Figure 7

**Share of adaptation components of nationally determined contributions referring to specific adaptation priority areas and sectors**



<sup>17</sup> FCCC/PA/CMA/2022/4.

## V. Means of implementation

42. Almost all Parties mentioned some or all means of implementation in their NDCs, although the structure and depth of that information varied significantly. While some Parties included a dedicated section on means of implementation or separate sections on finance, technology and/or capacity-building, many mentioned or referred to aspects of means of implementation in other sections of their NDCs.

43. Many Parties (44 per cent) provided quantitative estimates of financial support needs for NDC implementation. In their new or updated NDCs some Parties provided quantitative estimates of financial support needs, with some (34 per cent) of them providing updated quantitative estimates and others (15 per cent) providing estimates for the first time.

44. Many Parties (58 per cent) identified certain types of technology that they intend to use for implementing adaptation and mitigation actions, most frequently related to the energy, agriculture, water and waste sectors. Technology needs mentioned by Parties were mainly (42 per cent) of a cross-cutting nature addressing both adaptation and mitigation, followed by those focused on mitigation (33 per cent) or adaptation (25 per cent). Since the previous version of this report, the share of Parties (4 per cent) referring in their NDCs to policy and regulatory measures for promoting low-carbon and climate-resilient technologies towards implementing net zero strategies and decarbonization pathways at the national and sectoral level has grown.

45. Most Parties (74 per cent) identified capacity-building as a prerequisite for NDC implementation. Capacity-building needs for formulating policy, integrating mitigation and adaptation into sectoral planning processes, accessing finance and providing the information necessary for clarity, transparency and understanding of NDCs were identified. In the new or updated NDCs, compared with in their previous NDCs, more Parties expressed capacity-building needs for adaptation.

## VI. Relevant recent and forthcoming relevant reports

### A. Annual NDC synthesis report

46. This report is prepared in response to the request from CMA 3<sup>18</sup> for the secretariat to annually update the NDC synthesis report.

(a) In 2022, the NDC synthesis report was published on 26 October 2022,<sup>19</sup> prior to COP 27;

(b) This year's report will be published prior to COP 28.

### B. LT-LEDS synthesis report

47. This report will be prepared in response to the request from CMA 4<sup>20</sup> for the secretariat to prepare a synthesis report on long-term low greenhouse gas emission development strategies referred to in Article 4, paragraph 19, of the Paris Agreement for consideration by CMA 5.

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<sup>18</sup> Decision 1/CMA.3, para. 30.

<sup>19</sup> FCCC/PA/CMA/2022/4 available at <https://unfccc.int/documents/619180>, and its corrigenda available at <https://unfccc.int/documents/624617> (Corr.1) and <https://unfccc.int/documents/624655> (Corr.2)

<sup>20</sup> Decision 1/CMA.4, para. 26.

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## Annex

### List of Parties with new or updated NDCs as recorded in the NDC registry as at 23 September 2022

1. Albania	48. Georgia	98. Paraguay
2. Andorra	49. Ghana	99. Peru
3. Angola	50. Grenada	100. Philippines
4. Antigua and Barbuda	51. Guatemala	101. Qatar
5. Argentina	52. Guinea	102. Republic of Korea
6. Armenia	53. Guinea-Bissau	103. Republic of Moldova
7. Australia	54. Haiti	104. Russian Federation
8. Bahrain	55. Honduras	105. Rwanda
9. Bangladesh	56. Iceland	106. Saint Kitts and Nevis
10. Barbados	57. India	107. Saint Lucia
11. Belarus	58. Indonesia	108. Samoa
12. Belize	59. Iraq	109. Sao Tome and Principe
13. Benin	60. Israel	110. Saudi Arabia
14. Bhutan	61. Jamaica	111. Senegal
15. Bolivia (Plurinational State of)	62. Japan	112. Serbia
16. Bosnia and Herzegovina	63. Jordan	113. Seychelles
17. Brazil	64. Kenya	114. Sierra Leone
18. Brunei Darussalam	65. Kuwait	115. Singapore
19. Burkina Faso	66. Kyrgyzstan	116. Solomon Islands
20. Burundi	67. Lao People's Democratic Republic	117. Somalia
21. Cabo Verde	68. Lebanon	118. South Africa
22. Cambodia	69. Lesotho	119. South Sudan
23. Cameroon	70. Liberia	120. Sri Lanka
24. Canada	71. Malawi	121. State of Palestine
25. Central African Republic	72. Malaysia	122. Sudan
26. Chad	73. Maldives	123. Suriname
27. Chile	74. Mali	124. Switzerland
28. China	75. Marshall Islands	125. Tajikistan
29. Colombia	76. Mauritania	126. Thailand
30. Comoros	77. Mauritius	127. Togo
31. Congo	78. Mexico	128. Tonga
32. Costa Rica	79. Monaco	129. Tunisia
33. Cote d'Ivoire	80. Mongolia	130. Uganda
34. Cuba	81. Montenegro	131. Ukraine
35. Democratic People's Republic of Korea	82. Morocco	132. United Arab Emirates
36. Democratic Republic of the Congo	83. Mozambique	133. United Kingdom of Great Britain and Northern Ireland
37. Dominica	84. Myanmar	134. United Republic of Tanzania
38. Dominican Republic	85. Namibia	135. United States of America
39. Ecuador	86. Nauru	136. Uruguay
40. Egypt	87. Nepal	137. Uzbekistan
41. El Salvador	88. New Zealand	138. Vanuatu
42. Eswatini	89. Nicaragua	139. Venezuela (Bolivarian Republic of)
43. Ethiopia	90. Niger	140. Viet Nam
44. European Union (and its 27 member States)	91. Nigeria	141. Zambia
45. Fiji	92. North Macedonia	142. Zimbabwe
46. Gabon	93. Norway	
47. Gambia	94. Oman	
	95. Pakistan	
	96. Panama	
	97. Papua New Guinea	