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Greenhouse Gas Emission Reduction Pledges by Selected Countries: Nationally Determined Contributions and Net-Zero Legislation

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SUMMARY

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Greenhouse Gas Emission Reduction Pledges by Selected Countries: Nationally Determined Contributions and Net-Zero Legislation

Human-related emissions of greenhouse gases (GHG) have increased globally over time. These increasing emissions contribute to a changing climate, which is a concern for governments, organizations, and other stakeholders. Many governments are taking steps to reduce GHG emissions in an effort to lessen the potential impacts of climate change. Two ways in which national governments are making efforts to reduce GHG emissions are by setting emission reduction targets in updated Nationally Determined Contributions (NDCs) and by enacting domestic legislation aimed at achieving net-zero emissions, referred to as net-zero legislation. Net-zero emissions or net-zero refers to situations where human-caused GHG emissions are balanced by removal of GHG from the atmosphere, including by natural storage in forests and other ecosystems as well as by technological removal and storage.

NDCs are the primary communication of how Parties to the Paris Agreement (PA) are seeking to achieve the agreement's goals. NDCs reflect countries' own national climate plans, including emission reduction goals, adaptation plans, and other elements. All NDCs must address GHG emissions reductions, and most NDCs list quantifiable GHG emission reduction targets. Many countries requesting financial assistance include two sets of targets: targets unconditional on international support and additional, more ambitious targets that are conditional on international support. Parties must submit subsequent NDCs every five years; these submissions reflect a progressive set of targets that contribute to a collectively increased ambition over time. Increased ambition is reflected in some of the NDCs submitted in 2020, which, in many instances, include countries' actions by the year 2030. Many countries have submitted updated NDCs in 2020 and 2021 in advance of the 26th United Nations Climate Change Conference (COP26), which was originally scheduled to be held in November 2020 but was postponed until November 2021 due to the Coronavirus Disease 2019 (COVID-19) pandemic.

CRS selected to track herein the NDCs of 44 countries; the countries were identified using various criteria (e.g., G20 members, top 20 GHG emitters, countries with enacted or introduced net-zero legislation). Of the 44 countries, 31 have submitted updated or second NDCs, 21 of which include more ambitious GHG emission reduction targets than the first NDCs.

The PA asks countries to commit to increasingly ambitious GHG mitigation efforts and encourages countries to submit long-term low GHG emission development strategies. These strategies do not necessarily translate into clear pathways or concrete domestic efforts to reach net-zero emissions. Some countries have proposed or enacted legislation aiming to achieve net-zero emissions domestically, in addition to pledges in their NDCs. Other countries, like the United States, have references to net-zero emissions in policy documents without having enacted legislation.

Research by the Law Library of Congress indicates that 22 countries or regions have enacted legislation and three have proposed legislation; the research did not track U.S. legislation. Most (15 of 22) countries or regions with enacted legislation have set a date of net-zero emissions by 2050. The most ambitious deadline is set by Iceland, which has enacted legislation requiring net-zero emissions by 2040. Germany and Sweden both have set a deadline of net-zero emissions by 2045. Four countries (Ukraine, Slovenia, Malta, and Finland) do not specify dates, according to the Law Library of Congress report. The European Union and 11 of its member states (Denmark, Finland, France, Germany, Hungary, Iceland, Luxembourg, Malta, Slovenia, Spain, and Sweden) have enacted net-zero legislation. Seven of the G20 members (Canada, the EU, France, Germany, Japan, South Korea, and the UK) have enacted net-zero legislation.

Several bills proposing net-zero emissions goals for the United States have been introduced in recent Congresses. Discussion of legislative proposals for U.S. net-zero emissions is beyond the scope of this analysis.

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Introduction

Human-related emissions of greenhouse gases (GHG) have increased globally over time. These increasing emissions contribute to a changing climate, which is a concern to governments, organizations, and others. Many governments are taking steps to reduce GHG emissions in an effort to lessen the potential impacts of climate change. Such efforts are occurring on multiple levels, including globally, nationally, and sub-nationally, as well as by civil society and individuals. On the global and national scale, many countries are working toward the goals laid out in Article 2 of the Paris Agreement (PA), which commits collectively to "Holding the increase in the global average temperature to well below 2ºC above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5ºC above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."[1]

This report presents information about Nationally Determined Contributions (NDCs), which communicate the primary targets and actions to 2030 by which Parties to the PA are seeking to achieve the agreement's goals. NDCs report countries' own national climate plans and include emission reduction goals, adaptation plans, and financing needs, among other elements. Each country's NDC should reflect its capacity to contribute to the collective reduction of global emissions, a principle described in the PA as "common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."[2]

This report lists selected countries' enacted or proposed net-zero emissions legislation. *Net-zero emissions* refers to a situation where human-caused GHG emissions are balanced by removal of GHG from the atmosphere, including by natural storage in forests and other ecosystems as well as by technological removal and storage.[3] NDCs and legislation focused on achieving net-zero emissions are the main tools countries use to meet the goals of the PA and the broader goals of the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was adopted in 1992 with the objective of achieving

> [S]tabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[4]

The PA is a subsidiary agreement under the UNFCCC and Article 4 of the PA expands on the objectives of the UNFCCC:

> In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between

[1] United Nations Treaty Collection, Chapter XXVII Environment, 7.d. Paris Agreement, Paris, December 12, 2015, at https://unfccc.int/sites/default/files/english_paris_agreement.pdf. (Hereinafter, Paris Agreement.) For more information, see CRS Report R44609, *Climate Change: Frequently Asked Questions About the 2015 Paris Agreement*, by Jane A. Leggett and Richard K. Lattanzio.

[2] Paris Agreement, Article 2.

[3] For more information, see CRS In Focus IF11821, *Net-Zero Emissions Pledges: Background and Recent Developments*, by Michael I. Westphal.

[4] United Nations Framework Convention on Climate Change (UNFCCC), agreed on May 9, 1992, entered into force March 21, 1994, 1771 U.N.T.S. 107, United Nations, *Treaty* Series, vol. 1771, p. 107; and U.S. depositary notifications C.N.148.1993, at https://treaties.un.org/doc/Publication/CN/1993/CN.148.1993-Eng.pdf.

> anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.[5]

There are other ways in which countries individually and collectively work toward these goals, including developing long-term low emissions development scenarios (LT-LEDS)[6] and implementing the United Nations Sustainable Development Goals.[7] These latter efforts are outside of the scope of this report.

Congress has expressed interest in collective global GHG emissions reduction efforts for numerous reasons. The potential impacts from a warming climate pose risks globally and to varying degrees across countries and regions. The United States is vulnerable to many potential impacts of climate change, including more variable water supplies, more extreme weather events, shifting crop yields and declining livestock productivity, rising energy costs, higher levels of air pollution, and sea level rise. The ability to stabilize climate change and avoid potential global and domestic effects depends on the participation of significant GHG emitters.[8]

As a Party to the PA, the United States submitted an NDC in 2016 and again when it rejoined the agreement in 2021.[9] Members of Congress have expressed interest in countries' relative emissions reductions efforts, including how they compare with U.S. efforts. They have expressed concerns about the relationships between effort to mitigate GHG emissions, their fairness, and effects on economic competitiveness. Members and their staff meet with representatives from other nations to discuss potential needs and actions to address climate change; for example, they meet at the annual UNFCCC Conference of Parties (COP) meetings and other bilateral and multilateral meetings. The United States helps build governance capacities and funds, including via multilateral funding mechanisms and overseas climate mitigation and adaptation programs that may be identified in NDCs.

Whereas NDCs aim at the 2030 time frame, this report lists a mid-century perspective of countries' enacted and proposed domestic laws that aim to reduce GHG emissions to net-zero (**Table 3**). This report presents a series of tables and visualizations to facilitate comparison of countries' emission reduction targets, where available. Countries were selected for inclusion because they meet one or more of the following criteria:

- among the top 20 emitters of GHGs globally;
- a member of the Group of Seven (G7) or Group of 20 (G20) largest countries plus the European Union;
- hosted a COP meeting since adoption of the PA (i.e., Spain, Poland, Germany, Morocco, France);

[5] Paris Agreement, Article 4.

[6] UNFCCC, Communication of long-term strategies, at https://unfccc.int/process/the-paris-agreement/long-term-strategies.

[7] United Nations (U.N.), The 17 Sustainable Development Goals, at https://sdgs.un.org/goals.

[8] In 2018, the top 10 greenhouse gas (GHG) emitters are (from highest to lowest): China, the U.S., India, the EU, Russia, Indonesia, Brazil, Japan, Iran, and South Korea. World Resources Institute, Climate Watch Data, "Historical GHG Emissions," 2021, available at https://www.climatewatchdata.org/ghg-emissions.

[9] See CRS In Focus IF11746, *United States Rejoins the Paris Agreement on Climate Change: Options for Congress*, by Jane A. Leggett.

- among the top 50 emitters of GHGs globally and received over $10 million in economic assistance from the U.S. Agency for International Development (USAID) in 2018;[10]
- among the top 50 emitters of GHGs globally and have received funding from the Green Climate Fund;[11] or
- introduced or enacted net-zero legislation.

This report is not comprehensive of data for all countries globally or all Parties to the Paris Agreement. The data in this report are current as of October 20, 2021, unless otherwise noted.

Nationally Determined Contributions

NDCs present countries' own efforts, dependent on their circumstances, to reduce emissions and adapt to the effects of climate change. Per Article 4 of the PA, "Each Party shall prepare, communicate and maintain successive nationally determined contributions that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions."[12]

Each Party that signed the PA was required to submit an Intended NDC at that time, and that document became its First NDC upon ratification of the PA; otherwise, Parties must communicate their NDCs upon joining the agreement.[14] Parties are required to submit subsequent NDCs every five years. Subsequent NDCs are intended to reflect a progressive set of targets to contribute toward a collectively increased ambition over time. Article 4 of the PA states that, "Each Party's successive nationally determined contribution will represent a progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."[15]

NDCs Timeline[13]

2015 – COP21: Signatories to the PA were required to submit an Intended NDC (INDC); INDC becomes First NDC upon ratification of PA.

2020 (2021) – COP26: Parties to the PA are required to submit a new or updated NDC that includes the time frame to 2025 and 2030.

2025 – Next round of NDCs expected.

[10] These countries were identified using the federalassistance.gov database to search for all USAID economic (not military) obligations in 2018 and totaling each countries' obligations to identify those that received more than $10 million and Climate Watch Data to identify the top 50 emitters of GHG in 2018. Countries meeting both criteria were included in **Table 1**. This list is not comprehensive of all aid recipients. It does not include aid awarded regionally or to multiple countries.

[11] These countries were identified using the Green Climate Fund (GCF) Data-Interactive Map on program and project-level data by country available at https://unfccc.int/climatefinance/gcf/gcf_data and Climate Watch Data to identify the top 50 emitters. Countries meeting both criteria were included in **Table 1**. This list should not be considered comprehensive of all GCF recipients.

[12] Paris Agreement, Article 4.

[13] For more information, see UNFCCC, Nationally Determined Contributions (NDCs), at https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs.

[14] UN Treaty Collection, "7.d Paris Agreement," Status as at 26-8-2021, at https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en.

[15] Paris Agreement, Article 4.

Increased ambition is reflected in some of the NDCs submitted in 2020,[16] which, in many instances, include countries' actions by the year 2030. Parties who submitted first NDCs that did not include 2030 goals were required to submit new (second) NDCs by 2020. Others were asked to submit updated NDCs by 2020 that reflect increasing ambitions. As of October 20, 2021, of 192 Parties to the PA, all had submitted first (including 113 updated) NDCs and 13 had submitted second NDCs.[17]

The UNFCCC divides Parties into three broad groups with differing emissions reduction capacities and expectations. *Annex I Parties* (listed in Annex I of the UNFCCC) are generally those countries that were considered developed in 1992; *non-Annex I Parties* are all the others. The U.N. considers 49 Parties to be *least developed countries*; the UNFCCC recognizes these countries to have limited capacity to respond and adapt to climate change, and therefore provides different treatment in some provisions.[18] The UNFCCC also refers to developed country Parties and developing country Parties, but these categories are not defined.

The PA largely erased the bifurcation of responsibilities between Annex I and non-Annex I Parties, such that all share the same mandatory requirements. It retains the UNFCCC principle of common but differentiated responsibilities, and sometimes acknowledges that the pace of implementation may vary by development status. Article 4 of the PA states the following:

> Developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets. Developing country Parties should continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances.
>
> The least developed countries and small island developing States may prepare and communicate strategies, plans and actions for low greenhouse gas emissions development reflecting their special circumstances.[19]

All NDCs must address GHG emission reductions. Most NDCs list quantifiable GHG emission reduction targets. These targets appear in a variety of formats and include measurable reductions for specific sectors or GHGs and a specified year to reach peak emissions prior to reducing emissions. All Parties are required to include in their NDCs, "information necessary for clarity, transparency, and understanding,"[20] including a reference point (base year), implementation timeframe and sectors and gases included, among other details. Many countries requesting financial assistance include two sets of targets: targets unconditional on international support and additional, more ambitious, targets that are conditional on international support.[21] Countries' NDCs may include additional goals, for example, efforts to improve adaptation measures, increase forest coverage, or improve access to water.

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[16] The round of NDCs initially due in 2020 were delayed as a result of the global COVID-19 pandemic, which also resulted in a postponement of the 2020 COP meeting (COP26) from November 2020 to November 2021.

[17] UNFCCC, Nationally Determined Contributions (NDCs), at https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs.

[18] UNFCCC, Parties & Observers, at https://unfccc.int/parties-observers.

[19] Paris Agreement, Article 4.

[20] Paris Agreement, Article 4.

[21] UNFCCC, *Nationally Determined Contributions Under the Paris Agreement, Synthesis Report by the Secretariat*, September 17, 2021, at https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf.; Center for Climate and Energy Solutions, Q&A: Understanding Paris Agreement NDCs, at https://www.c2es.org/content/q-and-a-understanding-paris-agreement-ndcs/.

The September 2021 *Nationally Determined Contributions Under the Paris Agreement Synthesis Report by the Secretariat* reviewed 164 NDCs, including 86 new or updated NDCs communicated by 113 Parties that were available in the interim NDC registry as of July 30, 2021.[22] The Synthesis Report estimates the Parties included in this review account for approximately 93% of total global emissions in 2019.[23] Selected observations in the Synthesis Report include the following:

- "Most Parties provided quantified mitigation targets, expressed as clear numerical targets, while some included strategies, plans and actions as components of their NDCs for which there is no quantifiable information";
- "Most Parties communicated economy-wide targets, covering all or almost all sectors defined in the 2006 IPCC Guidelines, with an increasing number of Parties moving to absolute emission reduction targets in their new or updated NDCs";
- "[A]lmost all NDCs cover CO_2 emissions; most cover CH_4, and N_2O emissions, many cover HFC emissions and some cover PFC, SF_6, and NF_3 emissions";
- "Most of the Parties that submitted new or updated NDCs have strengthened their commitment to reducing or limiting GHG emissions by 2025 and/or 2030"; and
- "Most Parties provided quantified information on their mitigation targets and reference points. Of the Parties that submitted new or updated NDCs, most updated the basis for defining their targets, including reference points and/or 'business as usual' scenarios."[24]

Observations of Selected NDCs

NDC Submission Status

Table 1 contains the NDC submission status for all selected countries. Of the top 20 GHG emitters,[25] 12 submitted updated NDCs in 2019, 2020, or 2021, and 6 have submitted first NDCs. Turkey and Iran have not submitted NDCs. Russia and the UK submitted first NDCs in 2020 and the United States submitted its new first NDC after rejoining the PA in 2021.

[22] An Initial NDC Synthesis Report was published on February 26, 2021, a final version was published on September 17, 2021, and the UNFCCC anticipates publishing an updated version on October 25, 2021, see https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report#eq-1.

[23] UNFCCC, *Nationally Determined Contributions Under the Paris Agreement, Synthesis Report by the Secretariat*, September 17, 2021, at https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf.

[24] UNFCCC, *Nationally Determined Contributions Under the Paris Agreement, Synthesis Report by the Secretariat*, Executive Summary, September 17, 2021, pp. 4-5, at https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf.

[25] Based on 2018 Climate Watch Data.

Table 1. Nationally Determined Contribution (NDC) Submission Status for Selected Countries

as of October 20, 2021

Most Recent NDC	Countries	No. of Countries
First NDC	China, Democratic Republic of the Congo, Egypt, India, Kazakhstan, Pakistan, Philippines, Russia, Saudi Arabia, Uzbekistan, Venezuela	11
First NDC, updated	Angola, Australia, Bangladesh, Brazil, Burma, Cameroon, Canada, Chile, Colombia, Ethiopia, EU, France, Germany, Indonesia, Italy, Japan, Mexico, Morocco, Nigeria, Peru, Poland, South Africa, South Korea, Spain, Tanzania, Ukraine, United Kingdom,[a] United States,[b] Vietnam	29
Second NDC	Argentina, South Sudan	2
No NDC available	Iran, Turkey	2

Source: United Nations Framework Convention on Climate Change (UNFCCC), Nationally Determined Contributions (NDCs) Registry, at https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx.

a. The United Kingdom submitted its own First NDC on December 12, 2020, reflecting an increased ambition over the European Union's First NDC from 2016.

b. The United States submitted its First NDC on April 22, 2021, after rejoining the PA, reflecting an increased ambition over its First NDC from 2016.

Comparison of First NDCs to Updated or Second NDCs

In many instances, countries' updated or second NDCs reflect greater emissions reduction ambition than their first NDCs.[26] Of the countries included in this report, some countries did not provide sufficient information to compare the two NDCs' ambitions. Unlike in first NDCs, all but three of the submitted NDCs reviewed use a common time horizon of 2030.

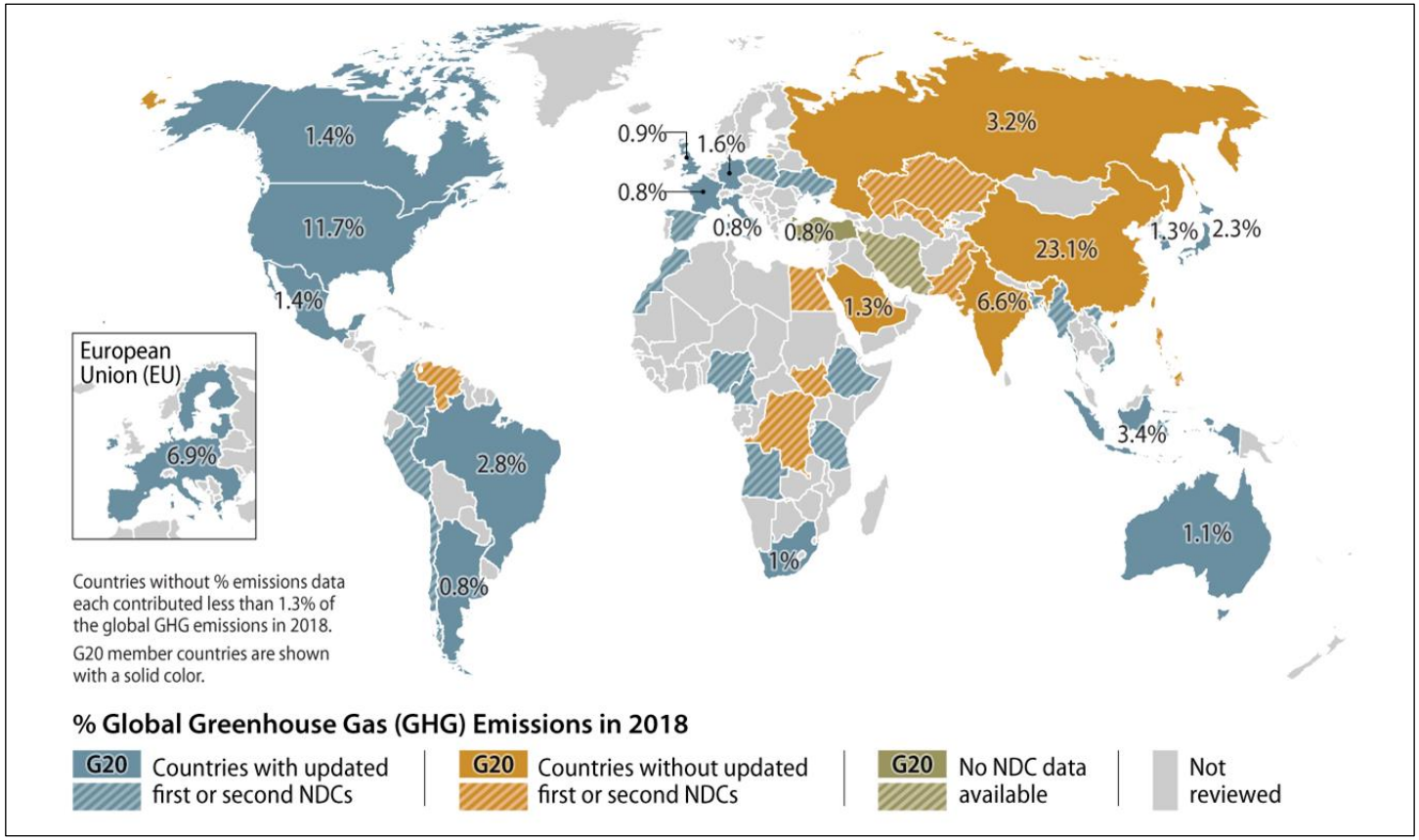
Figure 1 shows a map of the selected countries and their NDC status, including whether their updated or second NDCs reflect an increased greater emissions reduction intentions.

Table 2 contains countries that have submitted updated or second NDCs with increased ambitions and provides a comparison of GHG mitigation targets between each country's first and updated or second NDC.

[26] Article 4 of the Paris Agreement uses the term "ambition" to describe countries' emission reduction plans. The use of "ambition" throughout this report reflects this language and does not imply judgment by CRS.

Figure 1. Selected Countries NDC Status and Percentage of Global GHG Emissions

as of October 20, 2021



Sources: United Nations Framework Convention on Climate Change (UNFCCC), Nationally Determined Contributions (NDCs), at https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs; and World Resources Institute, Climate Watch Data, "Historical GHG Emissions," at https://www.climatewatchdata.org/ghg-emissions.

Notes: G20 member countries are shown with a solid color; countries that are not G20 members are shown with stripes.

Table 2. Increased Greenhouse Gas (GHG) Reduction Targets in Updated or Second NDCs from Selected Countries

GHG emissions estimates are in million metric tons (Mt) of carbon dioxide-equivalents (CO_2e) and include net of removals by land uses and forestry. BAU is "business-as-usual" scenario.

Country	First NDC (INDC) Mitigation Commitments	Second or Updated NDC Mitigation Commitments
Angola	35% reduction from BAU scenario (BAU = 156 in 2025) by 2030 (unconditional); 50% reduction from BAU scenario (BAU = 156 in 2025) by 2030 (unconditional + conditional)	14% reduction from revised BAU scenario (BAU = 108 in 2025) by 2025 (unconditional); 24% reduction from revised BAU scenario (BAU = 108 in 2025) by 2025 (unconditional + conditional)
Argentina	Shall not exceed 483 in 2030	Shall not exceed 359 in 2030
Bangladesh	5% reduction from BAU by 2030 in the power, transport, and industry sectors (unconditional); 20% reduction from BAU by 2030 in the power, transport, and industry sectors (unconditional + conditional)	6.73% reduction from BAU by 2030 (unconditional); 21.85% reduction from BAU by 2030 (unconditional + conditional)
Cameroon	32% reduction from baseline (104) in 2035 (conditional)	12% reduction by 2030 from 2010 levels (unconditional) 35% reduction by 2030 from 2010 levels (unconditional + conditional)
Canada	30% reduction from 2005 levels by 2030	40%-45% reduction from 2005 levels by 2030
Chile	30% reduction of CO_2 emissions/GDP from 2007 levels by 2030; 35%-45% reduction of CO_2 emissions/GDP from 2007 levels by 2030, conditional and considering economic growth	Peak emissions by 2025; Maximum annual emissions up to 95 by 2030; Accumulated emissions between 2020 and 2030 shall not exceed 1,100
Colombia	20% reduction from BAU by 2030 (unconditional); 30% reduction from BAU by 2030 (unconditional + conditional)	Emit a maximum of 169.44 in 2030 (equivalent to a 51% reduction compared with emissions projection in 2030 reference scenario)
Ethiopia	64% reduction from BAU by 2030	14% reduction from BAU by 2030 (unconditional); 68.8% reduction from BAU by 2030 (unconditional + conditional)
EU[a]	At least a 40% reduction from 1990 levels by 2030	At least a 55% reduction from 1990 levels by 2030
Japan	26% reduction from FY2013 levels by FY2030; (25.4% reduction compared with FY2005)	46% reduction from FY2013 levels by FY2030; Net zero by 2050
Morocco	42% reduction below BAU by 2030 (conditional)	18.3% reduction compared with reference scenario by 2030 (unconditional); 45.5% reduction compared with reference scenario by 2030 (unconditional + conditional)
Myanmar	INDC did not include quantified GHG reduction targets.	244.52 reduction by 2030 (unconditional); 414.75 reduction by 2030 (unconditional + conditional)

Country	First NDC (INDC) Mitigation Commitments	Second or Updated NDC Mitigation Commitments
Nigeria	20% reduction from BAU by 2030 (unconditional); 45% reduction from BAU by 2030 (unconditional + conditional)	20% reduction from BAU by 2030 (unconditional); 47% reduction from BAU by 2030 (unconditional + conditional)
Peru	20% reduction from BAU by 2030 (unconditional); 30% reduction from BAU by 2030 (unconditional + conditional)	Not to exceed 208.8 in 2030 (unconditional); Not to exceed 179 in 2030 (unconditional + conditional)
South Africa	398-614 in 2025-2030	398-510 by 2025, and 350-420 by 2030
South Korea	37% reduction from BAU (BAU = 850.6) by 2030	24.4% reduction from 2017 emission levels (709.1) by 2030
Tanzania	10%-20% reduction from BAU by 2030	30%-35% reduction from BAU by 2030
Ukraine	Not to exceed 60% of 1990 levels by 2030	65% reduction from 1990 levels by 2030; "Carbon neutrality" by 2060
United Kingdom	At least a 40% reduction from 1990 levels by 2030 (per EU First NDC)	At least 68% reduction compared to reference years by 2030
United States	26%-28% below 2005 levels by 2025	50%-52% reduction below 2005 levels by 2030
Vietnam	8% reduction from BAU by 2030 (unconditional); 25% reduction from BAU by 2030 (unconditional + conditional)	9% reduction from BAU by 2030 (unconditional); 27% reduction from BAU by 2030 (unconditional + conditional)

Sources: Compiled by the Congressional Research Service (CRS) using data from UNFCCC, NDCs, at https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs; and World Resources Institute, Climate Watch Data, "NDC Enhancement Tracker," 2020, at https://www.climatewatchdata.org/2020-ndc-tracker.

Notes: This table only includes emission reduction targets listed in NDCs and does not include other elements of NDCs, such as supporting information that may have been updated. Please see individual NDC documents for a complete description of gases, sectors, and other data and elements associated with each countries' targets.

a. European Union (EU) member states included among selected countries reviewed for this report are France, Germany, Italy, Poland, and Spain.

Emission Reduction Targets and 2030 Projected Emissions

As described above, this report summarizes NDCs from selected countries. **Table A-1** in the **Appendix** provides GHG emissions and NDC data—including quantified targets and projected emissions for 2030—for these countries, where available. The majority of the selected countries' NDCs contain quantifiable emission reduction targets, but not all of these provide all of the data needed to calculate projected 2030 emissions. Angola and Cameroon, for example, provide targets for years other than 2030 (2025 and 2035, respectively). Myanmar lists a reduction of total emissions but does not provide a reference year.

Countries that provide quantifiable 2030 targets do so in a number of different ways. Some countries (e.g., Democratic Republic of Congo and Japan) provide a single target; others (e.g., Indonesia, Nigeria, and Mexico) list targets conditional upon receiving foreign financial assistance in addition to not conditional targets; the EU and its member states present a "not to exceed" target; and the United States and Canada, for example, present a range of emissions reductions for 2030. Additional data presented in **Table A-1** include 2018 emissions, emissions

per capita, emissions per gross domestic product (GDP), and emissions reductions targets included in each country's NDC, if available.

G20 Countries

G20 countries are responsible for the majority of GHG emissions globally,[27] and many stakeholders are invested in the further emission reduction commitments of G20 members.[28] As of October 20, 2021, 15 members of the G20 have submitted new or updated NDCs and, of these new submissions, 11 indicated plans for greater emissions reductions beyond their initial NDC (including the EU, Italy, Germany, and France).

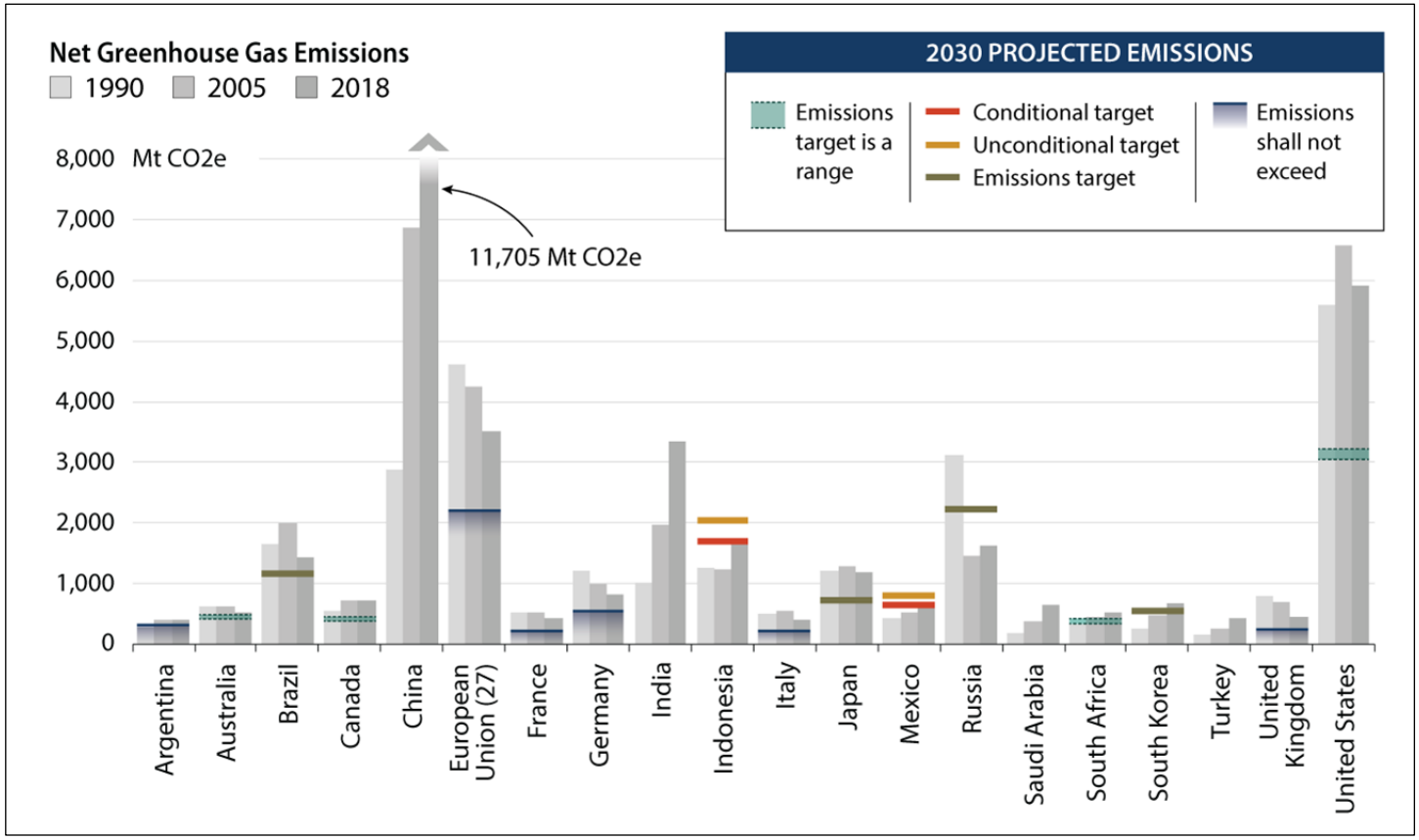
Figure 1 shows the percentage of global GHG emissions each G20 member was responsible for in 2018 and each member's NDC target. **Figure 2** illustrates historical GHG emissions and, where available, projected 2030 emissions for G20 member countries.

[27] G20 countries are Argentina, Australia, Brazil, Canada, China, France, Germany, Japan, India, Indonesia, Italy, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, the United States, and the European Union. Spain is invited as a permanent guest. See https://www.g20.org/about-the-g20.html.

[28] For additional analyses on G20 countries' NDCs and other climate-related activities as well as analyses on potential progress toward meeting the Paris Agreement's goals, see UNFCCC, *Nationally Determined Contributions Under the Paris Agreement, Synthesis Report by the Secretariat*, Executive Summary, September 17, 2021, at https://unfccc.int/sites/default/files/resource/cma2021_08_adv_1.pdf; World Resources Institute, *Closing the Gap: The Impact of G20 Climate Commitments on Limiting Global Temperature Rise to 1.5ºC*, September 16, 2021, at https://www.wri.org/research/closing-the-gap-g20-climate-commitments-limiting-global-temperature-rise; and Climate Action Tracker, at https://climateactiontracker.org/.

Figure 2. G20 Countries: Historical GHG Emissions and 2030 Emissions Projections

as of October 20, 2021



Sources: UNFCCC, NDCs, at https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs; and World Resources Institute, Climate Watch Data, "Historical GHG Emissions," at https://www.climatewatchdata.org/ghg-emissions.

Net-Zero Legislation

In addition to working toward meeting 2030 emission reduction targets identified in their NDCs, some countries are seeking to achieve net-zero emissions within the next several decades, in conformance with the Article 4 provision to "achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century." *Net-zero emissions* refers to a situation where any continued human-caused GHG emissions are balanced by any removal of GHG from the atmosphere, including carbon storage in forests and other ecosystems as well as technological removal and storage.[29] Multiple terms can refer to net-zero emissions, including *climate neutrality* or *carbon neutrality*, depending on whether the scope is all GHG or just CO_2. *Carbon neutrality* refers specifically to net-zero carbon emissions whereas other terms generally include all greenhouse gases. Although they have distinct meanings, some stakeholders or observers at times use the terms interchangeably or with ambiguity.[30]

The PA asks countries to commit to increasingly ambitious GHG mitigation efforts and encourages countries to submit long-term low greenhouse gas emission development strategies (LT-LEDS). Article 4 of the PA states, "All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their common but differentiated responsibilities and respective capabilities, in the light of difference national circumstances."[31]

Many countries have submitted LT-LEDS,[32] but these strategies do not necessarily translate into clear pathways or concrete domestic efforts to reach net-zero emissions. Some countries, however, have introduced or enacted legislation aimed at reducing domestic emissions to net zero. Other countries may refer to net-zero in policy documents without having enacted legislation. **Table 3** provides a list of countries with enacted or proposed domestic net-zero or climate neutrality legislation.[33] The table does not include countries that have *announced* net-zero policies or intentions but not taken action to embody them in law. The table is not a comprehensive list of potential legislation.

Observations of Net-Zero Legislation

Table 3 is derived from the 2021 report published by the Global Legal Research Directorate at the Law Library of Congress, *Net Zero Emissions Legislation Around the World*.[34] The Law Library identified 25 countries or regions with enacted or proposed net-zero legislation. Of these, 22 have enacted net-zero legislation and three have proposed legislation. The Law Library of Congress report does not include analysis of proposed net-zero emission legislation in the United States. Several bills proposing net-zero emissions goals for the United States have been

[29] For more information, see CRS In Focus IF11821, *Net-Zero Emissions Pledges: Background and Recent Developments*, by Michael I. Westphal.

[30] For more information, see CRS In Focus IF11821, *Net-Zero Emissions Pledges: Background and Recent Developments*, by Michael I. Westphal.

[31] Paris Agreement, Article 4.

[32] As of October 20, 2021, 33 countries had submitted long-term low greenhouse gas emission development strategies to the UNFCCC, see https://unfccc.int/process/the-paris-agreement/long-term-strategies.

[33] Table 2 only includes legislation that explicitly proposes net-zero emissions. Other climate-related legislation is not included.

[34] Law Library of Congress, Global Legal Research Directorate, *Net Zero Emissions Legislation Around the World*, 2021, p. 7, at https://lccn.loc.gov/2021687417.

introduced in recent Congresses. Analysis of U.S. net-zero legislative proposals is beyond the scope of this CRS report.

The EU and 11 of its member states (Denmark, Finland, France, Germany, Hungary, Iceland, Luxembourg, Malta, Slovenia, Spain, and Sweden) have enacted net-zero legislation. Seven of the G20 members (Canada, the EU, France, Germany, Japan, South Korea, and the UK) have enacted net-zero legislation.

Most (15 of 22) countries or regions with enacted legislation have set a date of net-zero emissions by 2050. The most ambitious deadline is set by Iceland, which has enacted legislation requiring net-zero emissions by 2040. Germany and Sweden both have set a deadline of net-zero emissions by 2045. Four countries (Ukraine, Slovenia, Malta, and Finland) do not specify dates, according to the Law Library of Congress report.[35]

Table 3. Net-Zero Emissions Legislation for Selected Countries and Regions

as of September 27, 2021

Country	Enacted Legislation (goal and date, if available)	Proposed Legislation
Canada	Canadian Net-Zero Emissions Accountability Act, S.C. 2021, c.22, Royal Assent, June 29, 2031 (net zero by 2050)	
Chile		Climate Change Framework Law, §IV.2.a, submitted to National Congress, Jan. 10, 2020 (net zero by 2050)
,Denmark	Climate Act (No. 965 of June 26, 2020) art. 1 (climate neutrality by 2050)	
European Union (EU)	Regulation (EU) 2021/1119 (European Climate Law), art. 2, 2021 O.J. (L 243) 1 (climate neutrality by 2050)	
Fiji		Climate Change Bill 2021 clauses 6(5) and 38(1) (net zero by 2050)
Finland	Klimatlag (FFS 609/2015), §6	
France	Code de l'énergie, art. L100-4, as amended by Loi n° 2019-1147 du 8 novembre 2019 relative à l'énergie et au climat, art. 1, Nov. 8, 2019 (net zero by 2050)	
Germany	Bundes-Klimaschutzgesetz [KSG], Dec. 12, 2019, Bundesgesetzblatt [BGBl.] I at 2513, as amended, art. 3, para. 2 (climate neutrality by 2045)	
Hungary	Law on Climate Policy: On the Declaration of a Climate Emergency, on Climate Protection, (T/7021), adopted on May 14, 2020, art. 3, §4 (climate neutrality by 2050)	

[35] Law Library of Congress, Global Legal Research Directorate, *Net Zero Emissions Legislation Around the World*, 2021.

Country	Enacted Legislation (goal and date, if available)	Proposed Legislation
Iceland	Climate Act (Lög um loftslagsmál, 2012 nr. 70 29. Júní, (Legally binding emissions reductions for 2030; specifies that the government can issue further legally binding targets. Current policy is carbon neutrality by 2040.)	
Ireland	Climate Action and Low Carbon Development Act 2015, No. 46/2015, s 3(1), as amended by the Climate Action and Low Carbon Development (Amendment) Act 2021, No. 32/2021 (climate neutrality by 2050)	
Japan	Amendment (Act No. 54 of 2021) of Act on Promotion of Global Warming Countermeasures, Act No. 117 of 1998, art. 2-2 (net zero by 2050)	
Liechtenstein	Emissionshandelsgesetz [EHG], Sept. 19, 2012, Landesgesetzblatt-Nummer [LGBl.-Nr.] 2012.346, as amended, art. 4, para. 4, (climate neutrality by 2050)	
Luxembourg	Loi du 15 décembre 2020 relative au climat et modifiant la loi modifiée du 31 mai 1999 portant institution d'un fonds pour la protection de l'environnement, art. 4, Dec. 15, 2020 (net zero by 2050)	
Maldives	Climate Emergency Act, Law No. 9/2021 (net zero by 2030)	
Malta	Climate Action Act, cap. 543	
New Zealand	Climate Change Response Act 2002 s 5Q, inserted by Climate Change Response (Zero Carbon) Amendment Act 2019 s 8 (net zero by 2050; except biogenic methane)	
Norway	Lov om klimamål (klimaloven) (LOV-2017-06-16-60) §4 (reduce emissions by 90%-95% compared with 1990 by 2050)	
Slovenia	Resolution on Slovenia's Long-Term Climate Strategy Until 2050, No. 801-08/21-5/, adopted by National Assembly on July 13, 2021	
South Korea	Framework Act on Carbon Neutral and Green Growth to Respond to Climate Crisis, Act No. 18469, Sept. 24, 2021, art. 7(1) (carbon neutrality by 2050)	
Spain	Ley 7/2021, de 20 de mayo, de cambio climático y transición energética, art. 3-2, Boletin Oficial del Estado, May 21, 2021 (climate neutrality by 2050)	
Sweden	Klimatlag (SFS 2017:720), §3	

Country	Enacted Legislation (goal and date, if available)	Proposed Legislation
	(Does not set specific timelines for emissions reductions, but government must review and set targets every four years. Official policy as of March 2021 is net-zero emissions by 2045; 85% reduction compared with 1990.)	
Taiwan		In 2021, the premier tasked the Environmental Protection Administration with amending the Greenhouse Gas Reduction and Management Act to incorporate the goal of net-zero carbon emissions by 2050 and rename the act the Climate Change Response Act. (Taiwan Working Toward Net-Zero Emissions by 2050, Overseas Community Aff. Council, Taiwan [OCAC] [Sept. 2, 2021]) Individual members of the Legislative Yuan proposed their own bills for amending the act to include the 2050 net-zero emissions goal. (See e.g., Yuan Zong No. 1711, Member Proposal No. 25885 [Feb. 26, 2021]; Yuan Zong No. 1711, Member Proposal No. 26787 [May 27, 2021].)
Ukraine	Law of Ukraine on the Principles of Monitoring, Reporting, and Verification of Greenhouse Gas Emissions, No. 377-IX, adopted Dec. 12, 2019, in force since Jan. 1, 2021, (BBP), 2020, No. 22, p. 150, pmbl. (harmonizes Ukrainian legislation with standards of EU law [an obligation for Ukraine under the EU-Ukraine Association Agreement] and implements the provisions of Directives No. 2003/87/EC and No. 2004/101/EC)	
United Kingdom	Climate Change Act 2008, c. 27, s 1(1), as inserted by the Climate Change Act 2008 (2050 Target Amendment) Order 2019, SI 2019/1056 (net zero by 2050)	

Source: Law Library of Congress, Global Legal Research Directorate, *Net Zero Emissions Legislation Around the World*, 2021, p. 7, at https://lccn.loc.gov/2021687417.

Notes: This table includes all countries listed in the Law Library of Congress report and is not limited to the set of selected countries as described earlier in this report. EU member countries are listed only in their own row if they have domestic net-zero legislation in addition to the EU-wide law included. Links to legislation (including links to English translations) available in the referenced Law Library of Congress report.

Appendix. Table of GHG Emissions and NDC Data for Selected Countries

Table A-1 provides GHG emissions data and NDC information for the selected countries discussed in this report. The emissions data, including net GHG emissions, emissions per capita, and emissions per GDP are the most recent year available (2018) from Climate Watch Data.[36] NDC targets are as reported in Parties' NDCs. The Congressional Research Service calculated 2030 emissions targets using data available via Climate Watch Data and stated NDC targets (e.g., a percentage reduction from a base year), unless otherwise noted. This table is not comprehensive of all Parties' NDC targets, emissions, and projections.

[36] Climate Watch Data integrates emissions inventories from the UNFCCC and other sources, then it provides access to the most complete annual emissions data across all countries. Article 12 of the UNFCCC requires that all Parties to Annex I countries submit annual emissions inventories (the most recent of which is for emissions in 2018). Non-Annex I countries submit emissions inventories less frequently. CRS relies on countries' own emissions inventory data, as available via Climate Watch Data, wherever possible. In instances where countries have not provided 2018 emissions data, CRS relies on data from CAIT, as available via Climate Watch Data. (see https://www.climatewatchdata.org/about/faq/ghg).

Table A-1. GHG Emissions Data and NDC Information for Selected Countries

Emissions data, including 2018 emissions, NDC targets and references, and 2030 projections are carbon dioxide-equivalent (CO2e) and are shown as million metric tons (Mt) CO2e, unless otherwise noted, and emissions per capita and per million $ GDP are shown as metric tons (t).

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
Angola[c] (First NDC, updated 5/31/2021)	125	+59	+9	4.04t	1,229t	14% reduction from BAU scenario (2015 inventory projections) by 2025 (unconditional) 24% reduction from BAU scenario (2015 inventory projections) by 2025 (unconditional + conditional)	not available
Argentina[c] (Second NDC, 12/30/2020)	396	+107	-15	8.89t	764t	Shall not exceed 359 in 2030	No more than 359 (from NDC)
Australia (First NDC, updated 12/31/2020)	537	-80	-80	21.51t	375t	26%-28% reduction from 2005 levels by 2030, to be implemented as an emissions budget covering the period 2021-2030	444-457
Bangladesh[c] (First NDC, updated 8/26/2021)	221	+106	+70	1.37t	806t	27.56 (7%) reduction from BAU levels (409.4) by 2030 (unconditional); 89.47 (22%) reduction from BAU (409.4) by 2030 (unconditional + conditional)	320-382
Brazil[c] (First NDC, updated 12/9/2020)	1,420	-220	-580	6.78t	753t	37% reduction from 2005 levels by 2025; and 43% reduction from 2005 levels by 2030	1,140

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
Cameroon[c] (First NDC, updated 10/11/2021)	123	+51.4	-3	4.89t	3187t	12% reduction by 2030 from 2010 levels (unconditional) 35% reduction by 2030 from 2010 levels (unconditional + conditional)	113 (unconditional); 83 (unconditional + conditional)
Canada (First NDC, updated 7/12/2021)	716	+173	-0.55	19.33t	417t	40%-45% reduction from 2005 levels by 2030	394-430
Chile[c] (First NDC, updated 4/9/2020)	52	+21	+11	2.76t	174t	Peak emissions by 2025; Maximum annual emissions up to 95 by 2030; Accumulated emissions between 2020 and 2030 shall not exceed 1,100	No more than 95
China[c] (First NDC, 9/3/2016)	11,710	+8,840	+4,850	8.4t	842t	Peak CO_2 emissions around 2030; Reduce CO_2 emissions/GDP from 2005 levels by 60%-65%; Increase share of nonfossil fuels in primary energy consumption to around 20%; Increase forest stock by 4.5 billion cubic meters from 2005 level	not available
Colombia[c] (First NDC, updated 12/30/2020)	268	+51	+40	5.4t	803t	Emit a maximum of 169.44 in 2030 (equivalent to 51% reduction compared with	169.44 (from NDC)

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
						emissions projection in 2030 reference scenario)	
Democratic Republic of the Congo[c] (First NDC, 12/13/2017)	682	+247	+240	8.11t	14,560kt	17% reduction compared with status quo emissions scenario (430) by 2030	357
Egypt[c] (First NDC, 6/29/2017)	329	+200	+96	3.35t	1320t	not available	not available
Ethiopia[c] (First NDC, updated 7/23/2021)	205	+111	+71	1.9t	2430t	14% reduction compared with the BAU scenario (404) by 2030 (unconditional); 68.8% reduction compared with the BAU scenario (404) by 2030 (unconditional + conditional)	347 (unconditional); 126 (conditional + unconditional)
European Union-27[d] (First NDC, updated 12/18/2020)	3,510	-1,100	-640	7.86t	220t	At least a 55% reduction from 1990 levels by 2030	No more than 2,210
France (EU First NDC, updated 12/18/2020)	427	-103	-88	6.37t	153t	EU target (at least a 55% reduction from 1990 levels by 2030)	No more than 238 (allocated share of projected EU emissions)
Germany (EU First NDC, updated 12/18/2020)	831	-389	-148	10.03t	210t	EU target (at least a 55% reduction from 1990 levels by 2030)	No more than 550 (allocated share of projected EU emissions)

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
India[c] (First NDC, 10/2/2016)	3,350	+2,340	+1,370	2.47t	1233t	33%-35% reduction of emissions intensity of GDP from 2005 levels by 2030; 40% cumulative electric power installed capacity from nonfossil fuel-based energy resources by 2030; Create additional carbon sink of 2.5-3 billion t CO2e through additional forest and tree cover by 2030	not available
Indonesia[c] (First NDC, updated 7/22/2021)	1,700	+440	+460	6.37t	1630t	29% reduction from BAU (2,870) by 2030 (unconditional); 41% reduction from BAU (2,870) by 2030 (unconditional + conditional)	2,037 (unconditional); 1,692 (conditional + unconditional)
Iran[c]	828	+588	+259	10.13t	1820t	No NDC communicated to UNFCCC	
Italy (EU First NDC, updated 12/18/2020)	391	-121	-160	6.48t	187t	EU target (at least a 55% reduction from 1990 levels by 2030)	No more than 231 (allocated share of projected EU emissions)
Japan (First NDC, interim updated 10/12/2020)	1,180	-30	-110	9.33t	238t	46% reduction from FY2013 levels by FY2030	724
Kazakhstan (First NDC, 12/6/2016)	402	+16	+130	21.99t	2241t	15% reduction from 1990 levels by 2030 (unconditional);	290-328

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
						25% reduction from 1990 levels by 2030 (unconditional + conditional)	
Mexico[c] (First NDC, updated 12/30/2020)	695	+278	+174	5.51t	569t	22% reduction in GHG emissions from BAU (991) and 51% reduction in black carbon emissions by 2030 (unconditional); 36% reduction in GHG emissions from BAU (991) and 70% reduction in black carbon emissions by 2030 (unconditional + conditional)	773 (unconditional); 634 (conditional + unconditional)
Morocco[c] (First NDC, updated 6/22/2021)	92	+58	+31	2.56t	782t	18.3% reduction compared with reference scenario (142.3) by 2030 (unconditional); 45.5% reduction compared with reference scenario (142.3) by 2030 (unconditional + conditional)	77.5-116 (from NDC)
Myanmar[c] (First NDC, updated 8/3/2021)	232	+24	+15	4.31	3041t	244.5 reduction by 2030 (unconditional); 414.8 reduction by 2030 (unconditional + conditional)	not available
Nigeria[c] (First NDC, updated, 7/30/2021)	358	+108	+76	1.83t	900t	20% reduction from BAU (453) by 2030 (unconditional); 47% reduction from BAU (453Mt) by 2030 (unconditional + conditional)	362 (unconditional); 240 (conditional + unconditional)

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
Pakistan[c] (First NDC, 11/10/2016)	438	+272	+160	2.07t	1393t	20% reduction from BAU (1603) by 2030 (conditional)	1282
Peru[c] (First NDC, updated 12/18/2020)	186	+82	+53	5.82t	838t	Not to exceed 208.8 in 2030 (unconditional); Not to exceed 179 in 2030 (conditional)	No more than 208.8 (unconditional); no more than 179 (conditional)
Philippines[c] (First NDC, 4/15/2021)	235	+137	+81	2.2t	677t	2.71% reduction from BAU (3.3 Gt cumulative emissions) for the period 2020-2030 (unconditional) 75% reduction from BAU (3.3 Gt cumulative emissions) for the period 2020-2030 (unconditional + conditional)	not available
Poland (EU First NDC, updated 12/18/2020)	376	-66	+23	9.91t	641t	EU target (at least a 55% reduction from 1990 levels by 2030)	No more than 199 (allocated share of projected EU emissions)
Russia (First NDC, 11/25/2020)	1,630	-1480	+170	11.28t	976t	70% reduction relative to 1990 levels by 2030	933
Saudi Arabia[c] (First NDC, 11/3/2016)	638	+447	+272	18.94t	811t	"Seek to achieve mitigation co-benefits ambitions of up to 130 Mt of CO_2eq avoided by 2030 annually through contributions to economic diversification and adaptation."	not available

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
South Africa[c] (First NDC, updated 9/27/2021)	521	+201	+71	9.01t	1410t	Target range of 398-510 by 2025, implementation period of 2021-2025; Target range of 350-420 by 2030, implementation period 2026-2030	350-420 (per NDC)
South Korea[c] (First NDC, updated 12/30/2020)	673	+429	+184	13.04t	390t	24.4% reduction from 2017 emission levels (709.1)	536
South Sudan[c] (First NDC, 2/23/2021)	68	+32	-3	6.24t	not available	not available	not available
Spain (EU First NDC, updated 12/18/2020)	296	+43	-109	6.33t	208t	EU target (at least a 55% reduction from 1990 levels by 2030)	No more than 114 (allocated share of projected EU emissions)
Tanzania[c] (First NDC, updated 7/30/2021)	176	+73	+47	3.12t	3030t	30%-35% reduction from BAU by 2030 (138-153 reduction from BAU)	not available
Turkey	426	+263	+164	5.18t	548t	Turkey is not a Party to the PA and therefore has not submitted an NDC	
Ukraine (First NDC, updated 7/31/2021)	342	-541	-70	7.66t	2610t	65% reduction compared with 1990 by 2030	309
United Kingdom	456	-342	-233	6.86t	159t	At least 68% reduction from 1990 levels by 2030	No more than 255

Country (date)	2018 Net GHG Emissions	Change in Net GHG Emissions 1990-2018	Change in Net GHG Emissions 2005-2018	GHG Emissions/ Capita in 2018	GHG Emissions/ Million GDP in 2018	NDC Targets[a]	Projected 2030 GHG Emissions Per NDC Targets[b]
(First NDC, 12/12/2020)							
United States (First NDC after rejoining the Paris Agreement, 4/22/2021)	5,900	+320	-680	18.07t	287t	50%-52% reduction from 2005 emissions levels by 2030	3,158-3,290
Uzbekistan[c] (First NDC, 11/9/2018)	232	+34	+15	7.04t	4610t	"To decrease specific emissions of GHG per unit of GDP by 10% by 2030 from level of 2010."	not available
Venezuela[c] (First NDC, 2/27/2018)	277	-48	-59	9.6t	not available	20% reduction from BAU (340) by 2030 (conditional)	272
Vietnam[c] (First NDC, updated 9/11/2020)	364	+363	+157	3.81t	1490t	9% reduction from BAU (927.9) by 2030 (unconditional); 27% reduction from BAU (927.9) by 2030 (unconditional + conditional)	677-844

Sources: World Resources Institute, Climate Watch Data "Country Profiles," at https://www.climatewatchdata.org/countries; and UNFCCC NDC Registry, at https://www4.unfccc.int/sites/NDCStaging/Pages/All.aspx.

Notes: GHG emissions data from 2018, 2005, and 1990 and GHG emissions per capita and per GDP data are from countries' reported submissions to the UNFCCC as available from Climate Watch Data, except where noted (see table note c). CO2e is the tons of CO2 that would have the equivalent effect of the GHG on forcing global average temperature (positive or negative) as one ton of the GHG in question. Emissions data include those emissions from land use, land use change, and forestry (LULUCF). Also, t = metric tons; and Gt (gigatons) = 1 billion metric tons. BAU = "business-as-usual." Maia Alberts, CRS Summer Intern, 2021, contributed to this table.

a. NDC targets extracted from most recently submitted NDCs available in the UNFCCC NDC Registry.

b. Year 2030 emissions targets calculated using NDC 2030 target reductions and base year emissions as reported by each country to the UNFCCC, where available. Estimates for the EU-27 and listed member states (France, Germany, Italy, and Spain) under their Effort-Sharing Decision are from Table A1.1 in European Environment Agency, *Trends and Projections in Europe 2020: Tracking Progress Towards Europe's Climate and Energy Targets*, EEA Report No. 13/2020, November 26, 2020, at https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2020/.

c. Because certain countries submitted GHG emissions data to the UNFCCC for intermittent years only, some emissions data are from CAIT (formerly known as the Climate Analysis Indicators Tool), as available from Climate Watch Data. CAIT compiles emissions data from nongovernmental sources to supplement countries' intermittent emissions reporting (see https://cait.wri.org/faq.html).

d. EU-27 emissions data for all years exclude emissions from the UK.

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