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Intended nationally determined contributions: what are the implications for greenhouse gas emissions in 2030?

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1. Introduction and context

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) agreed at the 20th session of the Conference of the Parties (COP20) in Lima, Peru, in December 2014 to set out their “intended nationally determined contributions” (INDCs) ahead of COP21 in Paris, France, in December 2015. It was further agreed that each INDC will “represent a progression beyond the current undertaking of that Party”.¹

The INDCs that were submitted by 23 October 2015 included an indication of expected annual greenhouse gas emissions beyond 2020 (i.e. usually as a target for emissions in 2025 and 2030). Many Parties provided information about their expected annual emissions in 2020 following COP15 in Copenhagen, Denmark, in December 2009.² Hence, these INDCs can be analysed to provide an indication of whether intended action by countries is collectively consistent with the decision, agreed at COP16 in Cancún, Mexico, in 2010, which states it “recognizes that deep cuts in global greenhouse gas emissions are required according to science, and as documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2°C above preindustrial levels, and that Parties should take urgent action to meet this long-term goal, consistent with science and on the basis of equity”.³

A paper by Boyd, Stern and Ward (2015) concluded that, based on announcements by the European Union, China and United States, the INDCs submitted ahead of COP21 are unlikely to be collectively consistent with the goal of having a reasonable chance of avoiding a rise in global average temperature of more than 2°C above its pre-industrial level. An initial analysis by Boyd, Turner and Ward (2015) of INDCs submitted by 46 countries, including the 28 Member States of the European Union, by 20 July 2015 concluded that they collectively represented progress compared with ‘business as usual’, but that they were inconsistent with an emissions pathway that would offer a reasonable chance of avoiding a rise in global average temperature of more than 2°C.

The analysis presented here considers whether the INDCs that were submitted by 23 October 2015 are consistent with a reasonable chance of not exceeding the 2°C warming limit.⁴ As of 23 October 2015, 154 countries (including the 28 Member States of the

¹ UNFCCC (2014; p.3).

² A list of the country submissions are available at:
http://unfccc.int/meetings/copenhagen_dec_2009/items/5276.php

³ UNFCCC (2011; p.3).

⁴ The authors also submitted to the United Nations Environment Programme a similar analysis of INDCs submitted by 146 countries by the 1 October 2015. Between 1 October and 23 October, 8

European Union) had submitted INDCs, including pledges to limit or reduce annual national emissions after 2020.⁵ These 154 countries were together responsible for over 85% of global annual emissions of greenhouse gases,⁶ and represented over 90% of global gross domestic product (GDP),⁷ in 2012. We compare the level of annual global emissions in 2030 implied by these INDCs with pathways for both hypothetical 'business as usual' (BAU) and those consistent with a reasonable chance of not breaching the 2°C warming limit.

Our conclusions are provided in the final section of this paper. Based on our analysis of the INDCs that has been submitted by 23 October 2015 by 154 countries, we conclude that there has been progress compared with hypothetical 'business as usual' global emissions pathways. However there is a gap between the emissions pathway that would result from current ambitions and plans, including those goals outlined by the submitted INDCs, and a pathway that is consistent with a reasonable chance of limiting the rise in global average temperature to no more than 2°C above pre-industrial levels. The most optimistic estimate of global emissions in 2030 resulting from the INDCs is about halfway between hypothetical 'business as usual' and a pathway that is consistent with the 2°C limit. Consequently, countries should be considering opportunities to narrow the gap before and after the COP21 summit in Paris, including:

- i. hard work by all countries to find credible ways of achieving bigger emissions reductions which can be included in INDCs and/or achieved through additional efforts by partnerships (e.g. through specific decarbonisation initiatives among willing countries);
- ii. an intensification of efforts to increase investment and innovation, particularly in relation to the development of cities, energy systems and land use, that could help to close the gap between intentions and the goal before and after 2030;
- iii. the creation of a mechanism, to be included in the agreement emerging from COP21 in Paris in December 2015, for countries to review their efforts and to find ways of ramping up the ambition of their emissions reductions by 2030 and beyond, taking into account the multiple economic benefits, including from reductions in local air pollution, resulting from measures to limit climate change risks;
- iv. concerted efforts by all countries to build strong and transparent domestic bases for the implementation of their INDCs, setting countries on a path to decarbonisation and enabling them to ramp up their ambitions; and
- v. further efforts by countries to provide clarity and quantify uncertainties about their expected future emissions.

countries, producing 1.4% of global emissions, submitted INDCs. This means there is a small difference between the "LSE" results present in the UNEP Emissions Gap Report 2015 and those in this paper.

⁵ INDCs that have been submitted to the secretariat of the UNFCCC are published at: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

⁶ World Resources Institute (2014, 2015).

⁷ The World Bank, World Development Indicators (2015), GDP (current US\$) 2014, retrieved from <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/1W?display=graph>.

2. Evaluation of post-2020 emissions reduction pledges in INDCs

We have assessed greenhouse gas emissions in 2030 based on INDCs that were submitted by 154 countries by 23 October 2015.⁸ The objective of our independent analysis of the INDCs is to help inform the Conference of Parties to the UNFCCC. We have taken INDCs at face value. Where there is uncertainty, our aim is to illustrate the full potential range rather than to produce a ‘best guess’.

There are a number of uncertainties about the national level of annual emissions in 2030 that are implied by the targets set out in the INDCs of some countries. To illustrate this uncertainty, we present three different INDC Scenarios in our results. The first two INDC Scenarios illustrate the range of emissions implied by those mitigation targets that are uncertain in some way. For instance, for an INDC that presents an emissions intensity target—e.g. a target for reducing the tonnes of carbon-dioxide-equivalent per unit of GDP output—the calculated level of emissions depends greatly on what GDP growth rates are assumed over the time period up to the target.⁹ In the case of India and China, we make assessments for two different GDP growth rates: INDC Scenario 1 shows the level of emissions if *independent* GDP growth rate projections are used for the intensity target calculations,¹⁰ and INDC Scenario 2 shows the same result if *official national* GDP growth rate projections are used¹¹.

In addition, INDC Scenario 1 and INDC Scenario 2 may be presented as a range where an emissions target, or emissions intensity target, is expressed as a percentage range (e.g. Russia’s INDC target is to reduce its emissions by 25–30% by 2030 compared with 1990, and India’s target is to reduce the emissions intensity of its economy by 33–35% by 2030 compared with 2005). These Scenarios include all greenhouse gas targets apart from conditional targets. In the case of an INDC that explicitly states both a conditional

⁸ We consider the basket of six anthropogenic greenhouse gases covered by the Kyoto Protocol (i.e. carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride), and express the size of emissions in terms of gigatonnes (Gt), or billions of metric tonnes, of carbon-dioxide-equivalent (CO₂e), based on 100-year global warming potentials, as published in the Second Assessment Report of the Intergovernmental Panel on Climate Change (1995). All sources from human activities, including changes to peat, of the basket of greenhouse gas emissions covered by the Kyoto Protocol are taken into account. See Appendix 1 for details about the approach used here.

⁹ As discussed in Appendix 1 and 2, this is particularly important for the assessment of the INDCs submitted by China and India, where future emissions are expressed in terms of emissions intensity, and the calculated level of emissions depends on assumed GDP growth between today and 2030. Three other countries also submitted INDCs by 23 October 2015 which include emissions intensity targets, but they account for just 0.4% of global emissions, so we have used only one GDP growth assumption each for these countries.

¹⁰ For the purposes of this brief, we use national GDP growth rate estimates from the International Monetary Fund up to 2020 (IMF, 2015), and estimates published by the Organisation for Economic Cooperation and Development (OECD) for the period between 2020 and 2030 (OECD, 2014). The IMF and OECD are both trusted and reliable sources for national financial metrics.

¹¹ India’s INDC explicitly includes official expectations of GDP growth from 2015 to 2030 based on an annual average growth rate of 8.6%. China’s National Centre for Climate Change Strategy and International Cooperation published a paper on China’s INDC (NCSC, 2015) which included GDP growth projections of 7% for the period between 2015 and 2020 and 5.3% between 2020 and 2030. See Appendix 2 for more information.

and unconditional target, we present INDC Scenario 3 to show the level of emissions assuming the delivery of the top (most ambitious) end of their target range only and the delivery of their conditional objective. A summary of the INDC Scenarios is presented in Table 1, and more details can be found in Appendix 1. Assumptions for each country can be found in Appendix 2.

Table 1: Summary of INDC Scenarios used in this report

Scenario	GDP growth assumption	Target range used	Conditional targets
1	Independent GDP projections ¹²	Top and bottom target ranges	Conditional targets are not met
2	National GDP projections		
3	Independent GDP projections	Top target range	All conditional targets met

We compare these three INDC Scenarios with two hypothetical ‘business as usual’ scenarios.

The first hypothetical ‘business as usual’ scenario, a Pre-INDC Reference Scenario, is an aggregate of estimates of emissions in 2030 for every Party to the UNFCCC based on actions and plans that had been introduced by mid-2014, and as assessed by the International Energy Agency and other sources. For those countries that had not submitted INDCs by 23 October 2015, the hypothetical Pre-INDC Reference Scenario allows us to make an informed assumption about their emissions in 2030. It is important to note that the hypothetical Pre-INDC Reference Scenarios generate single value estimates for emissions in 2030, and do not convey the uncertainties around these estimates, in order to make our analysis more manageable. The Pre-INDC Reference Scenarios for individual countries may differ from the assumptions about ‘business as usual’ emissions made by countries during the preparation of their INDCs. Details of our approach to the evaluation of post-2020 emissions reduction pledges in INDCs is described in detail in Appendix 1, with country-level assumptions discussed in Appendix 2.

The second hypothetical ‘business as usual’ scenario is that previously described by the United Nations Environment Programme (UNEP, 2014) for an extrapolation of current economic, social and technological trends, and takes into account climate policies implemented up to about 2005–2010 (i.e. what would happen to emissions if planned climate mitigation policies were not implemented)¹³.

We also compare the three INDC Scenarios with the estimates by the United Nations Environment Programme (2014) of the annual global emissions in 2030 that would be consistent with pathways that offer a 50–66 per cent chance of avoiding global warming of more than 2°C above the pre-industrial global average temperature. UNEP (2014)

¹² See text for details.

¹³ This figure will be updated in the forthcoming 2015 version of the UNEP Emissions Gap Report.

calculated that 36 GtCO_{2e} in 2030 was a median value for these pathways, without assuming significant amounts of ‘negative emissions’ through, for instance, the utilisation of bioenergy and carbon capture and storage (BECCS), or 42 GtCO_{2e} when that assumption is made.

The results of our analysis are presented in Table 2. The most optimistic estimate of global emissions in 2030 resulting from the INDCs (i.e. INDC Scenario 3) is about halfway between the hypothetical ‘business as usual’ pathway from UNEP (2014) and a pathway that is consistent with the 2°C limit.

The estimated total for annual global emissions in 2030 is projected to be between 54.0 billion tonnes of carbon-dioxide-equivalent (GtCO_{2e}) and 56.6 GtCO_{2e} for INDC Scenario 1, assuming conditional targets are not met. For INDC Scenario 2, the range of global annual emissions in 2030 is between 58.3 and 61.1 GtCO_{2e}, again assuming conditional targets are not met. The difference in the ranges for INDC Scenario 1 and INDC Scenario 2 is almost entirely explained by the differences in the assumed economic growth rates for India and China.

For INDC Scenario 3, in which the most ambitious end of conditional INDC targets is met, global emissions in 2030 are projected to be 52.8 GtCO_{2e}.

The projected totals for these INDC Scenarios may be larger than the totals obtained if further countries submit INDCs. However, with more than 85% of 2012 global emissions covered by the INDCs submitted by 154 countries as of 23 October 2015, we expect the potential differences to be relatively small.

Table 2: Projected annual global emissions in 2030

Scenario	Emissions in 2030 (GtCO_{2e})
UNEP hypothetical ‘business as usual’	68
Hypothetical Pre-INDC Reference Scenario	64.4
INDC Scenario 1	54.0 – 56.6
INDC Scenario 2	58.3 – 61.1
INDC Scenario 3	52.8
UNEP 2°C limit (without net negative emissions from power and industry)	36
UNEP 2°C limit (with net negative emissions from power and industry)	42

Table 2 and Figure 1 show the difference between the estimated emissions totals for each of the three INDC Scenarios, the two hypothetical ‘business as usual’ scenarios, and the UNEP estimates for pathways that offer a 50-66% chance of avoiding global warming of more than 2°C.

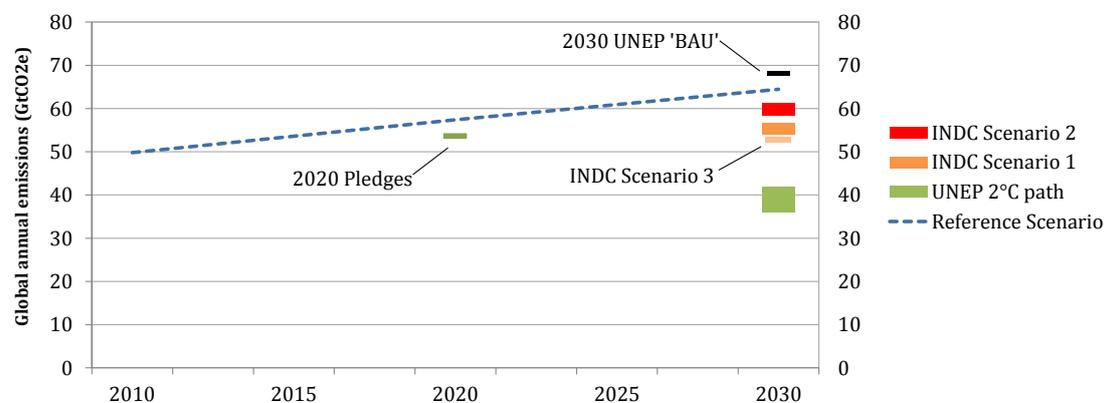
Global annual emissions in 2030 according to INDC Scenario 1 would be approximately 11.4 to 14 GtCO_{2e} lower than UNEP’s hypothetical ‘business as usual’ projection and about 7.8 to 10.4 GtCO_{2e} lower than our hypothetical Pre-INDC Reference Scenario. However, 2030 emissions in INDC Scenario 1 would still be 18 to 20.6 GtCO_{2e} above the

target emissions total for a pathway that offers a 50–66% chance of limiting global warming to no more than 2°C (or 12.0 to 14.6 GtCO_{2e} if significant negative emissions are assumed). Overall, the estimates for INDC Scenario 1 suggest emissions in 2030 will be about two-fifths of the way between hypothetical ‘business as usual’ and a pathway that is consistent with the 2°C warming limit.

According to INDC Scenario 2, global annual emissions in 2030 would be approximately 6.9 to 9.7 GtCO_{2e} lower than UNEP’s hypothetical ‘business as usual’ projection and about 3.3 to 6.2 GtCO_{2e} lower than our hypothetical Pre-INDC Reference Scenario. These emissions would still be 22.3 to 25.1 GtCO_{2e} or 16.3 to 19.1 GtCO_{2e} higher than the emissions pathways for the 2°C warming limit. Overall, the estimates for INDC Scenario 2 suggest emissions in 2030 will be about a quarter of the way between hypothetical ‘business as usual’ and a pathway that is consistent with the 2°C warming limit.

For INDC Scenario 3, emissions in 2030 would be 15.2 and 11.6 GtCO_{2e} lower than the UNEP hypothetical ‘business as usual’ and our hypothetical Pre-INDC Reference Scenario, respectively, but still 16.8 or 10.8 GtCO_{2e} higher than the emissions pathways for the 2°C warming limit. Overall, the estimate for INDC Scenario 3 suggests emissions in 2030 will be about half-way between hypothetical ‘business as usual’ and a pathway that is consistent with the 2°C warming limit.

Figure 1: Global annual emissions between 2010 and 2030



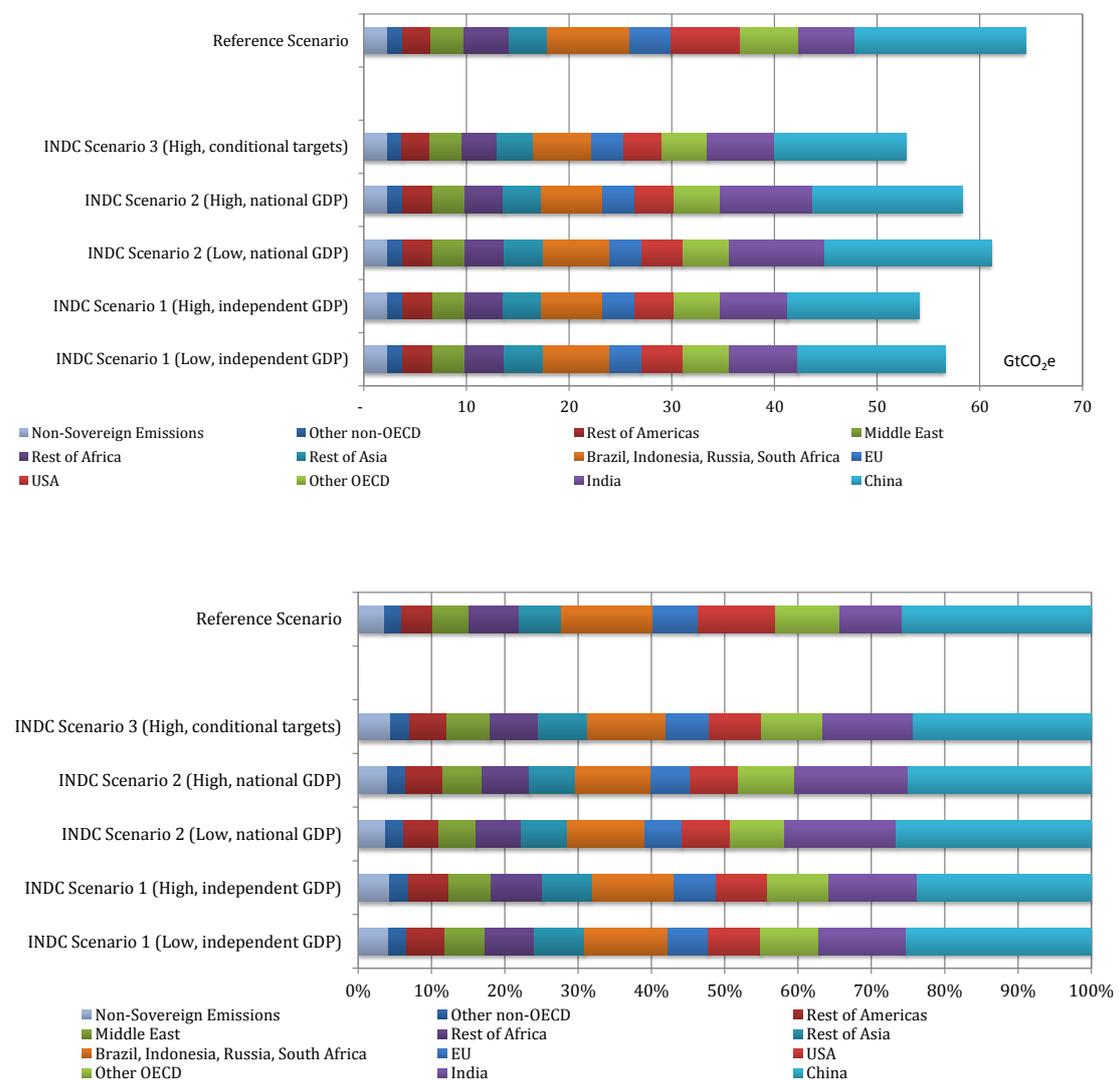
Based on these scenarios, the shares of global emissions in 2030 for OECD and non-OECD countries is around 19–21% and 74–77%, respectively, across the three INDC Scenarios, compared with figures of 32% and 65% in 2010.¹⁴

As noted earlier in this section, the variation in global emissions in 2030 across the INDC Scenarios (particularly between INDC Scenarios 1 and 2) largely results from a few countries that have emissions intensity targets, where assumptions about GDP growth rates are critical for determining emissions levels, as opposed to absolute emission reductions. Notably, two large emitters with emission intensity targets, China and India, account for around 36–41% of the total emissions in 2030, depending on the INDC Scenario; the United States and European Union represent around 13% of 2030

¹⁴ Non-sovereign emissions were around 3% in 2010 and are estimated at 4% in 2030.

emissions; and a group consisting of Brazil, Indonesia, Russia and South Africa, together account for around 11% of 2030 emissions. This means that the 'BRICS' group of countries plus the United States and the European Union would account for about 59–64% of global emissions in 2030, based on the INDC Scenarios presented here. The remaining OECD countries would be responsible for around 8% of total global emissions in 2030 across the three INDC Scenarios, with the rest of Africa (ca. 7%), Middle East (ca. 6%), the rest of the Americas (ca. 5%), the rest of Asia (ca. 7%), the other non-OECD countries (ca. 3%) and non-sovereign emissions (4%) accounting for the remaining emissions. Figures 2a and 2b show a breakdown of absolute emissions in 2030 by country/region and share of total 2030 emissions.

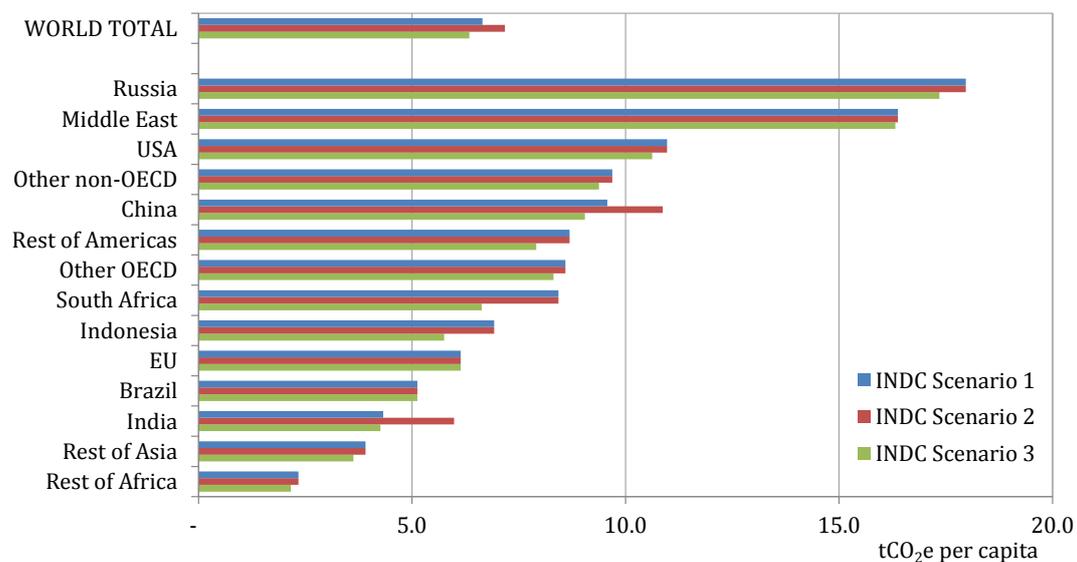
Figures 2a and 2b: Country and regional breakdown of emissions in 2030.



Note: Figure 2a (top) shows absolute emissions (in GtCO_{2e}) from the hypothetical Reference Scenario (top bar) and all INDC Scenarios. Figure 2 (bottom) shows the share of total 2030 emissions from each country/region in each scenario. See Table 6 in Appendix 2 for underlying data.

We can also consider the emissions estimates on a per capita basis: that is, average number of tonnes of carbon-dioxide-equivalent per person in a country or region, using population forecasts by the United Nations to 2030, when the global population might grow to 8.3 billion people.¹⁵ Figure 3 illustrates projected changes in per capita emissions across regions based on INDC Scenarios 1–3. The average per capita emissions for the global Reference Scenario in 2030 is projected to be 7.7 tCO₂e per person, compared with 6.5–7.3 tCO₂e per person across INDC Scenarios 1 and 2, and 6.3 tCO₂e per person in INDC Scenario 3.

Figure 3: Country and regional per capita emissions in 2030 for INDC Scenarios 1–3.



Note: the average from a range of per capita emissions is used for INDC Scenarios 1 and 2, if applicable. See Table 7 for the underlying data.

Appendix 1 presents a qualitative assessment of the submitted INDCs, and details of the approach employed to estimate 2030 emissions resulting from these INDCs.

¹⁵ UNDESA (2015).

3. Conclusions

The results of our analysis show that the INDCs submitted by 23 October 2015 by the 154 countries would result in a reduction in global emissions in 2030 relative to UNEP's hypothetical 'business as usual' pathway and our hypothetical Pre-INDC Reference Scenario.

Nevertheless, our assessment indicates that the INDCs that have so far been submitted, from countries representing over 85% of global emissions in 2012, are not consistent with the total of 36 GtCO_{2e} in 2030 calculated by UNEP (2014) as being on a global emissions pathway that would offer a 50–66 per cent chance of avoiding global warming of more than 2°C above the pre-industrial global average temperature. The most optimistic estimate of global emissions in 2030 resulting from the INDCs is about halfway between hypothetical 'business as usual' and a pathway that is consistent with the 2°C limit. Further, all of the INDC scenarios are higher than the 42 GtCO_{2e} total which UNEP (2014) suggests would be consistent with a 50–66 per cent chance of not breaching the 2°C limit, assuming significant amounts of 'negative emissions' through, for instance, the utilisation of bioenergy and carbon capture and storage (BECCS).

As has been stressed by Boyd, Stern and Ward (2015), the mismatch between the ambitions embodied by the INDCs and the overall objective of having a reasonable chance of avoiding global warming of more than 2°C means that Parties to the UNFCCC should undertake additional action, including:

- i. hard work by all countries to find credible ways of achieving bigger emissions reductions which can be included in INDCs and/or achieved through additional efforts by partnerships (e.g. through specific decarbonisation initiatives among willing countries);
- ii. an intensification of efforts to increase investment and innovation, particularly in relation to the development of cities, energy systems and land use, that could help to close the gap between intentions and the goal before and after 2030;
- iii. the creation of a mechanism, to be included in the agreement emerging from COP21 in Paris in December 2015, for countries to review their efforts and to find ways of ramping up the ambition of their emissions reductions by 2030 and beyond, taking into account the multiple economic benefits, including from reductions in local air pollution, resulting from measures to limit climate change risks; and
- iv. concerted efforts by all countries to build strong and transparent domestic bases for the implementation of their INDCs, setting countries on a path to decarbonisation and enabling them to ramp up their ambitions; and
- v. further efforts by countries to provide clarity and quantify uncertainties about their expected future emissions.

This is the final update in a series of analyses of likely emissions in 2030. Previous versions of this analysis can be found on the websites of the Grantham Research Institute on Climate Change and the Environment (<http://www.lse.ac.uk/grantham>) and the ESRC Centre for Climate Change Economics and Policy (<http://www.cccep.ac.uk>).

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<http://www.wri.org/resources/data-sets/unfccc-annex-i-ghg-emissions-0>

Appendix 1: Approach to evaluating post-2020 emissions reduction pledges in INDCs

Our approach to evaluating post-2020 emissions reduction pledges in INDCs consists of four main steps:

- i. estimating annual emissions of greenhouse gases in 2030 from the INDCs that had been submitted by 154 countries by 23 October 2015;
- ii. estimating a hypothetical Pre-INDC Reference Scenario for each country based on policies that had been implemented by mid-2014;
- iii. calculating the total projected annual global emissions of greenhouse gases in 2030, based on submitted INDCs, across a number of INDC Scenarios using various assumptions as shown in Table 1; and
- iv. quantifying the gaps between the INDC Scenarios and
 - a. a UNEP 'business as usual' pathway and an aggregate of the hypothetical Pre-INDC Reference Scenarios; and
 - b. an aggregate total for global emissions in 2030 that is projected to be consistent with a reasonable chance of avoiding global warming of more than 2°C above pre-industrial levels.

We consider the basket of six anthropogenic greenhouse gases covered by the Kyoto Protocol (i.e. carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride), and express the size of emissions in terms of gigatonnes (Gt), or billions of metric tonnes, of carbon-dioxide-equivalent (CO₂e), based on 100-year global warming potentials, as published in the Second Assessment Report (AR2) of the Intergovernmental Panel on Climate Change (IPCC, 1995). All sources from human activities, including changes to peat, of the basket of greenhouse gas emissions covered by the Kyoto Protocol are taken into account.

Estimating 2030 emissions from INDCs

We have based our calculations on INDCs that have been posted on the website of the UNFCCC.¹⁶ Details of assumptions used to calculate emissions in 2030 from each INDC are listed in Appendix 2. The INDCs for the 28 Member States of the European Union are considered together. In some cases, the INDCs imply a range within which emissions will lie in 2030. In these cases we have calculated the upper and lower limits to the ranges and presented this range in INDC Scenarios 1 and 2. The range does not include the conditional offers submitted by some Parties where both a conditional and unconditional target is stated. It does include unconditional targets, targets for which conditionality is not specified and targets where the Party has stated the entire INDC is conditional. Where conditional targets are expressed, these are estimated and included in INDC Scenario 3.

We use the total for annual emissions of greenhouse gases in 2030 where it is explicitly stated in an INDC. Where it is implied, we have undertaken a calculation based on

¹⁶ See: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>.

information provided by the Party that submitted the INDC. Our general approach has been to take INDCs and other information at face value. We have not conducted a detailed assessment of the different approaches to accounting for emissions from the land sector that have been adopted by Parties. Our general approach has been to assess the INDCs at their face values.

Where, for instance, an INDC expresses emissions in 2030 as a percentage of an earlier year's emissions (e.g. 40 per cent below 1990 levels), we calculate the total based on the emissions data submitted by that Party to the UNFCCC.¹⁷ Where the INDC for a Party is less specific about emissions in 2030, we make simple and reasonable assumptions to estimate the total, with details provided in Appendix 2.

For INDCs that do not explicitly state a level of emissions in 2030, we calculate the total based on the most up-to-date and reliable information about past and future emissions, as well as relevant data about other relevant factors, such as economic growth rates. In some cases this included referring to published analyses. Were any INDCs to include a target measured as a reduction compared with 'business as usual', but without specifying a 'business as usual' projection, we would use the hypothetical Pre-INDC Reference Scenario outlined below. However, of the 67 INDCs that have included a 'business as usual' target only five did not include a 'business as usual' projection, and these targets covered less than 1% of global emissions.

In addition to the analysis of emissions in 2030 based on INDCs, we provide projections of annual emissions in 2020 for the 13 individual countries and 11 regional blocs, based on submissions by Parties to the secretariat of the UNFCCC after COP15, including both conditional and unconditional pledges.¹⁸ These totals are updates on the figures first published by Stern and Taylor (2010), and subsequent submissions by the Grantham Research Institute on Climate Change and the Environment to the United Nations Environment Programme for its annual reports on the gap between emissions commitments and targets (e.g. UNEP, 2013). The totals allow a comparison between projected emissions in 2020 and 2030.

Of the 127 INDC documents assessed (representing 154 Parties), 17 included 'policies and measures', 14 of which we were unable to quantify the impact of greenhouse gas emissions (e.g. share of primary energy demand from non-fossil fuels), and so have excluded from this assessment. The countries that submitted these targets produced 2% of global emission in 2012 (see Table 4).

¹⁷ For Annex I countries: National Communication Reports submitted to the UNFCCC by Parties, compiled by the World Resources Institute (WRI, 2014). For non-Annex I countries: data from the World Resources Institute's CAIT 2.0 dataset (WRI, 2015).

¹⁸ A list of the country submissions are available at:
http://unfccc.int/meetings/copenhagen_dec_2009/items/5276.php

Table 3: Summary of characteristics of INDCs (including 28 Member States of the European Union) submitted by 23 October 2015

	Indicates base year	Includes absolute emissions reduction target	Emissions reduction against 'business-as-usual'	Carbon intensity reduction target	Policies and measures	TOTAL
Unconditional or not specified	50	5	10	2	2	69
Conditional and Unconditional	4	1	35	2	1	43
Conditional only	4	1	17	1	0	23
Unquantified¹⁹	0	0	5	0	14	19
TOTAL	58	7	67	5	17	154

Source: Authors' analysis of INDCs posted on UNFCCC website.

Table 4: Share of 2012 global emissions covered by INDCs submitted by 23 October 2015²⁰

	Indicates base year	Includes absolute emissions reduction target	Emissions reduction against 'business-as-usual'	Carbon intensity reduction target	Policies and measures	TOTAL
Unconditional or not specified	37%	1%	3%	23%	0%	63%
Conditional and Unconditional	1%	0%	11%	0%	0%	12%
Conditional only	0%	0%	2%	6%	0%	8%
Unquantified	0%	0%	1%	0%	2%	3%
TOTAL	38%	1%	17%	29%	2%	86%

Source: Authors' analysis of INDCs posted on UNFCCC website. Rows and columns may not add up due to rounding.

Hypothetical Reference Scenario emissions for countries without INDCs

The UNEP *Emissions Gap Report 2014* presented a hypothetical 'business as usual' pathway based on an extrapolation of current economic, social and technological trends.

¹⁹ In the analysis, hypothetical Pre-INDC Reference Scenarios were used to quantify the five targets measured as a reduction compared with 'business as usual', but without specifying a 'business as usual' projection.

²⁰ World Resources Institute's CAIT 2.0 dataset (WRI, 2015)

This hypothetical scenario only takes into account climate policies implemented up to around 2005–2010 and therefore serves as a reference point for what would happen to emissions without more recent pledges and policies. In this hypothetical scenario, global annual emissions of greenhouse gases would rise from 54 GtCO₂e in 2012 to 68 GtCO₂e in 2030. This figure will be likely change in the forthcoming 2015 version of the UNEP *Emissions Gap Report*.

While UNEP provides one benchmark against which to judge the progress represented by the INDCs, we have also sought to determine a hypothetical Pre-INDC Reference Scenario pathway based on policies that had been implemented by mid-2014. This provides a better estimate of what emissions would be as a result of current policies without additional action. The hypothetical Pre-INDC Reference Scenario emissions for countries that have not submitted INDCs are also used to calculate their total projected annual emissions of greenhouse gases in 2030. It is important to note that our hypothetical Pre-INDC Reference Scenarios for countries have only been used in the calculation of INDC estimates where countries have expressed future emissions relative to 'business as usual' but have not provided any indication of what 'business as usual' emissions would be.

The hypothetical Pre-INDC Reference Scenario to 2030 draws on the following data sources:

- i. emissions of carbon dioxide from all sources other than land use, land-use change and forestry (LULUCF), provided by Enerdata, using the POLES model calibrated for the data from the Current Policies Scenario in the World Energy Outlook (2014) published by the International Energy Agency;²¹
- ii. emissions of carbon dioxide from LULUCF, from the International Institute for Applied Systems Analysis (IIASA);²² and
- iii. emissions of greenhouse gases covered by the Kyoto Protocol, other than carbon dioxide, from the Netherlands Environmental assessment Agency (PBL)²³.

The hypothetical Pre-INDC Reference Scenario totals are calculated for 26 separate blocs:

- 13 individual countries (Brazil, Canada, China, India, Indonesia, Japan, Mexico, Russia, South Africa, South Korea, Turkey, Ukraine, United States);
- 11 regional blocs (European Union, Middle East, Oceania, Northern Africa, Rest of Central America, Rest of Europe, Rest of the Former Soviet Union, Rest of South America, Rest of South Asia, Rest of South East Asia, Rest of Sub-Saharan Africa); and
- two international fuel bunkers (aviation and maritime) which cannot be assigned to any individual countries or regional blocks so are treated as regions in their own right.

²¹ IEA (2014).

²² Kindermann *et al.* (2008).

²³ Lucas *et al.* (2007).

To project the level of emissions of smaller countries in the regional blocs that have not submitted INDCs, we assume that the percentage of emissions produced by a country within each region stays the same between 2012 and 2030 (even if the total absolute emissions for the bloc changes). This is a simplifying assumption; in reality, each country's share of emissions may change over time due to differences in economic growth rates, climate policies, and so on. However, the impact of these trends is likely to be small relative to the global emissions level reported in the results.

In addition, we considered that the emissions data for the 13 individual countries, 11 regional blocs and 2 international bunkers was likely to under-estimate global emissions by not fully including carbon dioxide emissions from peat. We have taken into account emissions from peat in the final total for the hypothetical Pre-INDC Reference Scenario by adding a further 1.5 GtCO₂e per year, with 0.7 GtCO₂e allocated to Indonesia, and 0.6 GtCO₂e unallocated to non-sovereign emissions.²⁴ The data used for the hypothetical Pre-INDC Reference Scenario was procured through open tender by the UK Government's Department of Energy and Climate Change (DECC) for use in its Global Carbon Finance Model (GLOCAF).

The hypothetical Pre-INDC Reference Scenario provides a useful indication of the theoretical level of emissions in 2030, based on the assessment of the International Energy Agency of current policies and socio-economic trends, and other sources. Nonetheless, projecting economic growth, demographic changes and technological development 15 years into the future inherently results in a significant level of uncertainty. The hypothetical Pre-INDC Reference Scenario should, therefore, be regarded as a reasonable estimate of what emissions would hypothetically be, based on current evidence and expectations. It should be noted that the hypothetical Pre-INDC Reference Scenario estimates for each country are presented as single values and do not convey the uncertainty around these estimates. It is also important to note that the values of hypothetical Pre-INDC Reference Scenarios may differ from the 'business as usual' assumptions made by countries during the preparation of their INDCs. For this reason, it is difficult to compare the Pre-INDC Reference Scenarios and the INDC Scenarios, as listed in Table 5 in Appendix 2, for individual countries.

For comparison purposes, alongside the estimates of future emissions for each bloc, we also provide the details of annual emissions in 1990, 2005 and 2010 (from the GLOCAF model). This shows that global emissions in 2010 totalled 49.8 GtCO₂e. These data points are for illustration purposes and were not used in the assessment of INDC emissions. Where INDC targets are expressed as absolute emissions reductions against an historic baseline (e.g. 40 per cent below 1990 levels), the estimation may use a figure other than the historic data provided in Table 5 in Appendix 2. In most cases, the

²⁴ Research suggests global emissions from drained peatland were 1.3 GtCO₂e in 2008, of which 0.5 Gt was from Indonesia. This does not include emissions caused by peat fires (for which conservative estimates are at least 0.4 GtCO₂e) (Joosten, 2010), suggesting a range of 1.3 Gt to 1.7 Gt. We have therefore increased the total annual emission from peat to 1.5 GtCO₂e (the mid-point of this range) to account for these additional emissions. Of this, 0.9 Gt is allocated to Indonesia (0.5 Gt and 0.4 Gt for peat fires). This brings our data Indonesia historical emissions into line with other WRI data.

baseline used will from official national inventory submissions of emissions from Annex I Parties to the UNFCCC, or from the WRI CAIT database for other Parties (i.e. Non-Annex I Parties to the UNFCCC).²⁵ Therefore see Appendix 2 for details of what baseline was used to calculate absolute emissions reductions.

Estimating global annual emissions in 2030

In order to assess the overall impact of the INDCs on global annual emissions in 2030, we create an estimated total based on the INDCs. This is calculated by starting with the hypothetical Pre-INDC Reference Scenario and replacing the emissions total for each Party that has made a submission to the UNFCCC with an estimate based on its INDC. To capture the relevant nuances in the 154 countries that had submitted INDCs, we employ three INDC Scenarios (see Table 1 for a summary of the INDC Scenarios).

- INDC Scenario 1 shows the level of emissions consistent with meeting the INDC targets if *independent* GDP growth rate projections from the IMF and OECD are used for the intensity target calculations (see footnote 10 for more information),
- INDC Scenario 2 shows the same result if *official national* GDP growth rate projections are used for the intensity target calculations for China and India.
- INDC Scenario 3 adopts the ambitious end of target ranges and all conditional targets.

The estimated global totals for each INDC Scenario can be compared with:

- i. The UNEP (2014) 'business as usual' global total, to assess what progress will be made by existing climate policies and the delivery of the INDCs;
- ii. The hypothetical Pre-INDC Reference Scenario, to assess the additional impact of INDCs on top of policies implemented since mid-2014; and
- iii. The UNEP estimates of the pathway for annual global emissions that is consistent with a 50–66 per cent chance of limiting the rise in global average temperature to no more than 2°C above pre-industrial level.

As UNEP (2014) makes clear, there is significant uncertainty around both what 'business as usual' emissions would be, and what level of emissions would be consistent with the 2°C warming limit. We follow the UNEP approach of using a median value from its ranges for emissions in order to make comparisons.

This paper is the final update in a series of analyses of likely emissions in 2030. A previous version of the report, published by the same authors in August 2015, is available on the websites of the Grantham Research Institute on Climate Change and the Environment (<http://www.lse.ac.uk/grantham>) and the ESRC Centre for Climate Change Economics and Policy (<http://www.cccep.ac.uk>). In addition, UNEP is currently updating its analysis of 'business-as-usual' emissions and what level of emissions would be consistent with the 2°C limit.

Appendix 2: Details of calculation of 2030 emissions from each INDC as of 23 October 2015²⁶

Country	Announced 2030 greenhouse gas emissions targets	Target emissions in 2030	Additional conditional target emissions in 2030 (where both a conditional and unconditional are included)
OECD			
Canada	30% reduction in emissions below 2005 by 2030. 2005 baseline 737 million tonnes (Mt) CO ₂ e excluding emissions from land use, land use change and forestry (LULUCF). LULUCF emissions 63 MtCO ₂ e. Target emissions calculated assumes that any increase in the sink relative to the 2005 baseline will be offset by increases in emission in the non-LULUCF sector (“net-net” accounting).	579 MtCO ₂ e.	-
European Union	Headline 40% reductions in emissions against 1990 levels (excluding LULUCF) translates to 41% compared to 1990 including LULUCF.	3126 MtCO ₂ e	-
Japan	26% reduction in emissions below 2013 levels by 2030, or 25.4% reduction below 2005 level (base year excludes LULUCF). INDC includes a target inclusive of LULUCF emissions in 2030 (1042 MtCO ₂ e provided in INDC, measured with global warming potentials as presented in the Fourth Assessment [AR4] of the IPCC (2007)), and the 2005 base year exclusive of LULUCF (1397 MtCO ₂ e provided in INDC, measured with global warming potentials as presented in the Fourth Assessment Report [AR4] of the IPCC (2007)). To estimate Japan's target emissions with Second Assessment Report [AR2] global warming potentials (IPCC, 1995), the authors have applied the same	1008 MtCO ₂ e	-

²⁶ Unless otherwise stated, source of baseline emissions used in calculations are explained under Appendix 1.

	percentage reductions of 25.4% to the 2005 baseline emissions figure from the UNFCCC dataset exclusive of LULUCF (1351 MtCO _{2e}). This gives target emissions in 2030 at 1008 MtCO _{2e} , inclusive of LULUCF emissions.		
Mexico	<p>Unconditional 22% reduction in emissions below 'business as usual' (BAU) by 2030. Authors' calculations do not count black carbon as greenhouse gas (GHG) emissions. BAU emissions for 2030 given in the INDC as 973 MtCO_{2e} and target emissions as 759 MtCO_{2e}.</p> <p>Separate conditional target of 36% reductions below BAU by 2030 with emissions target of 623 MtCO_{2e}.</p>	759 MtCO _{2e}	623 MtCO _{2e}
Oceania	<p>Australia: 26% to 28% reductions in emissions below 2005 levels by 2030. Target emissions levels (441–453 MtCO_{2e}) are published in the document <i>Australia's 2030 emissions reduction target</i> (Australian Government, 2015).</p> <p>New Zealand: 30% reductions in emissions below 2005 levels by 2030. 2005 baseline 77 MtCO_{2e} excluding LULUCF. LULUCF emissions –22 MtCO_{2e}. Target emissions are calculated assuming any increase in the sink relative to the baseline will be off-set by increase in allowed emission in the non-LULUCF sector ("net-net" accounting). Target emissions 32 MtCO_{2e}.</p> <p>Region also includes a number of smaller non-OECD nations, including:</p> <p>Fiji: Reference Scenario used as no INDC submitted.</p> <p>Kiribati: Unconditional 12.8% reductions in emissions below BAU by 2030, equating to 10.09 thousand tCO_{2e} (ktCO_{2e}) of abatement. BAU is calculated as 78.828 ktCO_{2e}. Unconditional target emissions 0.07 MtCO_{2e}. Conditional element is 61.8% reductions in BAU. Conditional target emissions 0.04 MtCO_{2e}.</p> <p>Marshall Islands: 45% reductions in emissions below 2010 levels by 2030.</p>	585–597 MtCO _{2e}	585 MtCO _{2e}

	<p>Target emissions 0.10 MtCO₂e.</p> <p>Papua New Guinea: INDC contains a list of policies and measures, overall impact on GHG emissions not quantified. Reference Scenario used.</p> <p>Samoa: INDC contains a list of policies and measures, overall impact on GHG emissions not quantified. Reference Scenario used.</p> <p>Solomon Islands: Unconditional 30% reduction in emissions below BAU by 2030. BAU emissions in 2030 calculated at 69.167 ktCO₂e. Unconditional target emissions 0.05 MtCO₂e. Conditional target 45% below BAU in 2030. Conditional target emissions 0.04 MtCO₂e.</p> <p>Tonga: Reference Scenario used as no INDC submitted.</p> <p>Vanuatu: abatement target of 72 ktCO₂e from BAU in 2030 from the energy sector. BAU given as 240 ktCO₂e. Target emissions: 0.17 MtCO₂e.</p>		
Rest of Europe	<p>Norway: 40% reduction on 1990 emissions level provided in INDC (52 MtCO₂e, excluding LULUCF). This gives 31.2 MtCO₂e. Projected net removals in 2030 constitute 21.2 MtCO₂e from Norway's INDC. Norway states that only removals beyond the level in the base year and the projected level will count towards the 40% commitment. Target net emissions in 2030 (including LULUCF) 10 MtCO₂e.</p> <p>Iceland: 40% reduction of emissions against 1990 is 3 MtCO₂e by 2030.</p> <p>Switzerland: 50% reduction of emissions against 1990 baseline. 1990 baseline provided in INDC (53.3 MtCO₂e).</p> <p>Region also includes a number of non-OECD nations, including:</p> <p>Albania: 11.5% reductions in emissions below BAU by 2030. Abatement equals to 0.708 MtCO₂e. Target covers CO₂ only. BAU for CO₂ emissions in 2030</p>	186–187 MtCO ₂ e	186 MtCO ₂ e

	<p>calculated as 6.2 MtCO₂e, target emissions for CO₂ 5.4 MtCO₂e. Total emissions estimated as 8.4 MtCO₂e with ratio of CO₂ (65%) and non-CO₂ (35%) in 1994, taken from UNFCCC (2008). Target emissions 8.4 MtCO₂e.</p> <p>Andorra: 37% reductions in emissions (194 ktCO₂e) below BAU (547 ktCO₂e) by 2030. Target emissions 0.35 MtCO₂e.</p> <p>Bosnia & Herzegovina: Unconditional 2% reduction in emissions below BAU by 2030, or 18% increase relative to 1990. Base year 1990 emissions given as 26.6MtCO₂e incl LULUCF. Unconditional target emissions 31 MtCO₂e. Conditional 23% reduction below BAU by 2030, or 3% reduction below 1990. Conditional target emissions 26 MtCO₂e.</p> <p>Liechtenstein: 40% reductions in emissions below 1990 levels by 2030 (229 ktCO₂e baseline given). Target emissions 0.14 MtCO₂e.</p> <p>Macedonia, FYR: 30% to 36% reduction in emissions below BAU by 2030. Target emissions given as 11.4–12.4 MtCO₂e. Targets cover 80% of emissions. Target emissions estimated as 14–15 MtCO₂e using this ratio.</p> <p>Monaco: 50% reduction in emissions below 1990 levels for most gases and below 1995 for fluorinated (f-) gases. Target emissions in INDC at 0.06 MtCO₂e.</p> <p>Montenegro: 30% reductions in emissions below 1990 levels by 2030 for sectors covered. Target emissions at 3,667 ktCO₂e given in INDC.</p> <p>Serbia: 10% reduction in emissions against 1990 by 2030 incl. LULUCF. Target emissions 73 MtCO₂e.</p>		
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Republic of Korea (South)	37% reduction of emissions against BAU in 2030. BAU given in INDC as 850.6 MtCO ₂ e, excluding LULUCF. LULUCF emissions in 2030 are estimated to be -23 MtCO ₂ e (based on 2020 LULUCF projections from the 3rd National Communications report. ²⁷ Therefore BAU in 2030 including LULUCF estimated at 827.6 MtCO ₂ e. Target emissions including LULUCF are therefore 512 MtCO ₂ e.	512 MtCO ₂ e	-
Turkey	21% reductions in emissions below BAU by 2030. BAU in 2030 at 1175 MtCO ₂ e is provided in the INDC. Target emissions 929 MtCO ₂ e.	929 MtCO ₂ e	-
USA	2025 target of 26–28% reduction on 2005 baseline emissions including LULUCF. 2030 based on linear trajectory from 2020 target of 17% reduction on 2005 level, leading to 2030 emissions 35–39% below 2005 level. Target emissions 3780–4028 MtCO ₂ e.	3780–4028 MtCO ₂ e	-
BASICs (Brazil, China, India, South Africa)			
Brazil	43% reduction in emissions below 2005 level by 2030. A target level is included in the INDC, which is estimated with global warming potentials from the IPCC Fifth Assessment Report [AR5] (IPCC, 2013). Authors have taken 43% reductions from WRI's 2005 emissions figure (2057 MtCO ₂ e) (WRI, 2015) as an estimate for Brazil's target emissions measured in global warming potentials in AR2 (IPCC, 1995). Target emissions 1172 MtCO ₂ e.	1172 MtCO ₂ e	-
China ²⁸	60–65% reduction in emissions intensity of GDP relative to 2005 levels.	12,810–14,294 MtCO ₂ e (INDC Scenario 1)	-

²⁷ Republic of Korea (2008).

²⁸ Other research has suggested China emissions in 2030 are likely to be lower than suggested by this analysis—see, for instance, Green and Stern (2015).

	<p>Emissions improvement and GDP projections (approximately 6.2% annual growth 2015–2020, 4% 2020–2030) based on projections from the IMF (2015) and OECD (2014). Authors assume target covers all CO₂ but no other GHGs.</p> <p>CO₂: 2005 baseline for all CO₂ is 5,936 MtCO₂e from China’s 2nd National Communications report.²⁹</p> <p>Non-CO₂: hypothetical Pre-INDC Reference Scenario projection used only for non-CO₂ gases: 2,706 MtCO₂e, and LULUCF of -284 MtCO₂e.</p> <p>Target 60–65% improvement in emissions intensity from 2005 gives 12,810–14,294 MtCO₂e of emissions in 2030 (INDC Scenario 1).</p> <p>With alternative GDP assumptions (approximately 7% annual growth 2015–2020, 5.3% 2020–2030) taken from analysis by the Chinese National Climate Strategy Centre (NCSC).³⁰</p> <p>Target emissions in 2030 are calculated as 14,527–16,256 MtCO₂e (INDC Scenario 2).</p>	14,527–16,256 MtCO ₂ e (INDC Scenario 2)	
India	<p>33–35% reduction in emissions intensity of GDP relative to 2005 levels.</p> <p>2005 baseline figures come from WRI (2015), incl. LULUCF at 1914 MtCO₂e. GDP projections taken from IMF (2015), with average annual growth of 6.8% between 2005 and 2030.</p> <p>Target 33–35% improvement in emissions intensity from 2005 calculated as 6,509–6,709 MtCO₂e (INDC Scenario 1).</p> <p>With alternative GDP assumptions, projections for 2014–2030 taken from</p>	<p>6,509–6,709 MtCO₂e (INDC Scenario 1)</p> <p>9,008–9,285 MtCO₂e (INDC Scenario 2)</p>	-

²⁹ People's Republic of China (2012).

³⁰ NCSC (2015).

	<p>INDC document give an annual average of 8.6% growth over the period. Combining GDP data from IMF (2015) between 2005 and 2013 gives an average of 8.2% between 2005 and 2030.</p> <p>Target 33–35% improvement in emissions intensity from 2005 calculated as 9,008–9,285 MtCO₂e (INDC Scenario 2).</p>		
South Africa	Range of target emissions committed by South Africa is given in INDC as 398–614 MtCO ₂ e by 2025 and 2030. Target excludes LULUCF.	398–614 MtCO ₂ e	-
REST OF WORLD			
Indonesia	Unconditional 29% reduction in emissions below BAU by 2030. BAU at 2030 given in INDC (2881 MtCO ₂ e). Unconditional target emissions 2046 MtCO ₂ e. Separate conditional target of 41% reduction in emissions below BAU by 2030. Conditional target emissions 1700 MtCO ₂ e,	2046 MtCO ₂ e	1700 MtCO ₂ e
Russian Federation	25–30% reduction in emissions below 1990 levels by 2030. Baseline 1990 emissions 3436 MtCO ₂ e (including LULUCF). Target emissions 2409–2577 MtCO ₂ e.	2409–2577 MtCO ₂ e	-
Ukraine	40% reduction in emissions below 1990 levels by 2030. Baseline 1990 emissions 875 MtCO ₂ e (including LULUCF) is provided in the INDC. Target emissions 525 MtCO ₂ e.	525 MtCO ₂ e	-
Middle East	Bahrain, Iran, Iraq, Kuwait, Saudi Arabia, Syria, Qatar, Yemen: Reference Scenario used as no INDCs submitted.	3115 MtCO ₂ e	3104 MtCO ₂ e

	<p>Israel: Per capita emissions target of 7.7 tCO₂e by 2030. Projected total emissions therefore given at 82 MtCO₂e.</p> <p>Jordan: Unconditional 1.5% reduction in emissions below BAU by 2030. BAU given at 51.028 MtCO₂e of emissions is given in INDC. Unconditional target emissions 50 MtCO₂e. Conditional target 12.5% with target emissions 45 MtCO₂e.</p> <p>Lebanon: Unconditional 15% reduction in emissions below BAU by 2030. Unconditional target emissions provided in a chart in the INDC (36 MtCO₂e). Conditional target of 30% reduction in emissions below BAU. Conditional target emissions provided in a chart in the INDC (30 MtCO₂e)</p> <p>Oman: target emissions of 88.714 MtCO₂e in 2030, 2% reductions below BAU by 2030. BAU given as 90.524 MtCO₂e. Target emissions 89 MtCO₂e.</p> <p>United Arab Emirates: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p>		
Northern Africa	<p>Algeria: Unconditional 7% reductions in emissions below BAU by 2030. Conditional 22% reduction in emissions below BAU by 2030. INDC did not include BAU projection so authors used Reference Scenario emissions (261 MtCO₂e) as a proxy. Unconditional target emissions 243 MtCO₂e and conditional target emissions 204 MtCO₂e.</p> <p>Egypt: Reference Scenario used as no INDC submitted.</p> <p>Morocco: Unconditional 13% reduction in emissions below BAU by 2030. BAU (171 MtCO₂e) and resulting unconditional target emissions (148 MtCO₂e) provided in INDC. Conditional 32% reduction in emissions below BAU by 2030, target emissions (117 MtCO₂e) provided in INDC.</p> <p>Libya: Reference Scenario used as no INDC submitted.</p>	1085–1114 MtCO ₂ e	997 MtCO ₂ e

	<p>Tunisia: Unconditional 13% reduction in emissions intensity of GDP by 2030 below 2010. Expected emissions of 62 MtCO₂e given in INDC. Conditional 41% reduction in emissions below BAU by 2030, with expected emissions of 40 MtCO₂e given in INDC.</p> <p>Western Sahara: Reference Scenario used as no INDC submitted.</p>		
Rest of Central America	<p>Bahamas, Bermuda, Cuba, El Salvador, Jamaica, Netherlands Antilles & Aruba, Nicaragua, Panama, Saint Lucia, Saint Vincent & Grenadines: Reference Scenario used as no INDCs submitted.</p> <p>Barbados: 44% reductions in emissions below BAU by 2030, also equals to 23% reductions below 2008. 2008 level given as 1,820 ktCO₂e. Target emissions 1.4 MtCO₂e.</p> <p>Belize: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Costa Rica: Carbon neutral economy starting from 2021. 9.4 MtCO₂e of net emissions by 2030.</p> <p>Dominica: 44.7% reductions in emissions below 2014 levels by 2030. Base year emissions given as 0.164 MtCO₂e. Target emissions 0.09 MtCO₂e.</p> <p>Dominican Republic: 25% reduction in emissions below 2010 levels by 2030. Base year figure taken from the WRI (32 MtCO₂e) (WRI, 2015). Target emissions 24 MtCO₂e.</p> <p>Grenada: 40% reduction in emissions below 2010 levels by 2030. Target emissions (0.15 MtCO₂e) based on chart in INDC.</p> <p>Guatemala: Unconditional 11.2% reduction in emissions below BAU by 2030. Unconditional target level from chart in INDC (48 MtCO₂e). Conditional 22.6% reduction in emissions below BAU. Conditional target level from chart in INDC (42 MtCO₂e).</p>	445 MtCO ₂ e	422 MtCO ₂ e

	<p>Honduras: 15% reduction in emissions below BAU by 2030. BAU provided in INDC at 28.9 MtCO_{2e}. Target emissions 25 MtCO_{2e}.</p> <p>Haiti: Unconditional 5% reduction in emissions below BAU by 2030. Unconditional target emissions 20 MtCO_{2e} from chart in INDC. Conditional 26% reduction in emissions below BAU by 2030. Conditional target emissions of 16 MtCO_{2e} from chart in INDC.</p> <p>Trinidad & Tobago: Unconditional target is 1.7 MtCO_{2e} abatement from BAU in 2030. BAU projection given as 103 MtCO_{2e} in 2030. Unconditional target emissions calculated 101 MtCO_{2e}. Conditional 15% reduction in emissions below BAU by 2030. Target emissions 88 MtCO_{2e}.</p>		
Rest of the Former Soviet Union (FSU)	<p>Armenia: Cumulative 633 MtCO_{2e} emissions between 2015 and 2050. 2030 emissions estimated by dividing 633 MtCO_{2e} equally over the years. Target emissions calculated as 18 MtCO_{2e}.</p> <p>Azerbaijan: 35% reduction in emissions below 1990 by 2030. Base year figure provided in INDC (69.641 MtCO_{2e}). Target emissions 45 MtCO_{2e}.</p> <p>Belarus: 28% reduction below 1990 level by 2030 (139.1 MtCO_{2e} provided in INDC). Target emissions 100 MtCO_{2e}.</p> <p>Georgia: Unconditional 15% reduction in emissions below BAU by 2030. Unconditional target emissions given in INDC (32.66 MtCO_{2e}). Conditional 25% reduction in emissions below BAU. Conditional target emissions given in INDC. (28.31 MtCO_{2e}).</p> <p>Kazakhstan: Unconditional 15% reduction in emissions below 1990 levels by 2030. 1990 base year figure taken from the WRI (2015) (293 MtCO_{2e}). Unconditional target emissions 249 MtCO_{2e}. Separate conditional target of 30% reduction below 1990 by 2030. Conditional target emissions 220 MtCO_{2e}.</p>	927–932 MtCO _{2e}	883 MtCO _{2e}

	<p>Kyrgyzstan: Unconditional 11.49–13.75% reduction in emissions below BAU by 2030. BAU projection from chart in INDC (15 MtCO₂e). Unconditional target emissions 13MtCO₂e. Conditional 29–30.89% reduction in emissions below BAU by 2030. Conditional target emissions 10–11MtCO₂e.</p> <p>Moldova: Unconditional 64–67% reductions in emissions below 1990 levels by 2030. 1990 figure excluding LULUCF given as 43.4 MtCO₂e. Unconditional target emissions 14–16 MtCO₂e. Conditional 78% reductions in emissions below 1990 levels by 2030. Conditional target emissions 10 MtCO₂e.</p> <p>Tajikistan: Unconditional 10%–20% reduction in emissions below 1990 levels by 2030. Base year emissions given in INDC (25.5 MtCO₂e). Unconditional target emissions 20–23 MtCO₂e. Conditional 25–35% reduction in emissions below 1990 levels by 2030. Conditional target emissions 17–19 MtCO₂e.</p> <p>Turkmenistan: INDC states expected emissions level will be limited to 136 MtCO₂e by 2030.</p> <p>Uzbekistan: Reference Scenario used as no INDC submitted.</p>		
Rest of South America	<p>Argentina: Unconditional 15% reduction in emissions below BAU by 2030. BAU provided in INDC (670 MtCO₂e). Unconditional target emissions 570 MtCO₂e. Conditional target of 30% reduction below BAU by 2030 with target emissions at 469 MtCO₂e.</p> <p>Bolivia: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Chile: Unconditional 30% reductions in emissions intensity of GDP below 2007 excluding LULUCF by 2030. Base year emissions excluding LULUCF of 91 MtCO₂e from WRI (2015). GDP projections not included in INDC. Unconditional target emissions excluding LULUCF calculated as 147 MtCO₂e based on GDP projection from the IMF (2015) and OECD (2014) (annual</p>	2498 MtCO ₂ e	2256 MtCO ₂ e

	<p>average growth of 3.73% between 2007 and 2030). LULUCF emissions in 2010 given as -50 MtCO_{2e}, and authors assumed this to stay constant between 2010 and 2030. GHG target emissions calculated as 97 MtCO_{2e}. Conditional target of 35–45% reduction in emissions intensity of GDP below 2007 excluding LULUCF by 2030. Conditional target emissions calculated as 66–87 MtCO_{2e}.</p> <p>Colombia: Unconditional 20% reduction in emissions below BAU by 2030. BAU given in INDC as 335 MtCO_{2e}. Unconditional target emissions 268 MtCO_{2e}. Conditional target of 30% with target emissions of 235 MtCO_{2e}.</p> <p>Ecuador: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Suriname: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Guyana: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Peru: Unconditional 20% reduction in emissions below BAU by 2030. BAU figure is provided in INDC (298.3 MtCO_{2e}). Unconditional target emissions 239 MtCO_{2e}. Conditional target of 30% reduction; target emissions 209 MtCO_{2e}.</p> <p>Paraguay: Unconditional 10% reduction in emissions below BAU by 2030. BAU projection for 2030 of 416 MtCO_{2e} given in INDC. Target emissions 374 MtCO_{2e}. Conditional 20% reduction with target emissions 333 MtCO_{2e}.</p> <p>Uruguay: INDC listed a series of measures. Target emissions associated with unconditional elements is given as -1.42 MtCO_{2e}. Total impact from conditional elements are not given clearly with the exception of LULUCF target (extra 6 ktCO_{2e} in removals) so conditional target is calculated as - 7.42MtCO_{2e}.</p> <p>Venezuela: Hypothetical Pre-INDC Reference Scenario used as no INDC submitted.</p>		
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Rest of South Asia	<p>Afghanistan: 13.6% reductions in emissions below BAU by 2030. BAU given as 48.9 MtCO_{2e}, target emissions given as 42.7 MtCO_{2e}.</p> <p>Bangladesh: Unconditional 5% reduction in emissions below BAU by 2030. BAU for the sectors covered is provided in INDC (234 MtCO_{2e}), covering 69% of greenhouse gases excluding LULUCF. Other GHGs are calculated as 105 MtCO_{2e} and are added to give unconditional target emissions 327 MtCO_{2e}. Conditional target is 15% reduction, thus same process gives conditional target emissions 303 MtCO_{2e}.</p> <p>Bhutan: Remain carbon neutral. 2030 target emissions assume to be at most 0 MtCO_{2e}.</p> <p>Maldives: Unconditional 10% reduction in emissions on BAU by 2030. BAU given in INDC as 3.3 MtCO_{2e}. Unconditional target emissions 3MtCO_{2e}. Conditional 24% reduction in emissions below BAU. Conditional target emissions 2.5 MtCO_{2e}.</p> <p>Nepal: Reference Scenario as no INDC submitted.</p> <p>Pakistan: Reference Scenario as no INDC submitted.</p> <p>Sri Lanka: Unconditional 7% reduction in emissions below BAU by 2030. Overall BAU projection is not given in INDC. Reference Scenario estimate for 2030 is 64 MtCO_{2e}, making unconditional target emissions as 60 MtCO_{2e}. Conditional 23% reduction in emissions below BAU, giving conditional target emissions 49 MtCO_{2e}.</p>	1002 MtCO _{2e}	977 MtCO _{2e}
Rest of South East Asia	<p>Brunei, Macau, Malaysia, Democratic People's Republic of Korea (North), Taiwan: Reference Scenario as no INDCs submitted.</p> <p>Cambodia: 27% reductions in emissions below BAU (11.6 MtCO_{2e} provided in</p>	2679–2859 MtCO _{2e}	2517 MtCO _{2e}

	<p>INDC) by 2030. Target emissions 8 MtCO₂e</p> <p>Laos: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Mongolia: 14% reduction in emissions below BAU by 2030. BAU given in INDC excluding LULUCF is 51.2 MtCO₂e. Target emissions 44 MtCO₂e</p> <p>Myanmar: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Philippines: 70% reduction in emissions below BAU by 2030. BAU is not provided in INDC. Reference Scenario emissions in 2030 are 257 MtCO₂e making target emissions 76 MtCO₂e.</p> <p>Singapore: 65 MtCO₂e allowed emissions. 36% reduction in emissions intensity of GDP relative to 2005 by 2030. Singapore's INDC includes a 2005 GHG baseline of 40.9 MtCO₂e and intensity figure of 0.176 kgCO₂e/S\$. Using GDP projections taken from the IMF (2014) and OECD (2014) (annual growth of 3.89% on average between 2005–2030), target emissions calculated as 68 MtCO₂e.</p> <p>Thailand: Unconditional 20% reduction in emissions below BAU by 2030. BAU in 2030 at 555 MtCO₂e provided in the INDC. Unconditional target emissions 444 MtCO₂e. Conditional target of 25% reduction below BAU by 2030 with Conditional target emissions at 416 MtCO₂e</p>		
<p>Rest of Sub-Saharan Africa</p>	<p>Angola, Guinea-Bissau, Nigeria, Sudan, Somalia: Reference Scenario as no INDCs submitted.</p> <p>Burundi: Unconditional 3% reduction in emissions below BAU by 2030 equates to 1.958 MtCO₂e of abatement in INDC; conditional 20% reductions below BAU by 2030 equates to 14.897 MtCO₂e of abatement. BAU calculated as 75 MtCO₂e. Unconditional target emissions 73 MtCO₂e and conditional target</p>	<p>2684–2692 MtCO₂e</p>	<p>2506 MtCO₂e</p>

	<p>emissions 60 MtCO₂e. Note on INDC: abatement is expressed in Gg in INDC but the chart suggests this is in MtCO₂e, suspect errors in the table.</p> <p>Benin: Cumulative reduction of 120 MtCO₂e (Figures 2 and 3 in the INDC document) during the period 2020–2030 compared to the BAU scenario. 2030 target emissions from chart in INDC. Target emissions of 32 MtCO₂e is sum of 5 MtCO₂e from figure 2 and 27 MtCO₂e from figure 3.</p> <p>Burkina Faso: Unconditional 6.6% reduction in emissions below BAU by 2030. BAU given in INDC at 118.3 MtCO₂e. Unconditional target emissions of 111MtCO₂e. Conditional 18.2% (21.57 MtCO₂e) reduction below BAU by 2030. Conditional target emissions of 97 MtCO₂e.</p> <p>Botswana: 15% reductions below 2010 levels by 2030. 2010 emissions given in INDC at 8.307 MtCO₂e) given in INDC. Target emissions 7 MtCO₂e.</p> <p>Central African Republic: Unconditional 4.062 MtCO₂e of abated emissions. INDC states 5% of abatement equals 5.5 MtCO₂e. BAU calculated to be 110 MtCO₂e. Target emissions 106 MtCO₂e. Conditional 5% reduction in emissions below BAU with target emissions 105 MtCO₂e.</p> <p>Chad: Unconditional 18.2% reduction in emissions below BAU by 2030. Unconditional target emissions 23 MtCO₂e provided in INDC. Conditional 71% reduction below BAU by 2030. Conditional target emissions 8 MtCO₂e provided in INDC.</p> <p>Côte d'Ivoire: 28% reduction in emissions below BAU by 2030. Target emissions 25 MtCO₂e given in INDC.</p> <p>Cameroon: 32% reduction in emissions below BAU by 2035. BAU given as 104 MtCO₂e in INDC. Target emissions calculated as 71 MtCO₂e. Analysis assumes same level of emissions in 2030.</p> <p>Democratic Republic of Congo: 17% reduction in emissions below BAU by 2030. BAU in 2030 given in INDC (430 MtCO₂e). Target emissions 357 MtCO₂e.</p>		
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	<p>Comoros: 84% reduction in emissions below BAU by 2030. Abatement of 0.4418 MtCO₂e from 0.523 MtCO₂e to target emissions of 0.081 MtCO₂e.</p> <p>Cape Verde: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Djibouti: Unconditional 40% reduction in emissions below BAU by 2030. Unconditional target emissions given as 2.685 MtCO₂e. Conditional 60% reduction below BAU by 2030. Conditional target emissions given as 1.79 MtCO₂e.</p> <p>Equatorial Guinea: 20% reduction in emissions below 2010 levels by 2030. 2010 base year emissions of 26 MtCO₂e taken from the WRI (2015). Target emissions 21 MtCO₂e.</p> <p>Eritrea: Target is to cap CO₂ emissions at 1.9 MtCO₂e (unconditional) and 0.6 MtCO₂e (conditional). BAU for all emissions in 2030 is 6.3 MtCO₂e, 3 MtCO₂e of which are of CO₂. Target emissions calculated as 5.2 MtCO₂e (unconditional) and 3.9 MtCO₂e (conditional).</p> <p>Ethiopia: 64% reduction in emissions below BAU by 2030. Target emissions at 145 MtCO₂e given in INDC.</p> <p>Gabon: 63% reduction in emissions below BAU by 2025, target emissions of 9 MtCO₂e from chart in INDC. Assumed same level of emissions by 2030.</p> <p>The Gambia: Abatement targets from BAUs for individual sectors. Overall BAU emissions from chart in INDC are 3.8 MtCO₂e in 2030. Unconditional target is 0.4 MtCO₂e of abatement from renewables and afforestation gives target emissions of 3.4 MtCO₂e. Conditional 45.4% reduction from BAU gives target emissions of 2.1 MtCO₂e.</p> <p>Ghana: Unconditional 15% reduction in emissions below BAU by 2030. BAU in 2030 is given in INDC (73.95 MtCO₂e). Target emissions 63 MtCO₂e.</p>		
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	<p>Conditional 45% reduction with target emissions 41 MtCO₂e.</p> <p>Guinea: 13% reduction in emissions below 1994 levels by 2030. Per capita emissions in 1994 given as 2.1 tCO₂e, population given as 7.2 million, and base year emissions estimated as 15 MtCO₂e. Target emissions thus 13 MtCO₂e.</p> <p>Kenya: 30% reduction in emissions below BAU by 2030. BAU in 2030 is given in INDC at 143 MtCO₂e. Target emissions 100 MtCO₂e.</p> <p>Liberia: 15% reduction in emissions below BAU by 2030. Target emissions of 4.5 MtCO₂e given in INDC.</p> <p>Lesotho: Unconditional 10% reduction in emissions below BAU by 2030, conditional 35% reductions. BAU is not given in INDC. Unable to estimate Lesotho's target emissions as WRI (2015) database does not cover Lesotho. Target not quantified.</p> <p>Madagascar: 14% reduction below BAU for non-LULUCF sector by 2030 and 32% increase (61 MtCO₂e) in absorption of LULUCF from BAU. Non-LULUCF BAU in 2030 is given in INDC at 214 MtCO₂e. BAU for LULUCF given at -192 MtCO₂e. Target emissions calculated to be -69 MtCO₂e, from BAU of +22 MtCO₂e</p> <p>Mali: Abatement from BAU levels for a number of sectors. Table included in INDC states expected emissions with unconditional target are -34 MtCO₂e and with conditional target is -85 MtCO₂e.</p> <p>Mozambique: 76.5 MtCO₂e reductions across the 11 years from 2020 to 2030: 23 MtCO₂e by 2024 and 53.4 MtCO₂e from 2025 to 2030. Assuming reductions are linear gives 8.9 MtCO₂e reduction from 2030 BAU. BAU is not given in INDC, Reference Scenario figure of 100 MtCO₂e used to calculate estimated target emissions of 92 MtCO₂e.</p> <p>Mauritania: 4.2 MtCO₂e of total abatement equals 22.3% of BAU, meaning BAU is calculated as 18.84 MtCO₂e. 12% of the abatement is unconditional, making</p>		
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	<p>unconditional target emissions 18 MtCO₂e. 88% of the abatement is conditional, making conditional target emissions 15 MtCO₂e</p> <p>Mauritius: 30% reduction in emissions on BAU by 2030 (7 MtCO₂e). Target emissions 4.9 MtCO₂e</p> <p>Malawi: Unconditional policies and measures are expected to deliver per capita emissions of 0.8 tCO₂e by 2030. Unconditional target emissions of 21 MtCO₂e estimated based on projected population in 2030 of 26 million (UNDESA, 2015). Conditional elements of the INDC will bring per capita emissions to 0.7 tCO₂e by 2030. Conditional target emissions estimated as 18 MtCO₂e</p> <p>Namibia: Unconditional 2 MtCO₂e of abatement below BAU by 2030. BAU given in INDC (22.6 MtCO₂e). Unconditional target emissions thus 21 MtCO₂e. Conditional 20 MtCO₂e of abatement below BAU by 2030. Conditional target emissions 3 MtCO₂e.</p> <p>Niger: Unconditional 3.5% reduction in emissions below BAU by 2030. Unconditional targets from chart in INDC (0.93 MtCO₂e). Conditional 34.6% reduction in emissions below BAU by 2030. Conditional target from chart in INDC (0.63 MtCO₂e)</p> <p>Rwanda: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Senegal: Unconditional 5% reduction in emissions below BAU by 2030. Target emissions from chart in INDC are 36 MtCO₂e. Conditional 21% reduction; target emissions from chart in INDC are 30 MtCO₂e.</p> <p>Sierra Leone: To maintain emissions level close to world's average at 7.58 MtCO₂e by 2035. Assume same level for 2030.</p> <p>Sao Tome & Principe: 0.057 MtCO₂e of abatement from BAU in 2030. BAU given as -0.4 MtCO₂e, target emissions -0.5 MtCO₂e.</p>		
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	<p>Swaziland: INDC contains list of policies and measures. Overall impact not quantified. Reference Scenario used.</p> <p>Seychelles: 29% reduction in emissions below BAU by 2030 equates to 0.18 MtCO₂e of abatement. BAU emissions calculated as 0.65 MtCO₂e, target emissions calculated as 0.46 MtCO₂e.</p> <p>Togo: Unconditional 11.14% reduction in emissions below BAU by 2030. BAU given in INDC as 38.9 MtCO₂e. Unconditional target emissions 35 MtCO₂e. Conditional target of 31.14% reductions below BAU by 2030. Conditional target emissions 28 MtCO₂e</p> <p>Tanzania: Conditional 10 to 20% reduction in emissions below BAU by 2030. Full range of BAU given in INDC is 138–153 MtCO₂e. Conditional target emissions 110–138 MtCO₂e.</p> <p>Uganda: Policies equate to 22% reduction below BAU by 2030. BAU given as 77.3 MtCO₂e in 2030. Target emissions 60 MtCO₂e</p> <p>Zambia: 33% reduction in per capita emissions below BAU by 2030. BAU per capita emissions of 3.313 tCO₂ provided in INDC; calculated target per capita emissions is 2.205 tCO₂. Target emissions 45 MtCO₂e, based on with 2030 population projection from UN of approximately 20 million.</p> <p>Zimbabwe: Unconditional 25% reduction in emissions reduction below BAU by 2030. Unconditional target emissions of 62 MtCO₂e from chart in INDC. Conditional 47% reduction below BAU by 2030. Conditional target emissions of 43 MtCO₂e from chart in INDC.</p>		
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Table 5: Annual emissions (in MtCO₂e) showing historical emissions, hypothetical Pre-INDC Reference Scenario and estimated totals for countries that submitted INDCs by 23 October 2015.

Annual emissions (million tonnes CO ₂ e)	INDCs submitted (as of 23 October 2015)	Historical data			Hypothetical Pre- INDC Reference Scenario		Cancún Pledge Scenario (Low)	Cancún Pledge Scenario (High)	INDC Scenario 1 (Low, ind. GDP)	INDC Scenario 1 (High, ind. GDP)	INDC Scenario 2 (Low, national GDP)	INDC Scenario 2 (High, national GDP)	INDC Scenario 3 (High, conditional targets)
		1990	2005	2010	2020	2030	2020	2020	2030	2030	2030	2030	2030
OECD													
Canada	YES	690	853	816	921	959	752	752	579	579	579	579	579
EU	YES	5,050	4,672	4,275	4,037	4,007	4,037	3,627	3,126	3,126	3,126	3,126	3,126
Japan	YES	1,223	1,320	1,282	1,283	1,242	1,283	1,283	1,008	1,008	1,008	1,008	1,008
Mexico	YES	571	712	755	839	966	672	672	759	759	759	759	623
Oceania	YES - partial	869	988	976	794	818	579	467	597	585	597	585	585
Rest of Europe	YES	208	200	206	255	257	204	195	159	159	159	159	154
South Korea	YES	318	634	767	848	772	520	520	512	512	512	512	512
Turkey	YES	213	319	390	554	657	554	554	929	929	929	929	929
USA	YES	6,021	6,849	6,472	6,691	6,808	5,144	5,144	4,028	3,780	4,028	3,780	3,780
BASICS													
Brazil	YES	1,696	2,789	2,760	2,521	2,576	1,789	1,789	1,172	1,172	1,172	1,172	1,172
China	YES	3,698	8,002	10,501	14,645	16,588	14,426	14,426	14,294	12,810	16,256	14,527	12,810
India	YES	1,253	2,054	2,781	3,888	5,477	3,888	3,888	6,709	6,509	9,285	9,008	6,509
South Africa	YES	630	752	506	554	627	554	554	614	398	614	398	398
REST OF WORLD													
Indonesia	YES	1,495	1,871	1,780	1,906	2,133	1,906	1,906	2,046	2,046	2,046	2,046	1,700
Russia	YES	3,065	2,281	2,391	2,492	2,643	2,492	2,492	2,577	2,406	2,577	2,406	2,406
Ukraine	YES	941	429	406	417	432	417	417	525	525	525	525	525
Middle East	YES - partial	901	1,645	2,118	2,563	3,195	2,538	2,538	3,115	3,115	3,115	3,115	3,104
Northern Africa	YES - partial	359	536	621	870	1,070	870	870	1,114	1,085	1,114	1,085	997
Rest of Central America	YES - partial	439	442	439	470	488	470	470	445	445	445	445	422
Rest of FSU	YES - partial	801	661	775	934	1,050	934	934	932	927	932	927	883
Rest of South America	YES - partial	2,329	1,885	1,925	2,059	2,244	1,920	1,870	2,498	2,498	2,498	2,498	2,256
Rest of South Asia	YES - partial	377	525	533	708	937	708	708	998	998	998	998	973
Rest of South East Asia	YES - partial	1,684	2,099	1,975	2,397	2,836	2,254	2,254	2,859	2,679	2,859	2,679	2,517
Rest of Sub Saharan Africa	YES - partial	5,250	3,164	2,657	2,861	3,339	2,861	2,861	2,692	2,684	2,692	2,684	2,506
NON-SOVEREIGN EMISSIONS													
International Aviation	N/A	248	405	440	586	796	550	550	796	796	796	796	796
International Maritime	N/A	286	555	639	712	915	712	712	915	915	915	915	915
Peat emissions	N/A	600	600	600	600	600	600	600	600	600	600	600	600
TOTAL		41,215	47,242	49,786	57,406	64,432	53,635	53,053	56,597	54,044	61,135	58,260	52,787

Table 6: Country and regional breakdown of emissions in 2030 accompanying Figures 2a and 2b.

<i>2030 emissions (MtCO_{2e})</i>	INDC Scenario 1 (Low, independent GDP)	INDC Scenario 1 (High, independent GDP)	INDC Scenario 2 (Low, national GDP)	INDC Scenario 2 (High, national GDP)	INDC Scenario 3 (High, conditional targets)	Hypothetical Pre-INDC Reference Scenario
Non-Sovereign Emissions	2,310	2,310	2,310	2,310	2,310	2,310
Other non-OECD	1,457	1,452	1,457	1,452	1,408	1,483
Rest of Americas	2,943	2,943	2,943	2,943	2,678	2,733
Middle East	3,115	3,115	3,115	3,115	3,104	3,195
Rest of Africa	3,806	3,769	3,806	3,769	3,506	4,409
Rest of Asia	3,857	3,677	3,857	3,677	3,490	3,773
Brazil, Indonesia, Russia, South Africa	6,409	6,022	6,409	6,022	5,676	7,979
EU	3,126	3,126	3,126	3,126	3,126	4,007
USA	4,028	3,780	4,028	3,780	3,780	6,808
Other OECD	4,543	4,531	4,543	4,531	4,390	5,671
India	6,709	6,509	9,285	9,008	6,509	5,477
China	14,294	12,810	16,256	14,527	12,810	16,588
WORLD TOTAL	56,597	54,044	61,135	58,260	52,787	64,432

Table 7: Country and regional per capita emissions in 2030 for INDC Scenarios 1–3 accompanying Figure 3.

<i>2030 per capita emissions (tCO₂e)</i>	Population in 2030 according to the UN³¹	INDC Scenario 1 (Low, independent GDP)	INDC Scenario 1 (High, independent GDP)	INDC Scenario 2 (Low, national GDP)	INDC Scenario 2 (High, national GDP)	INDC Scenario 3 (High, conditional targets)
Non-Sovereign Emissions	N/A	N/A	N/A	N/A	N/A	N/A
Rest of Africa	1,619,266,758	2.4	2.3	2.4	2.3	2.2
Rest of Asia	962,498,332	4.0	3.8	4.0	3.8	3.6
India	1,527,657,988	4.4	4.3	6.1	5.9	4.3
Brazil	228,663,251	5.1	5.1	5.1	5.1	5.1
EU	509,282,289	6.1	6.1	6.1	6.1	6.1
Indonesia	295,481,797	6.9	6.9	6.9	6.9	5.8
South Africa	60,034,391	8.6	8.6	8.6	8.6	8.3
Other OECD	528,097,920	8.7	8.7	8.7	8.7	7.9
Rest of Americas	338,631,823	9.7	9.7	9.7	9.7	9.4
China	1,415,545,109	10.1	9.0	11.5	10.3	9.0
Other non-OECD	150,123,831	10.2	6.6	10.2	6.6	6.6
USA	355,764,967	11.3	10.6	11.3	10.6	10.6
Middle East	190,195,550	16.4	16.4	16.4	16.4	16.3
Russia	138,652,480	18.6	17.4	18.6	17.4	17.4
WORLD TOTAL	8,319,896,486	6.8	6.5	7.3	7.0	6.3

³¹ See text in Section 2 for details and source.