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Overview of INDCs Submitted by 31 August 2015

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FOREWORD

This document was prepared by the OECD and IEA Secretariats in response to a request from the Climate Change Expert Group (CCXG) on the United Nations Framework Convention on Climate Change (UNFCCC). The Climate Change Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. Authors work with the CCXG to develop these papers. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudge the views of countries participating in the CCXG. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience.

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ABSTRACT

Overview of INDCs submitted by 31 August 2015

In 2015, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) communicated their Intended Nationally-Determined Contributions (INDCs) for the Paris climate agreement. This publication summarises the key information communicated in the mitigation components of INDCs that were submitted by 31 August 2015, and analyses the implications of this information for the clarity, transparency and understanding of individual and collective mitigation efforts.

JEL Classification: F53, O44, Q54, Q56, Q58

Keywords: climate, mitigation, UNFCCC

RÉSUMÉ

Tour d'horizon des CPDN soumises au 31 août 2015

En 2015, les Parties à la Convention-cadre des Nations Unies sur les changements climatiques (CCNUCC) ont communiqué leurs contributions prévues déterminées au niveau national (CPDN) dans l'optique de l'accord de Paris sur le climat. Cette publication fait la synthèse des informations relatives à l'atténuation des CPDN soumises au 31 août 2015, et elle en analyse les implications pour la clarté, la transparence et la compréhension des efforts individuels et collectifs de lutte contre le changement climatique.

Classification JEL : F53, O19, O30, O44, Q54, Q56, Q58

Mots clés : climat, atténuation, CCNUCC

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1. Introduction

Decisions at COP19 and COP20 invited Parties to the UNFCCC to communicate their intended nationally-determined contributions (INDCs) for the post-2020 period in a manner that facilitates the clarity, transparency and understanding of the intended contributions. In addition to specifying headline target(s), further information is needed in the INDC to fulfil these criteria of “clarity, transparency, and understanding”, including timeframes and coverage. For mitigation contributions, this also includes details of baselines and accounting assumptions (Briner and Prag, 2013; Herold et al., 2014; CDKN and Ricardo-AEA, 2015; Levin et al., 2015).

Although options for common reporting formats or common information for INDCs were considered in the international climate negotiations under the UNFCCC, the eventual COP20 decision only provided high-level guidance on what information could be appropriate, specifying that it:

“may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals, and how the Party considers that its intended nationally determined contribution is fair and ambitious, in light of its national circumstances, and how it contributes towards achieving the objective of the Convention.” (UNFCCC, 2014)

Parties were also invited to consider communicating their undertakings in adaptation planning, or consider including an adaptation component in their INDCs.

This publication summarises the key information communicated in the mitigation components of INDCs that have been submitted by 31 August 2015, analyses implications for clarity and transparency, and discusses their likely aggregate impact on GHG emissions. This paper only considers information in the INDCs themselves: information not contained in the INDCs may in some cases be found in other submissions to the UNFCCC such as biennial reports or national communications.

2. Transparency and Clarity of INDCs

A table of key information communicated in the mitigation component of INDCs is presented in Annex 1. Despite the lack of an agreed common reporting framework, almost all of the 29 INDCs covering 57 Parties¹ submitted by 31 August use the Lima decision categories to present their information, and most use a tabular format. However there is a significant variation in the level of detail provided by different Parties in the different categories of information, as will be explored in this section.

Just over half of the INDCs (15 of 29 INDCs) put forward absolute greenhouse gas emission goals, including absolute goals from Ethiopia and the Marshall Islands in addition to those from developed countries. The remaining 14 INDCs are either referenced to a business as usual (BAU) baseline (eleven Parties), to GDP (two Parties), or target per-capita emissions (one Party). Absolute emissions goals are more easily understood, while those referenced to a baseline require more information on how the baseline is calculated, what data is used, and whether the baseline will be reviewed (Clapp and Prag, 2012). Ten out of eleven Parties submitting goals for emission reductions against BAU provided (or made possible) an estimate of target-year or target-period emissions, which is important for understanding the likely impact of the INDC and for estimating the aggregate impact of all countries' actions. Beyond this estimate of final emissions, the information provided on defining the BAU pathway varies. For example, Korea, Macedonia, Morocco and Trinidad and Tobago provide

¹ The INDC of the European Union represents itself and its 28 member states.

information on the model used; Andorra and Kenya note that modelling methodology is outlined in their latest National Communication, while some Parties did not include details of the modelling methodology. Morocco explicitly notes that it reserves the right to revise the BAU baseline before 2020; while other countries do not mention potential revisions. Of the two countries putting forward GDP emissions intensity targets, neither provides target-year GDP estimates or indicates the data source for GDP, but Singapore does provide an estimate of target-year emissions.

Nine Parties indicated that their INDCs are contingent upon the final rules of the agreement, including those for land-sector accounting and access to international markets/carbon pricing. Russia also stated that its INDC is contingent on the INDCs submitted by other major emitters, and Morocco's INDC is contingent on the conclusion of a legally-binding agreement. These Parties have reserved the right to revise their INDCs before finalisation, based on the outcome of the negotiations.

Mitigation goals are not all expressed as a single target level. Five countries (Australia, China, Macedonia, Russia, and the United States) express their mitigation goal as a range. For example, Australia has a target range of 26 to 28% below 2005 levels in 2030, while China aims to reduce CO₂ emissions per unit of GDP by 60 to 65% below 2005 levels in 2030.

Four Parties signal the potential of going beyond their headline mitigation goals. The European Union and Norway specify a target of at least 40% reduction on 1990 levels, Gabon aims for a reduction of at least 50% below BAU, and Ethiopia aims to limit emissions to 145Mt or lower.

Ten Parties have stated that the level of implementation of their mitigation goal will be at least partially conditional on support (finance or other means of implementation). Of these, four Parties (Djibouti, Mexico, Morocco, and Trinidad and Tobago) stated both an unconditional mitigation goal, and one conditional on support.

Two of the INDCs include non-GHG goals for mitigation in addition to their GHG targets: Mexico includes a 51% (unconditional) to 70% (conditional on support) reduction in black carbon; and China puts forward goals of 20% renewables in primary energy consumption by 2030 and an increase in forestry stock volume by 4.5 billion cubic metres. The UNFCCC transparency framework may need to develop processes to account for progress toward such non-GHG goals, in addition to the more traditional focus on GHG targets (Hood, Briner and Rocha, 2014).

The mitigation components of all INDCs provide information on a target year, target period, or period for implementation. Twenty-six of the INDCs specify 2030 as the target year, with three using 2025. Only three Parties explicitly frame their contribution as a multi-year undertaking: Monaco and Switzerland detail emissions budgets for 2021 to 2030, while Benin sets a target for cumulative emission reductions below BAU for the period 2020 to 2030. Australia, New Zealand and Norway state an intention to translate the target-year goal into an emissions budget. The European Union's INDC does not make explicit reference to a carbon budget approach, but it is implied by inclusion of a period of application. Many other Parties also specify a period of application, however this appears to refer to the timeframe over which they will work towards the target-year goal, rather than implying a multi-year goal. The apparent choice of single-year targets by many Parties reduces clarity on total cumulative emissions expected over the timeframe. This has implications for strategic reviews of collective effort, giving less visibility looking forward regarding anticipated total emissions. Single-year targets also have implications for whether and how internationally-transferred units can be accounted for in achievement of the INDC (Prag, Hood and Barata, 2013; Hood, Briner and Rocha, 2014).

Almost all INDCs, from both developed and developing countries, have economy-wide or near economy-wide sectoral coverage, a very encouraging development from the perspective of understanding the aggregate emissions impact of INDCs. One interesting exclusion is that Gabon has included land-use change emissions, but excluded forestry sequestration (a large net emissions sink) from its INDC, so as to focus on actions to reduce emissions. Kenya notes that future development of

its extractive sector² is not covered by its BAU baseline, while Macedonia focuses on CO₂ from fossil fuel combustion, 80% of its emissions. Sectoral coverage of China's INDC is not explicitly stated, but the discussion text implies action across a wide range of sectors (energy, industry, agriculture, forestry, transport, buildings, waste, urban areas). Most INDCs use IPCC classifications to define sectoral coverage, however there are exceptions: for example the mitigation component of Ethiopia's INDC appears to cover all emissions, but sectors are not presented in terms of IPCC classifications.

Coverage of gases varies, although again Parties seem to have included those gases covering the largest share of emissions in their national situation. Many INDCs cover seven categories of gases (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃). Some have narrower coverage, for example the Marshall Islands and Morocco both choose to account for CO₂, CH₄ and N₂O and note that other gases have only a marginal contribution to national emissions. China's INDC is framed in terms of CO₂, however the discussion text implies action on other gases.³ The combination of broad coverage of sectors and gases in most countries' mitigation INDCs results in generally very high coverage of overall emissions.

Regarding information on intended use of international carbon market mechanisms, only Japan, Korea, Liechtenstein, New Zealand, and Switzerland noted their intention to include use of mitigation achieved internationally in their INDCs. Some of these countries have made their INDCs contingent on access to international markets. Other countries either indicated that they will not use international units, are open to doing so but do not have current plans, or did not provide this information. The European Union will not use international credits toward its INDC, a change from having been the largest source of demand for CDM credits (via demand in its emissions trading system) under the Kyoto Protocol. Only one potential host of crediting mechanisms (Ethiopia) noted it intends to participate as a seller of units. The lack of interest in international carbon markets by large potential buyers such as the European Union and the United States raises questions about how large a role existing and new market mechanisms will play in the post-2020 environment.

All mitigation components of INDCs provide an outline description of national laws, policies and measures that will be used to implement the INDC, or the process that will be used to develop these. Only nine of the INDCs referred to consistency with a national long-term mitigation goal (an emissions level in 2050, carbon neutrality, etc.), in describing the shorter-term actions of the INDC. The lack of a long-term mitigation perspective in the majority of INDCs raises the risk that actions taken in the period to 2030 to reduce emissions may not be consistent with a longer-term transition to low-carbon economies (IEA, 2014).

In the more technical aspects of assumptions and methodological approaches, all countries except China and Gabon explicitly mentioned IPCC methodologies in their INDC. In general, the approach taken follows that which the Party takes (or intends to take) in its biennial reporting. Developed countries uniformly use the 2006 IPCC guidelines and 4th assessment report global warming potentials (GWPs) (UNFCCC decision 24/CP.19), while developing countries use either the revised 1996 guidelines and second assessment report GWPs, or a mixture of these and more recent guidelines. Mexico elected to use the most recent IPCC fifth assessment report GWPs, which are not yet generally used for UNFCCC reporting. As Parties' INDC emissions goals are stated in terms of aggregate greenhouse gases (in terms of CO₂ equivalent), differences in the GWPs used for the conversion to CO₂ equivalent will complicate both the understanding of aggregate impact of INDCs, and their comparison.

² Mining, oil and natural gas production.

³ Policies and measures in China's INDC addressing gases other than CO₂ include enhanced recovery and utilisation of vented gas, phasing down production and consumption of HCFC-22 by 67.5% by 2025 and achieving effective control on HFC-23 emissions by 2020, making efforts to achieve zero growth in fertilizer use, and controlling methane emissions from rice fields and nitrous oxide from farmland.

Fewer countries explicitly provided their accounting assumptions for land-use or internationally transferred emissions units. Several INDCs (Andorra, Australia, Benin, Canada, Kenya, United States) specified inventory-based or “net-net” accounting for the land sector, while Switzerland and Japan indicated that they assume a “reference level” approach as developed under the Kyoto Protocol. The EU, Norway, and New Zealand noted the need for development of a comprehensive land sector accounting framework, but did not specify details of the assumptions underpinning their INDCs. Uncertainty in the accounting of land-sector emissions decreases the clarity of INDCs (Briner and Konrad, 2014). With regard to accounting for internationally transferred emissions units, principles such as environmental integrity of units and avoiding double-counting were mentioned by nine countries, with the remainder silent on treatment of units. Lack of clarity on accounting for units will impact on the understanding of INDCs, particularly their aggregate effect. Development of implementation rules for land sector and markets accounting after COP21 can resolve these uncertainties (Prag, Hood, and Barata, 2013): in fact some Parties (Australia, Liechtenstein, New Zealand, Russia) noted that their final INDCs will be contingent on the nature of these rules. This could mirror the lengthy process following agreement of the Kyoto Protocol, where rules under the Marrakesh Accords were agreed in 2001 well after Parties’ targets were established in 1997.

Most Parties included a narrative in their INDC explaining why they consider it to be fair and ambitious, and how it contributes to the objective of the Convention. A wide range of factors may be relevant to assessments of fairness and ambition, including emissions levels, intensities and trends; national capabilities (GDP, development); co-benefits and opportunities; and mitigation opportunities and costs, with no single one of these alone providing a full picture. The information provided in the INDCs varies significantly, with some focusing on consistency with national or IPCC low-carbon scenarios, while others highlighted progress in decoupling emissions from GDP growth, deviation from BAU, or trends in per capita emissions. Of the mitigation components of INDCs examined for this paper, only Macedonia’s INDC presented quantitative information about marginal abatement costs or opportunities. Further, Parties putting forward absolute targets did not generally provide an estimate of BAU emissions. The limited and varying information provided in the narratives describing fairness and ambition does not give a basis for comparing the fairness or ambition of INDCs on a consistent basis. All INDCs apart from Benin, China and the Dominican Republic did however provide enough information to estimate target-year emissions, although as already mentioned the limited information on approaches to land use and markets accounting create uncertainty even in the case of absolute targets. The ability to estimate target-year emissions allows for some clarity on expected aggregate progress toward the objective of the Convention.

Moving beyond mitigation, over half (17/29) of the INDCs submitted took up the invitation from COP20 to communicate actions in adaptation. Fourteen of these were developing country INDCs. Additionally, The European Union and United States released adaptation undertakings alongside (but not included in) their INDC. The three developed countries that provided adaptation information in their INDCs gave little detail: New Zealand and Norway referring to their most recent National Communications, and Australia noting that an adaptation plan is under development. Conversely, several of the developing country adaptation plans provide a significant amount of information on policies, plans and actions.

Turning to means of implementation, nine of the ten INDCs that are conditional on support also provided some quantification of finance needs, either as an estimate of total investment needs (Ethiopia, Kenya), or identifying the need for climate finance such as Morocco’s estimate of \$45 billion total investment to deliver its INDC (of which \$10 billion would be provided domestically), or Trinidad and Tobago’s estimate of USD \$2 billion to achieve its conditional INDC. No countries specified provision of climate finance in their INDCs, except for China noting that it will establish the Fund for South-South Cooperation on Climate Change.

3. Mitigation ambition of INDCs

COP20 also decided that the UNFCCC Secretariat will prepare a synthesis report on the aggregate impact of INDCs, to be published in early November 2015 (for INDCs submitted by 1 October). Several other organisations have undertaken recent assessments, including the International Energy Agency (IEA), Climate Action Tracker, PBL Netherlands Environmental Agency (PBL), and the ESRC Centre for Climate Change Economics and Policy (CCCEP) in conjunction with the Grantham Research Institute on Climate Change and the Environment. The United Nations Environment Programme (UNEP) is also expected to produce an update of its annual ‘emissions gap report’ in November. The four existing studies use different metrics for assessment, and are in various stages of development, making direct comparisons difficult. However, they all find that collectively the INDCs will have an impact on emissions but are not yet consistent with what is required to stand a good chance of limiting the global temperature increase to 2 degrees above pre-industrial levels. This section reviews the results of these studies, which will all be updated as more countries continue to submit their INDCs.

IEA’s *World Energy Outlook Special Report on Energy and Climate Change* (IEA, 2015) modelled the impact of all INDCs submitted as of 14 May 2015 on future energy trends.⁴ Under the pledges, the growth of energy-related CO₂ is slowed, weakening the historically strong relationship between economic growth and emissions and accelerating the decline in energy intensity of the global economy. The share of renewable energy in electricity grows to almost half by 2030, and the share of fossil fuels in primary energy declines, from 80% to around 75%. World demand for coal plateaus around 2020 (with growth in non-OECD countries offsetting declines in OECD countries). However, inefficient coal-fired power generation capacity declines only slightly, and overall emissions from coal use increase modestly through 2030. Importantly, there is no peak in global energy-related CO₂ emissions by 2030; emissions are 8% higher in 2030 than in 2013 (34.8 versus 32.2 Gt).^{5,6} The remaining carbon budget consistent with the 2-degree goal is exhausted by 2040, only 8 months later than is projected in the absence of INDCs. Without stronger action after 2030, the analysis concludes that this emissions trajectory is consistent with a global temperature increase of around 2.6°C in 2100 and 3.5°C after 2200.

PBL, using its Climate Pledge INDC tool,⁷ has evaluated the global impact of 29 INDCs submitted as of 31 August 2015. It estimates that these INDCs, representing about 60% of global GHGs in 2010 (including LULUCF), could reduce emissions by 3.5 (unconditional INDCs) to 4.0 (conditional INDCs) GtCO₂-e by 2030 below PBL’s current policies scenario. PBL estimates that the reduction attributable to INDCs represents about 19-21% of the 19 GtCO₂-e emissions gap between the global emission levels of 2030 that would be consistent with achieving the 2 degree goal⁸ and those that would result from current and planned policies.

Climate Action Tracker (CAT)⁹ has published detailed, individual assessments of 16 of the 29 INDCs submitted by 2 September 2015,¹⁰ covering 64.5% of global emissions in 2010 (excluding

⁴ Included in the IEA’s “INDC Scenario” are Switzerland, EU, Norway, Mexico, US, Gabon, Russia, Liechtenstein and Andorra, accounting for 34% of energy-related emissions. The modelled INDCs of other countries such as China, Japan, and India were informed by policy statements indicating the likely content of an INDC. Remaining countries’ INDCs were set equal to their policies in the “New Policies Scenario” of the *World Energy Outlook 2014*.

⁵ The IEA says a near-term peak in emissions is necessary to remain consistent with a climate goal below 2 degrees.

⁶ The broadest measure of emissions provided in the report is energy- and process-related GHGs, which rise 8% overall (37.5 to 40.6 Gt CO₂-e) during 2013-2030.

⁷ <http://infographics.pbl.nl/indc/>

⁸ From the median 2-degree pathway of the 2014 UNEP ‘emissions gap report’ (42 Gt CO₂-e in 2030), which represents a 50–66% chance of limiting the rise in global average temperature to no more than 2°C above pre-industrial levels. It assumes significant amounts of ‘negative emissions’ through, for instance, the utilisation of bioenergy and carbon capture and storage (BECCS). Without the use of negative emissions, the limit is 36 Gt CO₂-e.

⁹ CAT is a consortium of four research organisations: Climate Analytics, Ecofys, New Climate Institute, and Potsdam Institute for Climate Impact Research.

LULUCF).¹¹ 7 of the 16 INDCs assessed were rated as “inadequate” and 6 as “medium” in terms of ambition – meaning that if all governments adopted either “inadequate” or “medium” positions, the global rise in temperature would likely exceed 3-4 degrees or 2 degrees Celsius, respectively.¹² CAT plans to update its aggregate modelling assessment of the effect of current pledges and policies on global temperature to account for INDCs. This modelling assessment, most recently published in December 2014, projected that unconditional pledges or promises that governments had made to date would limit warming to 2.9 to 3.1°C (emphasising the gap with current policies and actions, which put the world on track for 3.6-4.2° of warming).¹³ It can thus be inferred that the collective impact of the level of ambition represented by this set of individual INDCs, if extended to all countries, would be insufficient to reduce CAT’s temperature projection below 2 degrees. To hold global warming below 2°C, CAT estimates that global emissions will need to be reduced further by 17-21 GtCO₂-e by 2030.

The CCCEP/Grantham policy paper (Boyd et al., 2015) takes an approach similar to that of PBL, in that it focuses on aggregate emissions impacts and does not explicitly model implications for global temperatures. Taking into account 19 INDCs submitted by 20 July 2015,¹⁴ the analysis projects global emissions in 2030 to be 56.9-59.1 GtCO₂-e, with the range representing “high ambition” and “low ambition” outcomes.^{15,16} The INDCs would reduce emissions by 5.3-7.5 GtCO₂-e below the Reference Scenario level of 64.4 GtCO₂-e.¹⁷ Projected emissions levels under the INDCs were 14.9-17.1 GtCO₂-e higher than 42 GtCO₂-e, the level of global emissions in 2030 that would be consistent with achieving the 2 degree goal (see footnote 11). Thus, under this analysis, the reduction in emissions brought about by the INDCs closes about 24-33% of the gap between projected emissions under current policies and those consistent with 2°C.

As pointed out previously, just over half of the INDCs have put forth absolute GHG emission goals. For the countries with emission targets pegged to a BAU baseline or GDP, most have specified target-year or target-period emissions or supplied sufficient information to make their estimation possible. China submitted a target defined in terms of the carbon intensity of GDP, but did not provide estimates of target-year emissions or GDP, and therefore external projections of GDP growth rates are required in order to estimate target-year emissions. The treatment of China’s INDC in the aggregate impact studies discussed above provides an example of how different assumptions used to fill in information gaps in the INDCs can influence emissions projections, of particular importance when it concerns a major emitter. PBL projects 2030 emissions for China of 14.0 GtCO₂-e (including LULUCF). CAT provides two emission projections for China in 2030 (excluding LULUCF): 13.6 GtCO₂-e if all INDC objectives except the intensity target are met (implying an overachievement of

¹⁰ Switzerland, EU, Norway, Mexico, US, Gabon, Russian Federation, Canada, Morocco, Ethiopia, China, South Korea, Singapore, New Zealand, Japan, Australia.

¹¹ <http://climateactiontracker.org/indcs.html>

¹² Only Ethiopia and Morocco, currently producing 0.3% and 0.2% of global GHGs, respectively, received the next highest rating of “sufficient,” signifying a level of ambition that, if adopted globally, would make achieving the 2-degree goal likely. The fourth and highest rating possible is that of “role model,” corresponding to temperature increases below 2 degrees C. Gabon was not rated, due to insufficient information in its INDC regarding the calculation of emissions from forest degradation.

¹³ The December assessment included the draft INDCs of the US, the EU and China, which together account for 51% of global emissions.

¹⁴ 46 Parties to the UNFCCC, including the 28 member states of the European Union.

¹⁵ “High” and “low” ambition outcomes take into account the target ranges implied by some INDCs, e.g., for the United States and China. Only unconditional parts of targets were included in the analysis.

¹⁶ Countries that had not yet submitted INDCs were assigned emissions levels under the Reference Scenario, which is based on actions and plans that had been introduced by mid-2014 (as assessed in the “Current Policies Scenario” of the IEA’s *World Energy Outlook 2014*).

¹⁷ The INDCs were also judged against an alternative “business as usual” emissions benchmark in 2030 (68 GtCO₂-e), based on the 2014 UNEP ‘emissions gap report,’ which only takes into account climate policies implemented up to around 2005–2010, prior to implementation of more recent pledges and policies.

the intensity target), and 15.0 to 16.9 GtCO₂-e if the intensity target alone is met.¹⁸ CCCEP/Grantham project China's 2030 emissions to be 14.4 or 16.3 GtCO₂-e (including LULUCF), depending if the more stringent (65%) or less stringent (60%) emissions intensity target is met. The IEA report found China's energy-related emissions peaking at 10.1 GtCO₂ around 2030.

4. Conclusion

The INDCs submitted by 31 August provide a mixed picture in terms of transparency and clarity of the INDCs themselves, and of their likely aggregate mitigation effect. There are many positive elements in the information provided:

Despite lack of an agreed template for reporting, most INDCs follow the guidance provided in the Lima Decision 1/CP.20 in terms of information provided

- Just over half of INDCs include absolute mitigation targets, including some from developing countries
- The mitigation component of almost all INDCs, from both developed and developing countries, have economy-wide or near economy-wide sectoral coverage, and cover the most important gases
- Almost all countries that have submitted mitigation targets referenced to BAU or GDP have provided enough information to estimate target-year emissions levels
- INDCs use IPCC methodologies for emissions inventories and accounting, which facilitates comparison
- Several developing countries have been able to provide specific estimates of finance needs for their INDC, including indicating what can be provided domestically and what international support is needed.

There are also areas where scattered information increases the challenge of clarity and transparency of individual INDCs, the ability to judge whether they have been achieved, and estimating their collective impact:

- While there is clarity over end-dates in the INDCs, the use (or implied use) of single-year targets in the majority of cases (instead of multi-year budgets) leads to increased uncertainty in total emissions over the timeframe.
- Use of varying inventory approaches (including different global warming potentials) will make aggregation of INDCs more difficult.
- Lack of detailed information on BAU baseline methodologies, and whether baselines will be revised at a future date creates uncertainty regarding the ultimate emissions impact of those goals referenced to BAU.
- Lack of clarity on accounting for use of international market transfers and the land sector further complicates understanding of individual and collective mitigation effects.
- The total scale of climate finance requested is not yet clear, as a number of developing country INDCs point to the need for further analysis to quantify support needs.

Despite the differing information in INDCs, the three existing studies that have examined the aggregate impact of the INDCs managed to come to the same general conclusion: collectively, the INDCs will have an impact on emissions but are not yet consistent with what is required to stand a good chance of limiting the global temperature increase to 2 degrees above pre-industrial levels. However, to make a robust comparison of the fairness or ambition of individual INDCs will be challenging, given the diverse and fragmented information provided in the INDCs themselves.

¹⁸ The interplay between China's three targets (peaking, intensity target and non-fossil target) determines the resulting level of emissions, which is more driven by the non-fossil and peaking targets than the intensity target. Moreover, as pointed out by Fu, Zou and Liu (2015), between 2005 and 2030 the contribution from decreasing energy intensity per unit of GDP will be more important than the contribution from the decarbonisation of energy supply.

Modelling assessments of the collective impact of INDCs to date have had to fill in a diversity of information gaps, including, but not limited to, assumptions about future GDP growth rates, emissions trajectories toward single-year targets and accounting assumptions for land-use or internationally transferred emissions units. Projections of future emissions depends on myriad factors and is an inherently uncertain exercise. However, more upfront clarity about these elements in submitted INDCs would help to reduce an important source of uncertainty, with the aim of producing more robust estimates of the aggregate effectiveness of the mitigation INDCs.

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Annex 1: Table of INDC information (listed in order of submission, for INDCs submitted by 31 August 2015)

Shaded boxes indicate where information was provided. Details of “Planning Processes”, “Assumptions and Methodological Approaches”, “Elements other than mitigation”, and “Fairness, Ambition and Contribution to the Convention” were not included to save space.

Headline Goal(s)					Reference and Time Frame					Scope and Coverage				Planning Processes		Assumptions and Methodologies			Elements other than mitigation		Fairness, Ambition, Contribution to Convention	
Country	Unconditional GHG goal	GHG goal conditional on support	GHG goal contingent upon final rules	Non-GHG mitigation goal(s)	Base year	Baseline	Target year	Target period	Further details of cap or baseline	Sectors	Gases ¹⁹	Percentage of emissions covered	Intended use of international unit transfers	National long-term target	Description national policies & measures	Inventory approach	Land-use	Units accounting	Adaptation	Means of Implementation	Narrative on fairness, ambition	Able to estimate target emissions
Switzerland	50% absolute reduction (average 35% over period)				1990		2030	2021-2030	✓	Economy-wide	7 gases	100%	yes	✓	✓	✓	✓	✓			✓	✓
European Union	At least 40% absolute reduction				1990		2030	2021-2030		Economy-wide	7 gases	100%	no	✓	✓	✓	✓				✓	✓
Norway			At least 40% absolute reduction, jointly with EU, contingent on rules. Will consider >40% through flexible mechanisms		1990		2030	2021-2030		Economy-wide	7 gases	100%	possible	✓	✓	✓	✓	✓			✓	✓
Mexico	25% reduction on BAU (22% GHG, 51% BC); implies peaking in 2026	Up to 40% reduction on BAU (GHG 36%, BC 70%)	40% goal also contingent on international agreement addressing carbon price, carbon border adjustments	51-70% reduction in black carbon	2013	BAU	2030		✓	Economy-wide	6 gases, black carbon	100%	possible	✓	✓	✓		✓	✓	✓	✓	✓
United States of America	26-28% absolute reduction				2005		Single year 2025			Economy-wide	7 gases	100%	no	✓	✓	✓	✓				✓	✓
Gabon	At least 50% reduction from BAU				2000	BAU	2025	2010-2025	✓	Economy-wide except forest	CO ₂ , CH ₄ , N ₂ O		no		✓	✓		✓	✓			✓

¹⁹ In this column “7 gases” refers to the seven categories of gases CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and NF₃. “6 gases” excludes NF₃.

Headline Goal(s)					Reference and Time Frame					Scope and Coverage				Planning Processes		Assumptions and Methodologies			Elements other than mitigation		Fairness, Ambition, Contribution to Convention	
Country	Unconditional GHG goal	GHG goal conditional on support	GHG goal contingent upon final rules	Non-GHG mitigation goal(s)	Base year	Baseline	Target year	Target period	Further details of cap or baseline	Sectors	Gases ¹⁹	Percentage of emissions covered	Intended use of international unit transfers	National long-term target	Description national policies & measures	Inventory approach	Land-use	Units accounting	Adaptation	Means of Implementation	Narrative on fairness, ambition	Able to estimate target emissions
	(excluding forestry sequestration)									sequestration												
Russia			25-30% absolute reduction, contingent on forestry accounting, outcome of negotiations, and INDCs submitted by major emitters		1990		2030	2020-2030		Economy-wide	7 gases	100%	no		✓	✓					✓	✓
Liechtenstein			40% absolute reduction, contingent on counting emissions reductions abroad		1990		2030	2021-2030		Economy-wide	7 gases	100%	yes		✓	✓	✓	✓			✓	✓
Andorra			37% below BAU, subject to rules			BAU	2030	2016 - 2030	✓	Energy, Waste (near economy-wide)	CO ₂ , CH ₄ , N ₂ O, SF ₆	98.5 %	no		✓	✓	✓				✓	✓
Canada	30% absolute reduction				2005		2030			Economy-wide	7 gases	100%	possible		✓	✓	✓	✓			✓	✓
Morocco	13% below BAU	32% below BAU	32% goal also contingent on conclusion of a legally-binding UNFCCC agreement			BAU	2030		✓	Economy-wide	CO ₂ , CH ₄ , N ₂ O	Near 100%	possible		✓	✓			✓	✓	✓	✓
Ethiopia		Limit emissions to 145Mt CO ₂ e or lower. Requires partial support			2010		2030		✓	Livestock, soil, forestry, transport, power, industry, buildings (incl. waste)	CO ₂ , CH ₄ , N ₂ O		yes	✓	✓	✓	✓	✓	✓	✓	✓	✓
Serbia	9.8% absolute reduction				1990		2030	2021-2030		Economy-wide	6 gases	100%			✓	✓					✓	✓

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Headline Goal(s)					Reference and Time Frame					Scope and Coverage				Planning Processes		Assumptions and Methodologies			Elements other than mitigation		Fairness, Ambition, Contribution to Convention	
Country	Unconditional GHG goal	GHG goal conditional on support	GHG goal contingent upon final rules	Non-GHG mitigation goal(s)	Base year	Baseline	Target year	Target period	Further details of cap or baseline	Sectors	Gases ¹⁹	Percentage of emissions covered	Intended use of international unit transfers	National long-term target	Description national policies & measures	Inventory approach	Land-use	Units accounting	Adaptation	Means of Implementation	Narrative on fairness, ambition	Able to estimate target emissions
Iceland	40% absolute reduction, jointly with EU				1990		2030	2021-2030		Economy-wide	7 gases	100%	Yes (ETS)		✓	✓	✓				✓	✓
China	CO ₂ peak around 2030; CO ₂ /GDP 60-65% lower			Share non-fossil fuels 20%; Increase forest stock volume by 4.5 BCM	2005	GDP	2030			Not explicitly stated, but various sectors mentioned	CO ₂ , (HFCs, CH ₄ , N ₂ O mention ed)				✓				✓	✓		
Republic of Korea	37% below BAU					BAU	2030		✓	Energy, industry, agriculture, waste	6 gases		yes		✓	✓			✓		✓	✓
Singapore	36% reduction in emission intensity; aim to peak around 2030				2005	GDP	2030	2021-2030	✓	Economy-wide	6 gases	100%	possible		✓	✓			✓		✓	✓
New Zealand			30% absolute reduction, contingent on land sector accounting, carbon market rules		2005		2030	2021-2030		Economy-wide	7 gases	100%	yes	✓	✓	✓	✓	✓	✓		✓	✓
Japan	26% absolute reduction				FY 2013		FY 2030	April 2021-March 2031		Economy-wide	7 gases	100%	yes		✓	✓	✓	✓			✓	✓
Marshall Islands	32% absolute reduction (indicative 45% by 2030)				2010		2025			Energy, waste (others negligible)	CO ₂ , CH ₄ , N ₂ O	100%	no	✓	✓	✓		✓	✓	✓	✓	✓
Kenya		30% reduction relative to BAU			2010	BAU	2030		✓	Economy-wide, not including	CO ₂ , CH ₄ , N ₂ O		possible		✓	✓	✓	✓	✓	✓	✓	✓

Headline Goal(s)					Reference and Time Frame					Scope and Coverage				Planning Processes		Assumptions and Methodologies			Elements other than mitigation		Fairness, Ambition, Contribution to Convention	
Country	Unconditional GHG goal	GHG goal conditional on support	GHG goal contingent upon final rules	Non-GHG mitigation goal(s)	Base year	Baseline	Target year	Target period	Further details of cap or baseline	Sectors	Gases ¹⁹	Percentage of emissions covered	Intended use of international unit transfers	National long-term target	Description national policies & measures	Inventory approach	Land-use	Units accounting	Adaptation	Means of Implementation	Narrative on fairness, ambition	Able to estimate target emissions
										future extractive sector												
Monaco	50% absolute reduction (average 40% over period)				1990		2030	2021-2030	✓	Economy-wide	7 gases	100%	possible	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macedonia		30 to 36% below BAU				BAU	2030		✓	fuel combustion	CO ₂	80%	possible		✓	✓			✓	✓	✓	✓
Trinidad and Tobago	30% below BAU in public transportation sector	15% below BAU in power generation, transportation, and industry			2013	BAU	Dec 31, 2030		✓	Transportation, power generation, industry	CO ₂ , CH ₄ , N ₂ O				✓	✓			✓	✓	✓	✓
Benin		Cumulative avoided emissions 120Mt, cumulative sequestration 163Mt below BAU			1995	BAU		2016-2030	✓	Energy (transport, residential, industry), agriculture, LULUCF	CO ₂ , CH ₄ , N ₂ O		no		✓	✓	✓	✓	✓	✓	✓	
Australia			26 to 28% absolute reduction. INDC is contingent on final rules		2005		2030	2021-2030		Economy-wide	7 gases	100%			✓	✓	✓	✓	✓	✓	✓	✓
Djibouti	40% below BAU	60% below BAU			2000	BAU	2030		✓	All sectors except land-use	CO ₂ , CH ₄ , N ₂ O				✓	✓			✓	✓	✓	✓
Democratic Republic of Congo		17% below BAU			2000	BAU	2030	2021-2030	✓	Agriculture, Forests, Energy	CO ₂ , CH ₄ , N ₂ O				✓	✓			✓	✓	✓	✓
Dominican Republic		25% reduction in per capita emissions	25% goal also contingent on improved market mechanisms		2010	Per capita	2030	2010-2030		Economy-wide	CO ₂ , CH ₄ , N ₂ O				✓	✓			✓	✓	✓	

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