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# Greenhouse Gas Pledges by Parties to the United Nations Framework Convention on Climate Change

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# Introduction

International negotiations are underway toward an agreement, due in December 2015, under the *United Nations Framework Convention on Climate Change* (UNFCCC)[1] regarding commitments and actions to address human-related, global climate change from 2020 on. This report briefly summarizes the existing commitments and pledges of selected national and regional governments to limit their greenhouse gas (GHG) emissions as contributions to the global effort. The negotiations cover additional topics, including adaptation to the impacts of climate change and financing to assist the efforts of low-income countries. However, parties to the UNFCCC have not agreed that *intended nationally determined contributions* (INDCs) of parties must or should include those other topics. Consequently, this report focuses only on the GHG mitigation pledges. More extensive information on the climate change negotiations is available in several additional CRS reports.[2]

Following background on the UNFCCC, this report describes the role of INDCs in the current negotiations. It then summarizes selected parties' existing GHG mitigation commitments and pledges in a table that covers both the period to 2020 and from 2020 on. Information on additional parties' INDCs is available through the website of the UNFCCC.[3]

# Background on the UNFCCC

## All Parties Have Common but Differentiated Obligations Aimed at Achieving the UNFCCC's Objective

Nearly all national governments around the world, including the United States,[4] agreed in 1992 to the UNFCCC as the principal framework for addressing climate change internationally. It provided the structure for collaboration among parties and for evolution of efforts toward the treaty's objective of "stabilization of greenhouse gas concentrations in the atmosphere at a level

[1] Sen. Treaty Doc. 102-38; United Nations, *Treaty Series*, vol. 1771, p. 107; and depositary notifications C.N.148.1993. Currently, there are 196 parties to the UNFCCC.

[2] See, among others, CRS Report R40001, *A U.S.-Centric Chronology of the United Nations Framework Convention on Climate Change*, by Jane A. Leggett; CRS In Focus IF10239, *President Obama Pledges Greenhouse Gas Reduction Targets as Contribution to 2015 Global Climate Change Deal*, by Jane A. Leggett; and CRS Report R41889, *International Climate Change Financing: The Green Climate Fund (GCF)*, by Richard K. Lattanzio.

[3] UNFCCC, "INDCs as Communicated by Parties," http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx.

[4] President George H. W. Bush referred the treaty to the U.S. Senate, which gave its advice and consent, and the United States deposited its ratification of the treaty on October 15, 1992.

that would prevent dangerous anthropogenic[5] interference with the Earth's climate system" (UNFCCC Article 2). (See box below.)

[5] Human-induced.

### Stabilizing Carbon Dioxide Concentrations Implies Zero Net Emissions

Parties' INDCs are proffered in the context of negotiations over how actions in 2020 and beyond may contribute to achieving the objective of the UNFCCC, to stabilize GHG concentrations. These are premised on the relationships between GHG emissions, their atmospheric concentrations, and ultimately, global climate change.

Carbon dioxide ($CO_2$) is the major human-related GHG in the atmosphere,[6] even though it constitutes only about 0.04% of the atmosphere. Because $CO_2$ concentrations were roughly stable for thousands of years before the industrial revolution, scientists conclude that natural emissions and natural removals were approximately equal. The human-related addition to the previously balanced "carbon flux" is currently less than 4% annually. However, the incremental accumulation led to important changes over centuries.

In 1992, when the UNFCCC was signed, $CO_2$ concentrations had risen from preindustrial levels by almost 30% (i.e., from about 280 parts per million [ppm] to about 356 ppm).[7] At some point during 2015 or 2016, annual average $CO_2$ concentrations could reach over 400 ppm.[8] The National Academy of Sciences has stated, "The present level of atmospheric $CO_2$ concentration is almost certainly unprecedented in the past million years, during which time modern humans evolved and societies developed. The atmospheric $CO_2$ concentration was however higher in Earth's more distant past (many millions of years ago), at which time paleoclimatic and geological data indicate that temperatures and sea levels were also higher than they are today."[9]

Various scenarios project that $CO_2$ concentrations could rise to 700-900 ppm in this century if human-related burning of fossil fuels, deforestation, and other land-use change were to continue unabated.[10] Such levels would be as much as three times the pre-industrial concentrations.

Meeting the objective of the UNFCCC—stabilizing GHG concentrations—at any level requires that emissions fall to near net zero. That is, the human increment of emissions could not exceed extra removals of the GHG from the atmosphere. Removals of carbon dioxide occur by natural processes, principally growing vegetation and phytoplankton in the oceans. These removal processes are likely to increase somewhat with higher $CO_2$ concentrations ("carbon fertilization") but are limited by nutrient availability and other factors. Removals could be enhanced by human actions.

To stabilize $CO_2$ emissions, human-related net emissions would need to decline to near zero. Some refer to approaching "net zero" as "carbon neutral" or "deep decarbonization" of the economy. This could be achieved by enhancing removals to match natural plus human-related emissions. The level of human-related emissions could be greater to the degree that enhancing removals could offset them—for example, through sequestering more carbon in trees or agricultural soils. The UNFCCC negotiations cover both human-related emissions and enhancing removals.

[6] The UNFCCC covers only GHG that are influenced by human activities though the treaty does not list them individually. Implicitly, some of those substances occur naturally—such as $CO_2$, methane, and nitrous oxide—but only the human-related emissions are covered. Other GHG are not naturally occurring; the only manufactured-only gases include hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3). Additional manufactured gases, such as chlorofluorocarbons (CFC), are also potent GHG but are not addressed under the UNFCCC; they are covered by an existing international treaty, the 1985 Vienna Convention to Protect the Stratospheric Ozone Layer and its subsidiary Montreal Protocol and additional amendments. Under the UNFCCC, negotiations will continue to consider the scope of compounds to be covered by national actions and commitments.

[7] These $CO_2$ concentrations are from the National Oceanic and Atmospheric Administration (NOAA), ftp://aftp.cmdl.noaa.gov/products/trends/co2/co2_annmean_gl.txt. Dated June 5, 2015. Earth Systems Research Laboratory, *Global Greenhouse Gas Reference Network*.

To achieve the UNFCCC's objective over the long-term, all parties agreed to legally binding, qualitative commitments that include (among many others) formulating, implementing, publishing, and regularly updating programs containing measures to mitigate climate change by addressing their GHG emissions and removals from the atmosphere (Article 4.1). Further, all parties agreed to communicate their GHG inventories according to agreed methods and to describe the steps taken or envisaged by the party to implement the convention. The UNFCCC did not contain quantified obligations to achieve specific GHG emission targets, although such obligations have been a primary topic of negotiation ever since.[11]

Because the stated objective of the UNFCCC is to stabilize atmospheric GHG concentrations, parties implicitly obligated themselves jointly to the objective of reducing human-related, global GHG emissions to net zero. (See box.) Because $CO_2$ and most other GHG remain in the atmosphere for decades to thousands of years, they accumulate there as atmospheric concentrations. The cumulative amount of emissions determines the level of concentrations. In turn, the atmospheric concentrations at which GHG may stabilize determines, ultimately, the magnitude of human-forced climate change.[12]

Put another way, the task of stabilizing $CO_2$ concentrations at, say, 550 ppm or avoiding a particular human-induced temperature increase (e.g., 2 degrees Celsius) becomes greater and greater as net emissions continue. The "budget" of cumulative emissions consistent with a set concentration or temperature target gets used up. Continuing net emissions leave less and less of

[8] Ibid.

[9] U.S. National Academy of Sciences, and the Royal Society (United Kingdom). "Climate Change: Evidence and Causes," 2014, https://nas-sites.org/americasclimatechoices/more-resources-on-climate-change/climate-change-evidence-and-causes/.

[10] See, for example, Leon Clarke et al. "Scenarios of Greenhouse Gas Emissions and Atmospheric Concentrations," Washington DC: U.S. Climate Change Science Program, July 2007, http://www.climatescience.gov/Library/sap/sap2-1/default.php. Figure 3.22. Rising concentrations of additional GHG would add to the increase in radiative forcing of the climate system.

[11] See CRS Report R40001, *A U.S.-Centric Chronology of the United Nations Framework Convention on Climate Change*, by Jane A. Leggett.

[12] This statement is independent of the uncertainty of how much global average temperature will increase with a given increase in GHG concentrations. This relationship is called "climate sensitivity." While the *amount* of climate sensitivity is not precisely established, there is not scientific controversy that higher GHG concentrations will result in higher global average temperature and other climate changes. See, for example, Richard S. Lindzen et al. "On the Observational Determination of Climate Sensitivity and Its Implications." *Asia-Pacific Journal of Atmospheric Sciences* 47, no. 4 (August 28, 2011), pp. 377-390, and discussion of a research response to Lindzen's hypothesis: Andy Dessler, "The Return of the Iris Effect?," RealClimate, April 24, 2015, http://www.realclimate.org/index.php/archives/2015/04/the-return-of-the-iris-effect/#ITEM-18375-5. See also CRS Report RL34266, *Climate Change: Science Highlights*, by Jane A. Leggett (Also, certain speculative human interventions are possible through geo-engineering to modify concentrations or climate sensitivity to them. See CRS Report R41371, *Geoengineering: Governance and Technology Policy*, by Kelsi Bracmort and Richard K. Lattanzio.)

the budget for continuously growing economies to emit as they develop and deploy options compatible with reaching and sustaining net zero emissions.

Parties are currently negotiating over whether to quantify the UNFCCC's objective—currently proposed by some as a particular temperature increase to avoid[13] or a concentration target.[14] Doing so would implicitly set an emissions "budget," though it may not be legally binding and individual parties may not be accountable for their shares of the effort.

## Sharing the UNFCCC Objective

The question of how to share the effort to achieve the UNFCCC's stabilization objective has been a core challenge for international cooperation. Because emissions come from all countries, only limitations—then reductions—by all major emitters can stabilize the rising GHG concentrations in the atmosphere.

**"Common but Differentiated Responsibilities and Respective Capabilities"**

Two principles in the UNFCCC are that (1) parties' should act "on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities" (CBDR) and (2) that developed country parties should take the lead in combating climate change. Deciding how these principles should apply to parties' commitments beyond 2020 is a lively topic in the negotiations.

The UNFCCC incorporated "differentiation" of responsibilities in part by listing the higher income parties (in 1992) in Annex I of the treaty. Annex I parties, including the United States, the European Union, Russia, and other then-industrialized nations,[15] took on more specific obligations than non-Annex I Parties—to adopt national policies and measures that would limit GHG emissions and communicating them "with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol" (Article 4.2(b)). At the same time, and reflected in the

[13] The 2010 Cancun Agreements recognized that deep cuts in global GHG emissions are required "with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2 [degrees Celsius] above pre-industrial levels … [and] need to consider … strengthening the long-term global goal … in relation to a global average temperature rise of 1.5 [degrees Celsius]." UNFCCC Conference of the Parties, *Report of the Conference of the Parties on Its Sixteenth Session, Held in Cancun from 29 November to 10 December 2010, Addendum, Part Two: Action Taken by the Conference of the Parties at Its Sixteenth Session*, FCCC/CP/2010/7/Add.1, March 15, 2011, paragraph I.2.4.

[14] The current negotiating text includes a proposed option to stabilize GHG concentration at 350 ppm—well below current concentrations of $CO_2$ only. Most other proposed options include only goals to avoid temperature increases of 2 degrees Celsius (ºC) or 1.5ºC (3.6º or 2.7º Fahrenheit).

[15] Annex I did not include, as examples, Brazil, China, India, Israel, Korea, Mexico, or Singapore. Some of these have incomes per capita higher than some Annex I Parties.

general obligations of the UNFCCC, parties understood that all parties would need to contribute to the common mitigation effort to meet the treaty's objective.

Subsequent rounds of negotiations since 1992 have struggled with the existing bifurcation of responsibilities into Annex I ("developed") and non-Annex I ("developing") countries.

## The Kyoto Protocol's GHG Targets for Annex B Parties Only

Immediately after the UNFCCC entered into force, the parties predicted in 1995 that voluntary national efforts would be insufficient to meet the treaty's objective and therefore entered into negotiations toward a new, subsidiary agreement that would contain binding GHG abatement obligations. In contentious negotiations over the "Berlin Mandate" for the new agreement, the parties agreed to "no new commitments" for developing countries. The resulting 1997 Kyoto Protocol established quantitative, legally binding emission reduction obligations during 2008-2012 for the highest income parties listed in its Annex B, obligations that could be achieved individually or jointly with other parties through markets and other mechanisms.

The United States is one of three of the 195 parties to the UNFCCC that is not also party to the subsidiary Kyoto Protocol. (The other two are Canada[16] and Andorra.) The United States signed the Kyoto Protocol but neither President Clinton nor President Bush sent it to the Senate for advice and consent to ratification.

## Copenhagen Accord and Cancun Agreements

In multiple decisions, the parties agreed on the importance of achieving further GHG mitigation beyond the end of the first Kyoto commitment period (2008-2012). They expected to negotiate a new agreement—either an amendment creating a second commitment period under the Kyoto Protocol or new subsidiary agreement directly under the UNFCCC (or both)—in the 2009 Copenhagen meeting of the Conference of the Parties (COP). Parties disagreed in Copenhagen over whether non-Annex I Parties should take on GHG abatement commitments. The result was the political—but not legally binding—Copenhagen Accord[17] in which the parties

> agree that deep cuts in global emissions are required according to science, and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius, and take action to meet this objective consistent with science and on the basis of equity. We should cooperate in achieving the peaking of global and national emissions as soon as possible, recognizing that the time frame for peaking will be longer in developing countries and bearing in mind that social and economic development and poverty eradication are the first and overriding priorities of developing countries and that a low-emission development strategy is indispensable to sustainable development.

[16] Canada withdrew from the Kyoto Protocol in December 2012.

[17] Conference of the Parties, FCCC/CP/2009/11/Add.1, paragraph 2.

Parties also agreed that Annex I Parties would implement "quantified economy-wide emissions targets for 2020" that each would submit, to be compiled in a document. Non-Annex I Parties agreed to implement GHG mitigation actions that would also be submitted and compiled. In an important sense, this politically binding agreement arguably marked a turning point in the negotiations as non-Annex I Parties agreed to explicit and country-specific commitments to mitigate GHG emissions. The agreement in the Copenhagen Accord was reiterated and expanded in the 2010 Cancun Agreements.

More than 90 parties submitted conditional or unconditional targets or "nationally appropriate mitigation actions" that they would implement to reduce emissions by 2020. For Annex I Parties, these pledges encompass quantified economy-wide emission reduction targets under the convention for all developed countries (FCCC/SBSTA/2014/INF.6) and/or legally binding commitments for the second commitment period of the Kyoto Protocol in 2013-2020.

**Table 1** summarizes the pledges of selected parties to GHG reduction targets or *nationally appropriate mitigation actions*[18] under the 2009 Copenhagen Accord, the 2010 Cancun Agreements, the second commitment period of the Kyoto Protocol, or any more recent pledge (whichever is more current).

## The Durban Platform Negotiations Toward a New Agreement in 2015

The circumstances and capabilities of parties have evolved in the more than two decades since the UNFCCC was negotiated. However, the gap between *obligations* (but not necessarily actions) of Annex I Parties and those of non-Annex I Parties has widened. Since the UNFCCC entered into force in 1994, parties adopted decisions pertaining to Annex I Parties on common estimation methods and reporting guidelines and frequencies, terms for independent and in-country reviews, and—for most Annex B Parties under the Kyoto Protocol—binding, quantitative targets for GHG emissions through 2020.[19] The United States—and later Australia, Canada, Japan, and Russia—took the position that they would not agree to new GHG targets under the UNFCCC unless all major emitting countries also took on GHG mitigation commitments.

Consequently, when UNFCCC parties agreed to engage in a new round of negotiations—the *Durban Platform for Enhanced Action*—toward a new agreement "with legal force" for actions in 2020 and later, they agreed that it would be "applicable to all parties." In concept, this mandate

[18] *Nationally appropriate mitigation actions*, or NAMAs, is a term referring to the set of policies, programs, or other actions that non-Annex I Parties (i.e., those not listed in Annex I of the UNFCCC, generally lower income countries) should identify to mitigate their GHG emissions. Parties that seek international support for NAMAs must record them in a registry and be subject to international measurement, reporting, and verification, according to the Copenhagen Accord.

[19] Canada withdrew from the Kyoto Protocol in December 2012, while Australia, Japan, and Russia declined to take on new GHG targets for the second commitment of the Kyoto Protocol, for 2013-2020.

could eliminate the bifurcation in the UNFCCC between *Annex I* and *non-Annex I Parties*, or between countries with and without binding obligations for quantitative GHG mitigation.

## GHG Mitigation in the "Durban Platform" Negotiations

As part of the Durban Platform negotiations, in 2013, the COP invited all parties to submit their *Intended Nationally Determined Contributions* (INDCs) toward achieving the objective of the UNFCCC, Article 2, in the context of adopting a protocol, another legal instrument, or an agreed outcome with legal force under the convention applicable to all parties.[20] Submission of INDCs is without prejudice to the legal form that Nationally Determined Contributions may take in or associated with the agreement mandated by December 2015.

All parties are expected to provide an "unconditional" INDC—a pledge of actions that the party will undertake without dependence on assistance from other parties. Mexico has included in its INDC a "conditional" pledge of greater GHG mitigation depending on international market incentives and assistance. Other parties also submitted unconditional pledges and conditional pledges (not all quantified) if financial, technological, or capacity-building support were available.

INDCs were to be communicated by the first quarter of 2015 for those parties ready to do so, but for all parties "well in advance of" the 21st meeting of the COP. As of October 6, 2015, 138 of 195 parties to the UNFCCC had submitted official INDCs (including the EU members, which offered a joint submission) containing their GHG pledges beyond 2020. All the top emitting parties, with the exception of Iran, had submitted INDCs.

**Table 1** summarizes pledges or legally binding commitments of 14 selected (mostly high-emitting) parties for 2020 and for post-2020. The list does not include the multitude of individual policies and measures enacted in countries to reduce their emissions or to meet their existing pledges. The yes/no assessments of whether parties appear to be on track to meet their 2020 pledges are derived from various third-party analysts in research organizations and are best considered tentative and uncertain: Much may happen before 2020 to influence countries' GHG emission pathways. In some cases, whether a party may be on track to meet its pledge may have more to do with the challenge inherent in the pledge than with the level of effort made thus far.

Following **Table 1** are qualitative descriptions of INDCs from a few additional, widely varying countries. These summaries are intended to provide a flavor of the range of pledges and concerns expressed in the INDCs.

As noted above, the question of what may be perceived as "ambitious" or "fair" will continue to be an important part of the negotiations; analysis of these issues, however, is beyond the scope of this report. Parties were invited to address the ambition and fairness of their INDCs in their

[20] UNFCCC COP 19, "Further Advancing the Durban Platform," *Report of the Conference of the Parties on Its Nineteenth Session, Held in Warsaw from 11 to 23 November 2013, Addendum, Part Two: Actions Taken by the Conference of the Parties at Its Nineteenth Session*, in FCCC/CP/2013/10.Add.1, Decision 1/CP.19, November 2013.

submissions. One could expect that those topics will be debated as more INDCs are submitted and considered by additional other parties.

**Table 1. Selected Parties' Pledges to Abate Greenhouse Gas Emissions**

(as of October 6, 2015)

| Party | Copenhagen Pledge or 2nd Commitment Period of the Kyoto Protocol to 2020 | Appears on Track for 2020?[a] | Post-2020 Pledge in INDCs |
|---|---|---|---|
| **TOP FIVE EMITTERS** | | | |
| #1 China | Endeavor to reduce $CO_2$ emissions intensity (per unit of GDP) by 40-45% below 2005 levels by 2020. Increase share of non-fossil fuels in primary energy consumption to around 15% by 2020. Increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 compared with 2005. | Y | Announced that, by 2030, it would:<br>• Achieve peaking of $CO_2$ emissions around 2030 and make best efforts to peak earlier;<br>• Increase the share of non-fossil fuel energy sources to around 20% of primary energy supply;<br>• Lower $CO_2$ emitted per unit of GDP by 60-65% compared with 2005 levels;<br>• Expand forest stock volume by around 4.5 billion cubic meters ($m^3$) compared with 2005 levels; and<br>• "Proactively" adapt to climate change. |
| #2 United States | Reduce GHG emissions by 17% below 2005 levels by 2020. | Y | Reduce GHG emissions by 26-28% below 2005 levels by 2025. |
| #3 European Union | Reduce GHG emissions by 20% below 1990 levels by 2020, binding in 2nd commitment period of the Kyoto Protocol. | Y | Binding target to reduce GHG emissions by at least 40% below 1990 levels by 2030. |
| #4 India | Reduce GHG emissions intensity by 20-25% below 2005 levels by 2020, excluding agricultural emissions.<br>Install 175 gigawatts (GW) of renewable energy capacity by 2022, with 100 GW from solar and 38.5 GW from wind, partly financed by a tax on coal. | Y | Reduce GHG emissions intensity of GDP by 33-35% below 2005 levels by 2030; reach 40% share non-fossil installed electric capacity by 2030 with help and financing; increase carbon sink by 2.5-3 billon tons $CO_2e$ by 2030; qualitative goals to mitigate GHG and adapt. |
| #5 Russian Federation | Reduce GHG emissions by 25% below 1990 levels by 2020, conditioned on accounting of forestry sector and binding obligations from all major emitting countries. | Y | "Long-term indicator" to limit GHG emissions to 25-30% below 1990 levels by 2030, subject to the "maximum allowance" of credits for $CO_2$ removals by land use changes and forestry. Target conditioned on what "major emitters" pledge. |

| Party | Copenhagen Pledge or 2nd Commitment Period of the Kyoto Protocol to 2020 | Appears on Track for 2020?[a] | Post-2020 Pledge in INDCs |
|---|---|---|---|
| **SELECTED OTHER COUNTRIES (IN ALPHABETICAL ORDER)** | | | |
| Australia | Reduce GHG emissions by 5% below 2000 levels (13% below 2005 levels), including credits from LULUCF.[b] | Y | Reduce GHG emissions by 26-28% below 2005 levels by 2030. Establish an emissions budget for 2021-2030. Targets National Energy Productivity Plan to achieve 40% improved productivity by 2030. |
| Brazil | Reduce GHG emissions by 36.1% to 38.9% below business-as-usual (BAU) emission trajectories, conditional on international financing. Includes LULUCF. | Y | Reduce GHG emissions 37% below 2005 levels by 2050 and "indicative" 43% below by 2030; elaborate and implement a National Adaptation Plan; implement and maintain REDD+ activities in accordance with require payments under COP decisions. |
| Canada | Reduce GHG emissions by 17% below 2005 levels by 2020. | N | Reduce GHG emissions by 30% below 2005 levels by 2030. |
| Indonesia | Reduce GHG emissions by 26% below BAU by 2020 unilaterally and by 41% conditioned on international support. Includes LULUCF. | N | Reduce GHG emissions by 29% below BAU (2,881 $GtCO_2e$) by 2030 unilaterally and by 41% conditioned on international support. Increase the share of renewable energy to at least 23% by 2025. Consider adaptation and mitigation as integrated for food, water, and energy resources. |
| Japan | Reduce GHG emissions by 26% below 2013 levels (3.8% below FY2005 levels) by 2020, changed following the Fukushima nuclear disaster from its Copenhagen target of 25% below 1990 by 2020. | Y | Reduce GHG emissions by 26% below FY2013 levels by 2030 (24.5% below 2005 levels).<br>Assumes the share of nuclear in electricity supply would be 20-22% by 2030. The share of renewable energy technologies would increase to 22-24%, led by hydro power at approx. 9% and solar at 7%. Coal would take a 26% share. |

| Party | Copenhagen Pledge or 2nd Commitment Period of the Kyoto Protocol to 2020 | Appears on Track for 2020?[a] | Post-2020 Pledge in INDCs |
|---|---|---|---|
| Mexico | Reduce GHG emissions by 30% below BAU, conditioned on adequate financial and technological support. | N | Implies that GHG emissions will peak in 2026. Reductions by 2030 from BAU projections of 25% of all GHG and SLCP[e] emissions, implying a reduction of GHG by 22% and black carbon aerosols by 51%. Total reductions could increase to 40% conditioned on international market incentives and policies. Long-term domestic goal to reduce GHG emissions by 50% below 2000 levels by 2050. Includes adaptation commitments for 2030, *inter alia*, to strengthen adaptive capacities of most vulnerable municipalities, and establish early warning systems and risk management practices. |
| South Africa | Reduce GHG emissions by 34% below BAU by 2020, including LULUCF, and 42% below BAU by 2025, capped at this level. Conditioned on international support. | N | Six adaptation goals premised on existing financial commitments under UNFCCC. "Peak, plateau, and decline": with peak GHG emissions in 2012-2025 and between 398 and 614 $MtCO_2e$ by 2025 and 2030. A "support-INDC" seeking recognition of its past climate-related investments and indicating incremental future costs that require investment and finance for mitigation and adaptation (e.g., US$349 billion to decarbonize electricity by 2050). |
| South Korea | Reduce GHG emissions by 30% below BAU emissions (reported as 813 million tons $CO_2e$) by 2020. | N | Reduce its GHG emissions by 37% below 2030 BAU level (reported as 851 million metric tons of $CO_2e$). Intends to use international carbon credits to achieve this target in part. No decision yet on whether emissions and removals from the land sector will be included. States that it aims to reduce GHG emissions by 49-70% from 2010 levels by 2050. |
| Thailand | Reduce GHG emissions by 7-20% below BAU in the energy and transport sectors only by 2020. | Y | Reduce GHG emissions by 20% below projected BAU (~555 $MtCO_2e$) by 2030. The contribution could increase up to 25% with adequate support under the UNFCCC. |

**Sources:** CRS from various sources, widely available. Country-reported INDCs available at http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx. The notes below provide references to difficult-to-find information. CRS does not intend to include all 195 parties to the UNFCCC in **Table 1** as INDCs are submitted.

**Notes:**

a. Many of the assessments of whether a party is on track to meet its Copenhagen pledge come from analysis of assessments done by ClimateActionTracker.org, a pro-GHG mitigation research group, supplemented by additional sources. Any prediction is, of course, subject to uncertainty.

b. LULUCF means Land Use, Land Use Change, and Forestry activities. Credits may be generated by reducing deforestation or land degradation, or by increasing rates of removals of carbon from the atmosphere by growing vegetation.

c. N.A. means not available.

d. Mohan Vishwa, "PM-Led Climate Panel to Pick Issues for Obama Talks," *The Times of India*, January 19, 2015, http://timesofindia.indiatimes.com/india/PM-led-climate-panel-to-pick-issues-for-Obama-talks/articleshow/45934516.cms.

e. SLCP means Short-Lived Climate Pollutants, a category that includes such radiatively active emissions, such as black carbon aerosols.

The countries covered in **Table 1** are primarily the largest, highest emitting GHG countries in the world. However, a much wider array of countries have submitted INDCs, which display many interests and capabilities. A sense of this variety may be gleaned from the following summaries of a few additional countries' statements, selected to provide a sampling across regions and income levels in conjunction with **Table 1**. In some cases, these countries have made quantitative pledges, while other countries made qualitative statements of intent.

**Bangladesh** stated that it is "working to achieve lower-carbon as well as more resilient development," aiming to become a middle-income country by 2021 while not exceeding the global average GHG emissions per capita.[21] Its INDC pledges GHG mitigation actions "to play its role in global efforts to limit temperature rise to two degrees or preferably 1.5 degrees [Celsius] above pre-industrial levels." Along with adaptation and governance actions, Bangladesh—without conditions—will reduce its GHG emissions from the power, transport, and industry sectors by 12 $MMTCO_2e$ by 2030 to 5% below BAU emissions. Conditioned on international support, Bangladesh "will reduce its GHG emissions in the power, transport, and industry sectors by 36 $MMTCO_2e$ by 2030 or 15% below BAU for those sectors." Bangladesh provides detailed estimates of its current emissions and projections associated with its INDC. It also specifies the existing and new actions it pledges to deliver the conditional contribution, as well as actions in sectors not covered by its GHG emissions mitigation pledge (e.g., agriculture, households, etc.). Bangladesh's INDC identifies adaptation needs and cites World Bank estimates of those costs by 2050: $5.5 billion to address tropical cyclones and storm surges, with annual costs of $112 million, and $2.6 billion to address inland monsoon flooding, with annual costs of $54 billion. Those two categories yield estimated adaptation costs of around $6.6 billion by 2030.

**Chile** pledges[22] to reduce its emissions of $CO_2$ per unit of GDP ($CO_2$ intensity) by 30% compared to the 2007 level. Conditioned on international financial grants, Chile would commit to reducing its $CO_2$ intensity by 35-45% compared to 2007. Chile's INDC also commits to sustainable

[21] Government of the People's Republic of Bangladesh, Ministry of Environment and Forests, "Intended Nationally Determined Contribution (INDC)," September 15, 2015.

[22] Unofficial translation by CRS of Government of Chile, "Intended Nationally Determined Contribution of Chile to the Paris Climate Agreement 2015," September 2015.

management and afforestation of 100,000 hectares (247,105 acres) of forest, equivalent to avoiding emissions or removing GHG from the atmosphere of 600,000 $TCO_2e$ annually by 2030. The INDC also includes a commitment to reforest 100,000 hectares (247,105 acres), mostly with native species, by 2030, equivalent to increasing sequestration of 0.9-1.2 $MMTCO_2e$ annually.

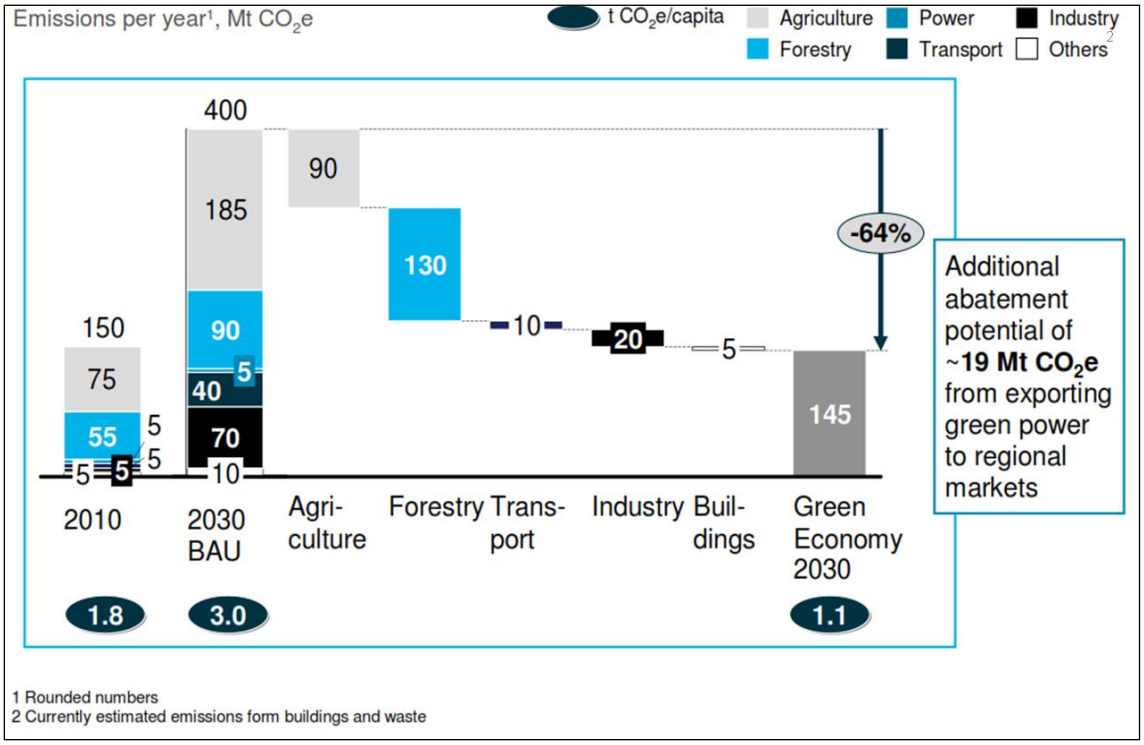
**Ethiopia** "intends to limit its net GHG emissions in 2030 to 145 $MMtCO_2e$ or lower. This would constitute a 255 $MMTCO_2e$ reduction from the projected BAU emissions in 2030 or a 64% reduction from the BAU scenario in 2030. [See **Figure 1**.] Ethiopia also intends to undertake adaptation initiatives to reduce the vulnerability of its population, environment, and economy to the adverse effects of climate change, based on its Climate Resilient Green Economy Strategy."[23] Its INDC is conditioned on receiving international support that stimulates investments. The government further explained:

> At 1.8 $MTCO_2e$, Ethiopia's per capita GHG emissions are insignificant compared to total global emissions. If Ethiopia's contribution is fully implemented, it would reduce per capita emissions to 1.1 $MTCO_2e$ by 2030. For a Least Developed Country, this reduction exceeds expectations for both fairness and ambition while contributing towards the achievement of the objective of the Convention.

Ethiopia also expressed its "vision" of becoming carbon neutral while attaining middle-income status.

[23] Federal Democratic Republic of Ethiopia, "Intended Nationally Determined Contribution (INDC) of the Federal Democratic Republic of Ethiopia," October 6, 2015.

**Figure 1. Ethiopia's Explanation of How to Achieve Its INDC**




**Source:** Federal Democratic Republic of Ethiopia, "Intended Nationally Determined Contribution (INDC) of the Federal Democratic Republic of Ethiopia," October 6, 2015.

**Note:** Ethiopia provides further explanation of its method for estimating sector GHG reductions in its INDC.

**Israel**'s INDC describes an intention "to achieve an economy-wide unconditional target of reducing its per capita greenhouse gas emissions to 7.7 $MTCO_2e$ by 2030 which constitutes a reduction of 26% below the level in 2005 of 10.3 $MTCO_2e$ per capita. An interim target of 8.8 MTCO2e is expected by 2025."[24] Israel noted that its GHG emissions per capita were 10.5 MTCO2e in 2012, while its INDC would bring that down to 10.0 $MTCO_2e$ per capita in 2030. Israel's INDC explains how its national target would be allocated to various sectoral targets. It provides little explanation of specific policies or actions that would achieve those targets.

**Singapore** intends to reduce its GHG emissions intensity by 36% from 2005 levels by 2030, to 0.113 $kgCO_2e$ per Singapore dollar, and to aim to peak its emissions around 2030. Singapore's GHG emissions per capita in 2005 were 40.9 $MTCO_2e$, according to its INDC. The INDC pledges that, contingent on conclusion of a universal legally binding agreement in 2015, it would

[24] Government of Israel, "Israel's Intended Nationally Determined Contribution (INDC)," September 29, 2015.

enhance its existing pledge to reduce its GHG emissions to 16% below its BAU level by 2020, compared to its previous pledge of -7 to -11% below BAU by 2020. The INDC provides few details on how it would achieve its pledges.

Additional INDCS may be found on the UNFCCC website at http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx.

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