

Is it possible to track progress of the submitted nationally determined contributions under the Paris Agreement?

Overview of implicit accounting decisions in submitted NDCs and implications for the tracking of progress under the Paris agreement

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List of abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
APA	Ad Hoc Working Group on the Paris Agreement
AR	Assessment Report
BAU	Business-as-usual
CDM	Clean Development Mechanism
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
GDP	Gross domestic product
GHG	Greenhouse gas
GTP	Global temperature potential
GWP	Global Warming Potential
HWP	Harvested Wood Products
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Use
LULUCF	Land use, land use change and forestry
Mt CO ₂ eq	Mega tons CO ₂ equivalents
NDC	Nationally Determined Contribution
REDD+	Reducing Emissions from Deforestation and Forest Degradation in developing countries
UNFCCC	United Nations Framework Convention on Climate Change

1. Summary

Under the Paris Agreement adopted at COP 21 in Paris in December 2015, countries submitted their intended nationally determined contributions (INDCs) in the course of 2015 and in 2016. These intended contributions become nationally determined contributions (NDC) when Parties ratified the Paris Agreement. The NDCs form the heart of the Paris Agreement and will determine the global mitigation pathway between 2020 and 2030. Until March 2018, 175 Parties ratified the Paris Agreement and 169 Parties submitted their first NDCs. These NDCs comprise 197 countries because the European Union and its Member States have submitted a joint NDC.¹

This paper examined the NDCs submitted under the Paris Agreement and highlighted those areas in which information is lacking in order to track progress towards the implementation and achievement of the NDCs. While most countries have submitted NDCs that are roughly quantified at a first glance, many specific pieces of information are missing in order to precisely assess the mitigation impact of NDCs and to track progress with the implementation and achievement of the NDCs. In this regard it will be essential to provide better and more detailed guidance under the Paris Agreement on the information communicated together with the NDCs. On the other hand, such detailed information on the NDCs should be provided as part of the information under Article 13 of the Paris Agreement, in particular as part of the modalities, procedures and guidelines under Article 13, paragraph 7(b) on information related to the tracking of progress.

About 87 Parties have submitted NDCs with emission reductions compared to a BAU projection. This will be one of the areas where additional guidance should be elaborated to ensure a credible and transparent implementation of this NDC type. While it seems unlikely that Parties would agree on methodologies how BAU projections should be established, it is nevertheless important to establish guidance

- that ensures consistency related to emission methodologies used and the coverage between the BAU projections and the GHG emissions and removals reported in the period 2020 to 2030.
- that addresses whether and how BAU projections can be updated or revised and what type of information should be communicated related to such revisions.
- that ensures that sufficient information and data is available related to the BAU scenario that enables the tracking of progress and achievement.
- that ensures transparency about the methodologies and assumptions that have been used in the establishment of the BAU projection to enhance clarity and understanding.

Other types of NDCs such as intensity targets or renewable targets require in particular that some additional information is provided in the reporting after 2020 to enable the tracking of progress, such as information related to GDP, population or renewable shares in the electricity generation. Such information is not yet part of the current reporting system. As this information is already collected and available, it should be straightforward to complement the existing system with the necessary additional elements. The diversity of NDCs and the information gaps revealed in this paper show that a more complex system of reporting, review and assessment of NDCs will be required in the future that collects information specific for the types of NDCs chosen by Parties. Reporting guidelines should be elaborated that address the specific information requirements for the different types of NDCs which have been submitted by Parties in order to make it possible to track progress towards their implementation.

¹ May 2017 was the cut-off date used for this analysis of NDCs. The INDC submissions are available on the following website: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

2. Introduction

Under the Paris Agreement adopted at COP 21 in Paris in December 2015, countries submitted their intended nationally determined contributions (INDCs) in the course of 2015 and in 2016. These intended contributions become nationally determined contributions (NDC) when Parties ratified the Paris Agreement. The NDCs form the heart of the Paris Agreement and will determine the global mitigation pathway between 2020 and 2030. Until March 2018, 175 Parties ratified the Paris Agreement and 169 Parties submitted their first NDCs. These NDCs comprise 197 countries because the European Union and its Member States have submitted a joint NDC.² The NDCs are accessible at an interim NDC registry at the homepage of the UNFCCC and on a separate homepage are the intended NDCs as submitted prior to the COP 21.³

This paper analyses whether the information contained in the NDC submissions is transparent and sufficient to track progress with the mitigation targets expressed in the NDCs and summarizes the accounting decisions assumed in the submitted NDCs, e.g. what type of emissions and removals, gases, sectors will Parties count as part of their mitigation targets, which methodologies will they use, against which references will the future emissions be compared or how will the LULUCF sector be treated. The accounting decisions made as part of the NDCs are also relevant for the quantification of the impact of the individual NDCs in a precise manner and the aggregate effect of the NDCs under the Paris Agreement and an assessment whether the NDCs include ambitious mitigation targets.⁴

When countries compiled and submitted their NDCs prior to COP 21 only very general guidance on the information to be included was available which consisted in paragraph 14 of decision 1/CP.20:

“Parties [...] 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 as set out in its Article 2”.

In the absence of clear guidance on the information to be submitted for the NDCs, each country had to decide on its own what type of information it provided. Prior to the adoption of the Paris Agreement, no guidance was available related to the question how countries will account for their mitigation targets, which elements they will include in the targets and which references they will chose as a measure for their progress. This paper analyses the implicit accounting decisions taken by Parties or references to expected guidance that can be found in the NDC submission with the aim to develop elements for accounting guidance under Article 4, paragraph 13 of the Paris Agreement which includes the mandate for the Ad Hoc Working Group on the Paris Agreement (APA) to elaborate guidance for accounting for Parties' NDCs for consideration and adoption by the first session of the CMA.

Against this background, this paper seeks to analyse whether the information provided as part of the NDC submissions will be sufficient to track progress towards implementation and achievement of the NDCs. Furthermore, it takes stock of the information which has been provided together with

² May 2017 was the cut-off date used for this analysis of NDCs. The INDC submissions are available on the following website: <http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

³ <http://www4.unfccc.int/ndcregistry/Pages/All.aspx>

⁴ The synthesis report on the aggregate effect of the INDCs by the UNFCCC secretariat provides further evidence to this point as it describes how approximations had to be used in order to quantify those INDCs whose definition included several methodological uncertainties (UNFCCC 2015).

the NDCs and highlights those areas where additional information would be necessary in order to clearly determine the NDC's mitigation impact.⁵ The analysis comprises 191 countries and 163 NDCs.⁶

The first section presents an overview of the types of NDCs that have been submitted under the Paris Agreement. The second section outlines the information components that are necessary to track progress with implementing and achieving NDCs. The subsequent sections analyse accounting information related to the accounting of the forestry and land-use sector, the use of carbon markets and specific types of NDCs, followed by a brief overview of NDCs with conditional targets that mostly refer to support needs. This last section examines to what extent the conditional element is clearly defined.

3. Analysis of the information provided with NDCs

3.1. Types of targets presented in NDCs

Broadly, 6 different types of NDCs can be differentiated:

- Absolute emission reductions (including carbon neutrality target);
- Absolute emission limits (including carbon neutrality and peaking year targets);
- Reduction relative to a business-as-usual (BAU) scenario (including reductions relative to BAU per sector);
- Reduction of carbon or GHG intensity (e.g. CO₂/GHG emissions per capita or CO₂/GHG emissions per GDP);
- Policies and actions and
- sectoral non-GHG targets.

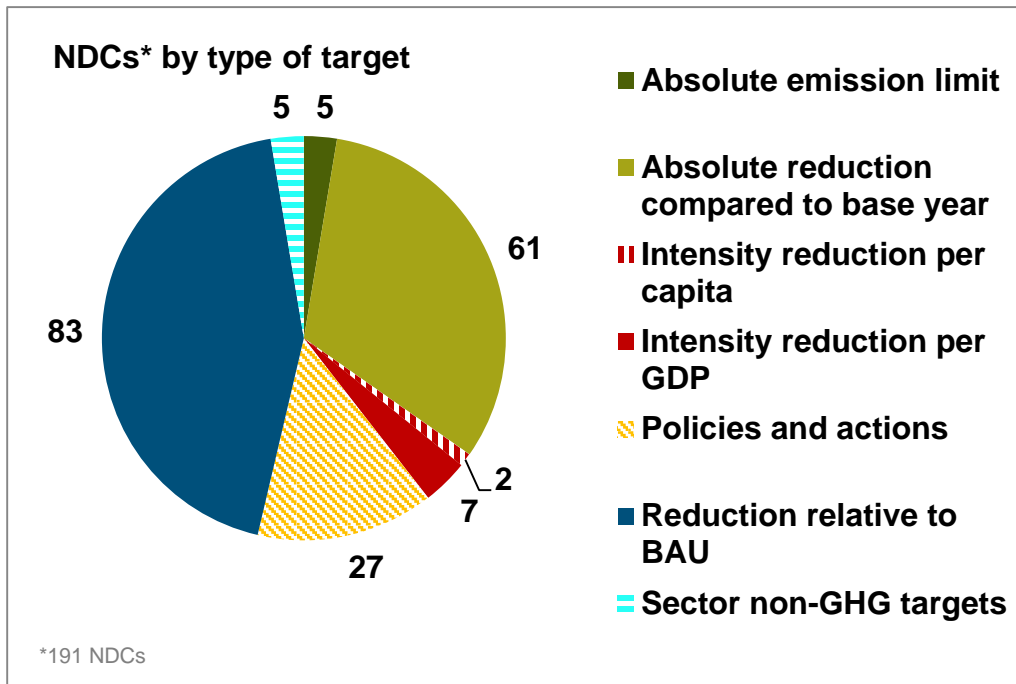
In this categorization, targets to achieve carbon neutrality and targets that include a future year or period of peaking emissions were included in the absolute emission limitation or reduction targets. These categories are considered as separate categories in other analytical exercises, e.g. in UNFCCC (2015). Table 3-1 includes a more differentiated consideration of NDC types with additional subcategories. Some NDCs also include several target types, e.g. an intensity target and peaking year target.

The most frequently chosen type of target by 83 countries is a reduction target relative to a BAU scenario. All countries that chose this target type are non-Annex I countries except for Turkey. The second most frequently chosen type of target is an absolute emission reduction target. 43 Annex I countries and 18 non-Annex I countries submitted such a type of target as their NDC; this includes Costa Rica which presented an absolute emission limitation target of achieving carbon neutrality.

⁵ The EU submission is counted as representing 29 Parties in the assessments in this paper.

⁶ Few NDC submissions were not taken into account due to late submission (INDC submissions of Timor-Leste, Uzbekistan, Pakistan, Sri Lanka)

Figure 3-1 Types of targets proposed in the INDCs



Source: Own analysis based on NDCs submitted under the UNFCCC

Thus, the variety of types of NDCs is rather limited. 32% of all countries chose an absolute emission reduction target which is the type of target that can most easily be quantified in terms of emission reductions.

Table 3-1 provides a more detailed overview of the different target types that have been selected by countries in their NDCs and a characterization of these types.

Table 3-1 Overview of target types

Type of commitment	Outcome based/ action based	Variations of commitment type	Proposed as an NDC by
Quantified economy-wide absolute emission targets relative to base year	Outcome based	<ul style="list-style-type: none"> fixed percentage/range of reduction/absolute reduction/emission limitation (in terms of MtCO₂eq) single year/multi-year carbon neutrality 	Australia, Azerbaijan, Belarus, Botswana, Brazil, Canada, Cook Islands, Costa Rica, Dominica, Equatorial Guinea, EU (+28 Member States), Grenada, Guinea, Iceland, Japan, Kazakhstan, Liechtenstein, Marshall Islands, Micronesia, Moldova, Monaco, Montenegro, New Zealand, Norway, Palau, Russian Federation, San Marino, Serbia, South Africa, Switzerland, Tajikistan, Tuvalu, Ukraine, USA
Quantified economy-wide absolute emission targets relative to BAU	outcome based	<ul style="list-style-type: none"> fixed percentage/range of reduction/absolute reduction (in terms of MtCO₂eq) in terms of intensity per capita single year/multi-year 	Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Bahamas, Bangladesh, Barbados, Benin, Bosnia and Herzegovina, Brunei, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Chad, Colombia, Comoros, Côte d'Ivoire, Democratic Republic of Congo, Congo, Djibouti, Ecuador, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guatemala, Haiti, Honduras, Indonesia, Iran, Iraq, Jamaica, Jordan, Kenya, Kiribati, Korea, Kyrgyzstan, Lebanon, Lesotho, Liberia, Macedonia, Madagascar, Maldives, Mali, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Namibia, Niger, Nigeria, North Korea, Oman, Pakistan, Paraguay, Peru, Philippines, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Senegal, Seychelles, Solomon Islands, Sri Lanka, Tanzania, Thailand, Togo, Trinidad and Tobago, Turkey, Vanuatu, Venezuela, Viet Nam, Yemen, Zimbabwe
Achieve carbon / emission neutrality	outcome based	<ul style="list-style-type: none"> balance of emissions and removals reduction to another fixed net emissions level single year/multi-year scenario 	Bhutan, Costa Rica,
Reduction of carbon/ GHG intensity	outcome based	<ul style="list-style-type: none"> GHG emissions per GDP GHG emissions per capita fixed percentage/range of reduction/absolute reduction (in terms of MtCO₂eq) single year/multi-year base year/BAU economy-wide/per specific sectors 	Chile, China, Dominican Republic, India, Israel, Malaysia, Singapore, Tunisia, Uruguay
Absolute emission limit	Outcome based	<ul style="list-style-type: none"> intensity target carbon neutrality 	Armenia, Bhutan, Sierra Leone, South Africa, Turkmenistan
Indication of peaking year	outcome based	<ul style="list-style-type: none"> absolute emission limit Intensity reduction per GDP 	China, Sierra Leone, Singapore, South Africa, Turkmenistan
Sectoral non-GHG targets	Outcome based	<ul style="list-style-type: none"> Share of renewables in energy sector/for electricity generation Compared to BAU/base year 	Bolivia, Cabo Verde, Niue, Samoa, Tonga
Renewable-target	outcome based	<ul style="list-style-type: none"> increase of share of renewables (absolute/relative) single year/multi-year ratio of additions of low-carbon to fossil-fired electricity generating capacity 	A quantified increase of the share of renewables in the Energy mix is an element included in many INDC submissions, separate renewable targets are indicated also in NDCs that establish general economy-wide targets. Afghanistan, Algeria, Antigua and Barbuda, Australia, Bangladesh, Barbados, Belize, Benin, Bolivia, Bosnia

Type of commitment	Outcome based/ action based	Variations of commitment type	Proposed as an NDC by
			and Herzegovina, Brazil, Brunei, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Chad, Chile, China, Comoros, Congo, Costa Rica, Djibouti, Ecuador, Equatorial Guinea, EU, Gabon, Ghana, Grenada, Guatemala, Guinea, Guyana, Haiti, India, Indonesia, Israel, Ivory Coast, Japan, Jordan, Kiribati, Lao, Lesotho, Liberia, Madagascar, Malawi, Marshall Islands, Mexico, Mongolia, Morocco, Myanmar, Namibia, New Zealand, Niger, Niue, Papua New Guinea, Palau, Paraguay, Samoa, Sao Tome and Principe, Senegal, Seychelles, Singapore, Solomon Islands, Swaziland, Thailand, Togo, Tonga, Tunisia, Turkey, Tuvalu, Uganda, United Arab Emirates, Uruguay, USA, Vanuatu
Forest-related targets	outcome based	<ul style="list-style-type: none"> · increase of forest cover/ reduction of deforestation afforestation/ reforestation of specified area · maintenance of net sink at a specified level · implementation of REDD+ activities · single year/multi-year 	Included as sub-target in many NDCs, quantified targets: Angola, Benin, Bosnia and Herzegovina, Brazil, Burundi, Cabo Verde, Cambodia, Chile, China, DR Congo, Georgia, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Jordan, Laos, Madagascar, Mexico, Myanmar, Sri Lanka, Tonga, Viet Nam
Set of quantified mitigation actions/ policies	action based commitments	<ul style="list-style-type: none"> · mix of clearly quantified mitigation actions in terms of emission reductions in forest, energy sector 	Laos, Mozambique,
(packages of) policies	action-based commitments	<ul style="list-style-type: none"> · set of mitigation actions that are integrated into an overall low carbon development strategy · e.g. low-carbon urban planning, land-use planning, low-energy buildings, industrial processes <p>not quantified policies:</p> <ul style="list-style-type: none"> · changes in agricultural systems, agricultural practices · development of urban transport system 	Antigua and Barbuda, Bahrain, Belize, Cuba, Egypt, El Salvador, Guinea Bissau, Guyana, Kuwait, Malawi, Myanmar, Nauru, Nepal, Panama, Papua New Guinea, Qatar, Rwanda, Saudi Arabia, Somalia, South Sudan, Sudan, Suriname, Swaziland, Uganda, United Arab Emirates, Zambia

Source: own compilation based on NDC submissions on UNFCCC website

3.2. General information required for assessing of progress and achievement of NDCs

A number of general information requirements need to be provided for all target types in order to allow the quantification of the mitigation impact implied by NDCs and to be able to track progress towards their implementation. The following sections analyse such accounting elements.

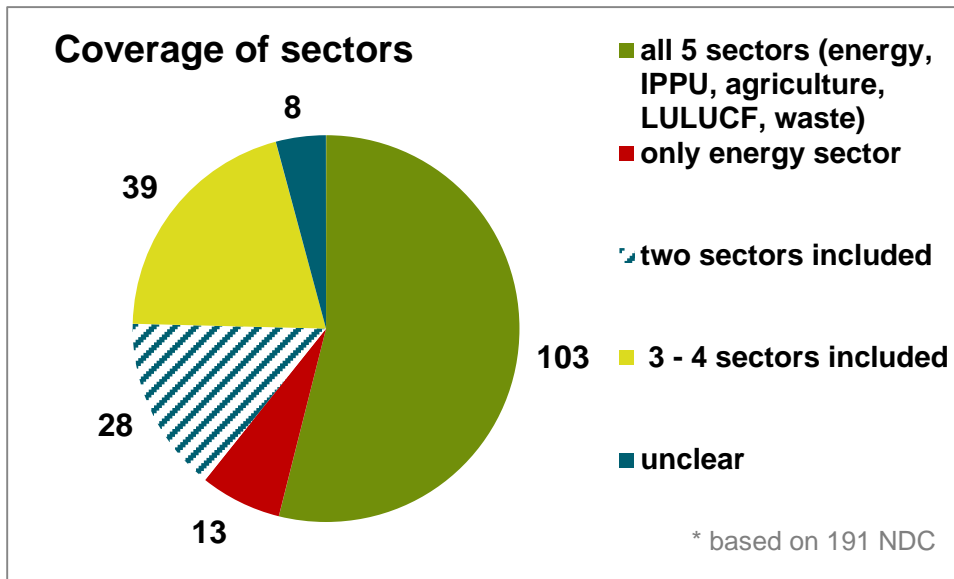
3.2.1. Scope of the commitment: coverage of sectors

The NDCs differ considerably with regard to their coverage of sectors. In terms of scope of the targets, the NDCs differ with regard to the sectors included. 48% of all NDCs submitted include all inventory sectors in their mitigation targets (covering 92 countries, out of which 43 are Annex I Parties and 49 non-Annex I Parties). Even among the countries which submitted absolute emission reduction targets, 14 countries did not include all inventory sectors in their NDC (Azerbaijan, Belarus, Botswana, Cook Islands, Dominica, Equatorial Guinea, Grenada, Guinea, Marshall Islands, Micronesia, Montenegro, Palau, Tajikistan and Tuvalu). Thus, not all countries with absolute emission reduction targets in their NDCs defined those as economy-wide targets. From 191 NDC submissions, 103 covered all 5 IPCC sectors (energy, IPPU, agriculture, LULUCF, waste), and 39 submissions cover at least 3 to 4 sectors.

All of the submissions include the energy sector; 13 Parties submitted an NDC which only aims at mitigation in the energy sector. 28 submissions include two sectors, seven of which comprise energy and waste and three energy and industry while the others include land use, land-use change and forestry (LULUCF)/ agriculture, forestry and other land use (AFOLU)/forestry/REDD+ next to the energy sector.

Most Parties do not specify in their NDC submission how the sectors included in their pledge are defined or delineated. However, for those countries which explicitly mention IPCC guidelines in their submission it can be assumed that the definition of sectors is based on their latest GHG inventory. Yet, for several countries, it is not clearly defined which sources of emissions are covered by their NDCs and the sectors listed therein. Firstly, it is not clear from many NDC submissions how the land use sector is treated and delineated. For example, Cameroon, the Democratic Republic of Congo, Ethiopia, Grenada, Malaysia, Rwanda and South Sudan include forestry in their NDC but do not explain in greater detail which activities are included in this sector. Furthermore, several sectors are mentioned by Parties as included in their NDCs which do not correspond to inventory sectors (e.g. natural resource management in the Afghan NDC; mangroves, coastal vegetation and seagrass in the INDC of Kiribati; urban development in the Armenian NDC, or electricity in several NDCs).

Figure 3-2 Coverage of sectors in NDC submissions



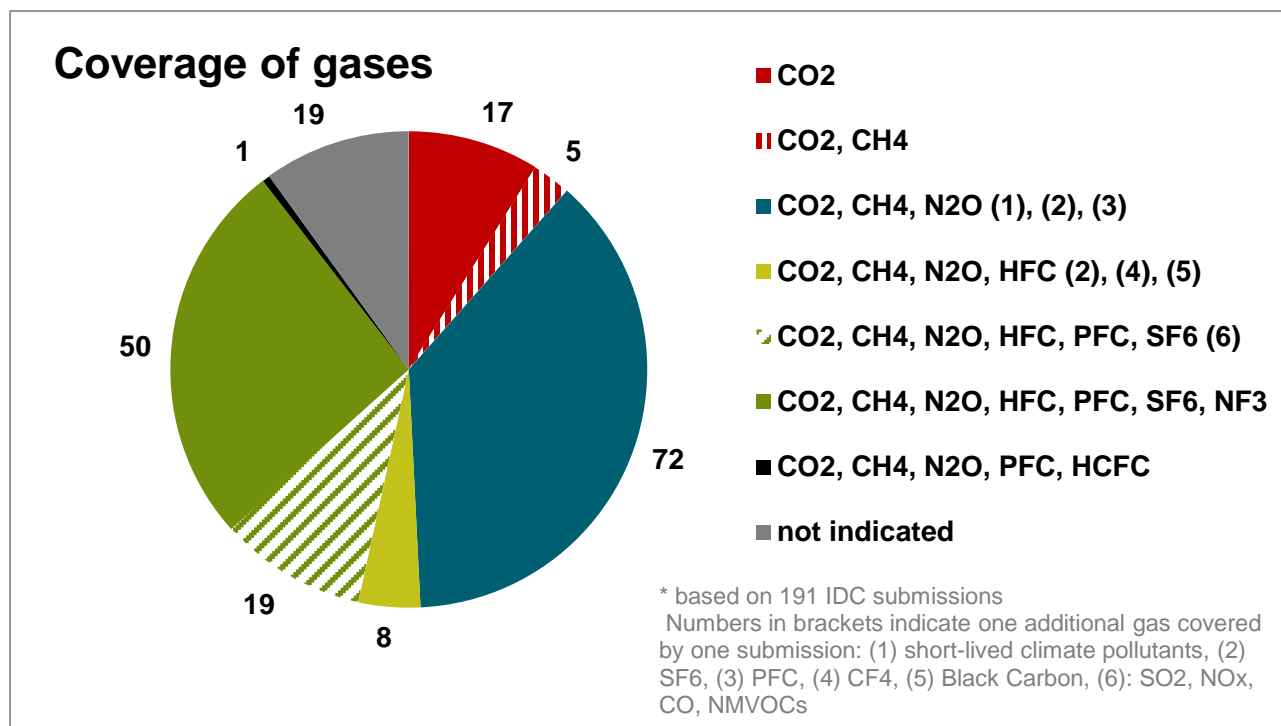
Source: Analysis by Öko-Institut based on NDCs submitted under the UNFCCC

For the future tracking of progress with the implementation of NDCs, it will be essential that all Parties that have not yet provided such information in their NDC submissions clarify the coverage of sectors in terms of GHG inventory sectors and categories because this is the way GHG emissions and removals are tracked under the UNFCCC. If countries refer to sectors not part of GHG inventories, it is essential that they provide explanations how these categories are related to categories in their national GHG inventories and how they are estimated.

3.2.2. Scope of the commitment: coverage of gases

Regarding the gases covered by the NDCs, 26% of all countries (50 NDCs) include all GHGs covered by the Kyoto Protocol (CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, NF₃). The majority of submissions (i.e. 79% or 150 submissions) include CO₂, CH₄ and N₂O in their targets. Those three GHGs cover the largest share of all emissions in non-Annex I countries. Only 17 submissions include only CO₂ in their target. Except for China, these countries are quite small though.

Figure 3-3 Scope of gases included in the NDCs



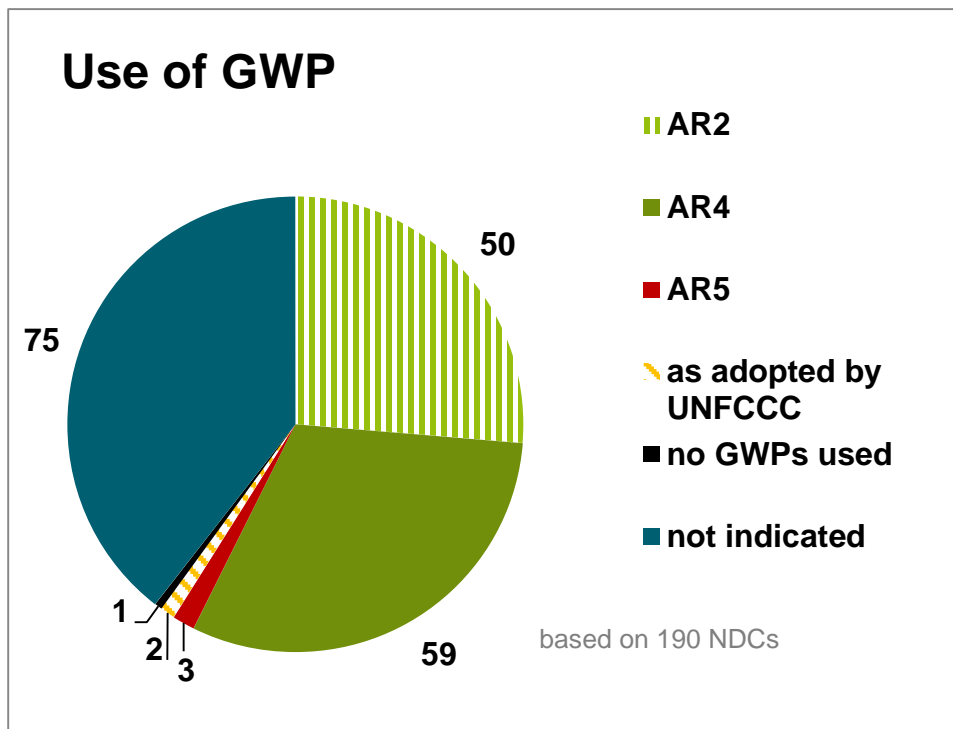
Source: Analysis by Öko-Institut based on NDCs submitted under the UNFCCC

For the future tracking of progress with the implementation of NDCs, it will be essential that all Parties that have not yet provided such information in their NDC submissions clarify the coverage of gases of their NDCs. 10% of NDC submissions that miss a reference to the GHG emissions included also point to the need of improvement of the guidance on information accompanying the NDC submissions.

3.2.3. Metrics to account for effects of individual GHGs

Common metrics are parameters which are used to convert individual GHG gases to CO₂equivalents based on their radiative forcing effect. The IPCC assessment reports introduced the concept of Global Warming Potentials (GWPs) and provided values for different time horizons (20, 100 and 500 years). With the GWPs, different GHG can be converted into CO₂ equivalents and aggregated to total emissions. 26% of all NDC submissions used GWPs from the IPCC's second Assessment Report (AR) while 31% used GWPs from the 4th Assessment Report, this includes 17 non-Annex I countries. Brazil, Ecuador and Mexico used GWPs from the 5th IPCC Assessment Report which have not yet been generally adopted for reporting under the UNFCCC. Brazil is the only country providing estimates of its NDC on the basis of Global Temperature Potentials (GTPs), but it also indicates the implied emission reductions of its target calculated on the basis of GWP-100 of the IPCC's 5th Assessment Report.

Figure 3-4 GWPs used in the NDCs



Source: Own analysis based on NDCs submitted under the UNFCCC

For the future tracking of progress with the implementation of NDCs, it is important that Parties report the metrics used to convert individual gases to CO₂equivalents. Paragraph 31(a) of decision 1/CP.21 requests a future decision under the Paris Agreement that establishes a common metric for all Parties to be used for the accounting of NDCs.

A large share of 39% of countries did not provide information on the common metrics that will be used for the tracking of progress of NDCs. This may be related to the expectation that future decisions will be taken on metrics under the Paris Agreement and that subsequently GHG inventories and NDCs expressed in a certain metric could be recalculated with such metric. This may slightly change the contributions of sectors or gases to the total emissions, but the impacts on the time series of emissions are likely to be relatively small, while effects on the level of emissions can be larger. Paragraph 32 of decision 1/CP.21 decided that accounting guidance adopted by the CMA will only apply on a mandatory basis to the second and subsequent NDC and that Parties may elect to apply such guidance to their first NDC.

The use of different common metrics for the first NDCs strongly impacts the comparability of NDCs and mitigation efforts and the aggregation of emissions and mitigation efforts. If one country would multiply N₂O emissions with 310, another with 265 and a third country with 234 to calculate CO₂equivalents, this would not provide a comparable basis for the aggregation of emissions and emission reductions across Parties.

Table 3-2 Values of GWP100 as published over time in IPCC assessment reports (AR) and GTP100

Greenhouse gas	Second IPCC AR	Third IPCC AR	Forth IPCC AR	Fifth IPCC AR	GTP100 Fifth IPCC AR
CO ₂	1	1	1	1	1
CH ₄	21	23	25	28	4
N ₂ O	310	296	298	265	234
HFC-23	11700	12000	14800	12400	12700
HFC-32	650	550	675	677	94
HFC-43-10mee	1300	1500	1640	1650	281
HFC-125	2800	3400	3500	3170	967
HFC-134	1000	1100	1100	1120	160
HFC-134a	1300	1300	1430	1300	201
HFC-143	300	330	353	328	46
HFC-143a	3800	4300	4470	4800	2500
HFC-152a	140	120	124	138	19
HFC-227ea	2900	3500	3220	3350	1460
HFC-236fa	6300	9400	9810	8060	8380
HFC-245ca	560	640	693	716	100
PFC-14	6500	5700	7390	6630	8040
PFC-116	9200	11900	12200	11100	13500
PFC-218	7000	8600	8830	8900	10700
PFC-318	8700	10000	10300	9540	11500
PFC-31-10	7000	8600	8860	9200	11000
PFC-41-12	7500	8900	9160	8550	10300
PFC-51-14	7400	9000	9300	7910	9490
SF ₆	23900	22200	22800	23500	28200
NF ₃	n.a.	10800	17200	16100	18100

If no such decision would be taken, it will be essential that those countries that did not specify the use of metrics yet provide such information in their reporting under the Paris Agreement. It is also important that a Party uses the same common metric and values throughout a NDC period.

A future decision adopting common metrics under the Paris Agreement would eliminate the need to report the metric as part of the NDC submission and achieve comparable emission figures that can be aggregated.

3.2.4. Definition of the target year(s) or target period and the target value

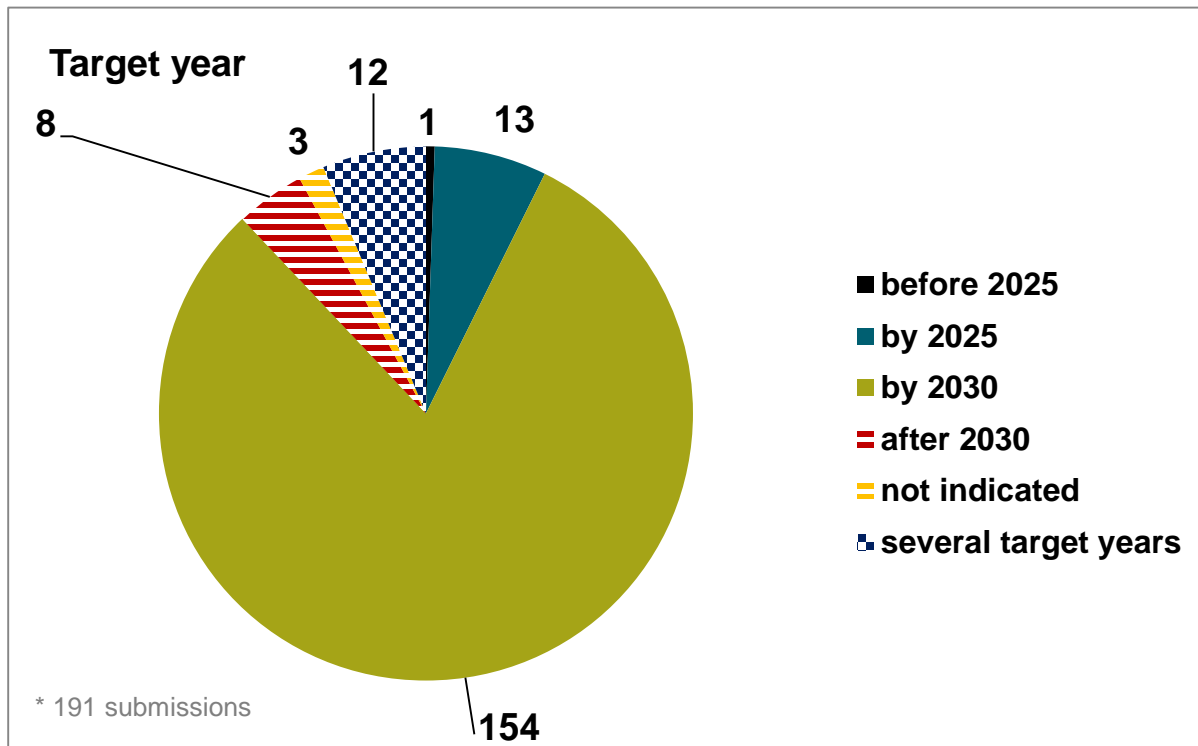
Submitted NDCs also include different target years. The large majority of countries (81% or 154 countries) proposed to implement their NDC by 2030. 2025 was indicated as the target year by only 7% (13 countries) of all countries. Few countries have indicated interim targets for 2025.

It is not always clear from the information provided in the NDCs whether countries aim to achieve their pledges by a certain year as a single year target or over a whole commitment period. Only Switzerland specified in their NDC that its target of reducing GHG emissions by 50% by 2030 is to be achieved through an average reduction of 35% over the period from 2021 until 2030.

Also, little information is available from the NDCs submitted so far in terms of trajectories for meeting the proposed targets. Some countries have defined interim targets on the way towards reaching their ultimate targets (e.g. Belize specified targets for 2025, 2027 and 2033, Congo for 2025 and 2035, and Brazil, El Salvador, Kiribati, Saint Kitts and Nevis, the Seychelles, South Africa and Switzerland for 2025 and 2030).

16 out of 28 countries which submitted policies and actions as their NDCs pledged to fulfil these by 2030. Timeframes indicated in the other NDCs vary from 2021, 2025 to 2050. Somalia and Suriname did not indicate any target period at all.

Figure 3-5 Target years of the NDCs



Source: Own analysis based on NDCs submitted under the UNFCCC

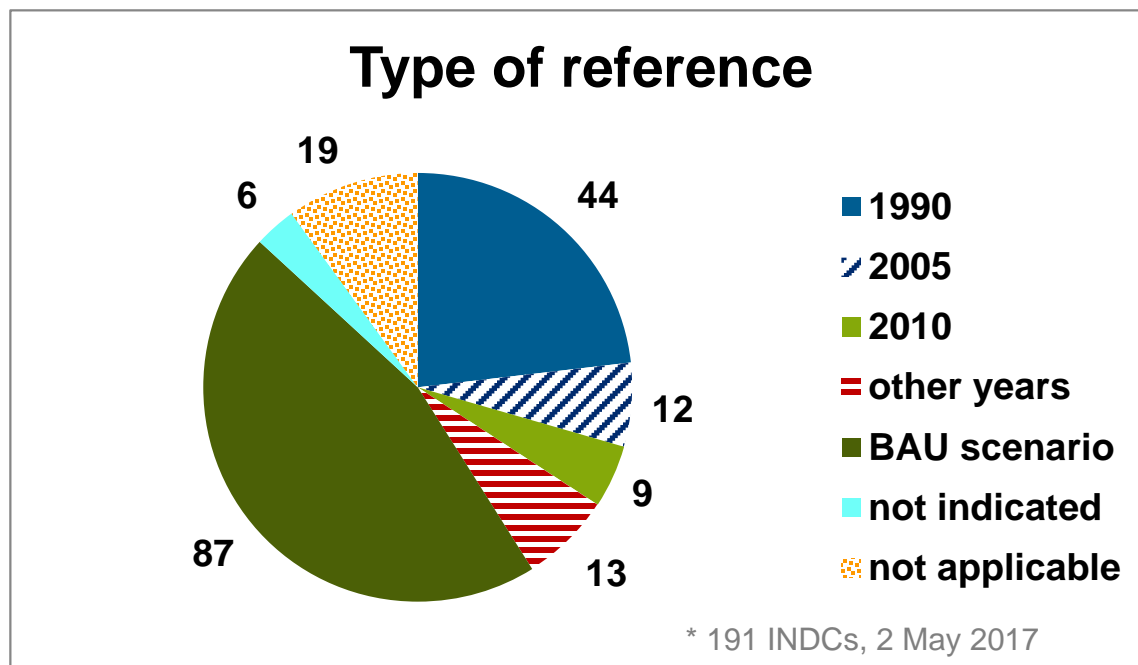
Different NDC periods and subsequently different updating period will complicate the process of tracking of progress considerably because countries will achieve their NDCs in different years and thus the processes of technical review and facilitative multilateral consideration will already provide final assessments of the achievement for some Parties while others are still on their way with the implementation and a third group may already implement the subsequent NDC. This will generally make it very difficult to derive conclusions about the aggregate mitigation achievements under the Paris Agreement.

3.2.5. Definition of the reference or baseline

Among the NDCs submitted so far, 78 countries have defined a mitigation target compared to a base year (44 countries chose 1990 as a base year, 12 countries 2005 and 9 countries 2010). For some target types such as the implementation of policies and measures the choice of a base year does not apply in the same way as for quantitative targets (19 countries). Those countries that chose 1990 as a base year are mainly the countries that have quantitative targets under the Kyoto Protocol. Apart from the years 1990, 2005 and 2010 which are the most frequent base year choices, also base years 1994, 2002, 2006, 2007, 2009, 2013 or 2014 appear in the NDC

submissions. Many developing countries do not have time series of GHG emissions for the past year, but they only reported GHG emissions for specific years in their national communications such as 1994, 2000 or 2010, therefore these years appear more frequently in NDC submissions from developing countries.

Figure 3-6 Type of reference for target indicated in the NDCs

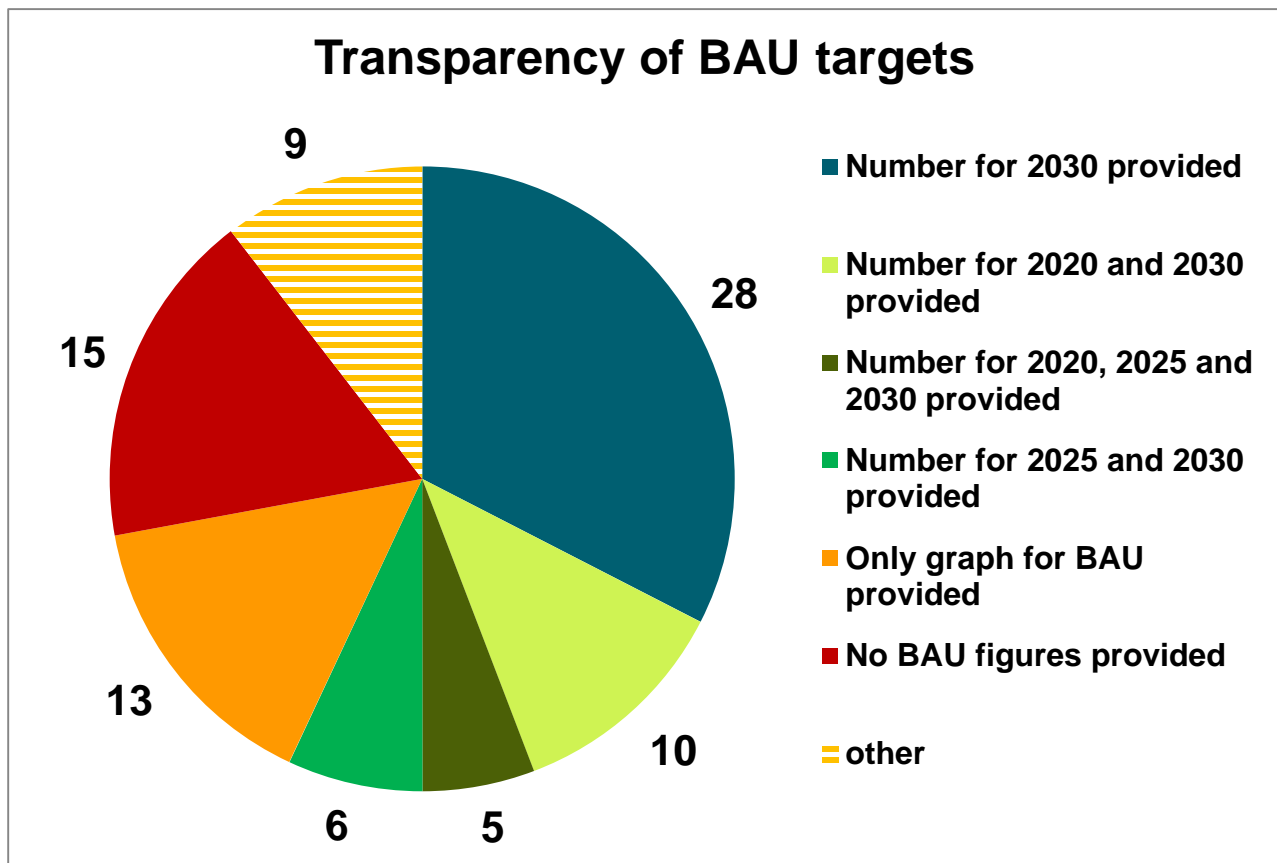


Source: Own analysis based on NDCs submitted under the UNFCCC, numbers do not completely match with Figure 3-1 because some NDCs include multiple targets (e.g. intensity target compared to BAU which is allocated to intensity targets in Figure 3-1, but not to BAU targets to avoid double counting of NDCs. But in this section, such targets are included in the analysis)

87 countries specified a target compared to a BAU scenario. These are all non-Annex I countries, except Turkey. Thus, for developing countries emission reductions compared to a BAU scenario is the most frequent target type chosen for their NDCs.

However, the submissions with BAU targets are not always transparent. 15 countries did not include any quantified figures for the BAU scenario at all. For these countries it is not possible to track progress with their NDCs without additional information, because the BAU figures are not communicated and it is unclear against which figure the GHG emissions in the period 2020-2030 should be compared to assess the progress (see Figure 3-7). 13 countries only provide a graph with the projected BAU emissions in which the BAU figures for specific years such as 2030 are not clearly indicated, but may be roughly estimated from the graph. This does not present a transparent target that can be tracked under the agreement because the graph only provides a very rough estimate. When these two categories are summed together, 33% of the countries with BAU targets do not include a clear number of the assumed BAU projection for the target years.

Figure 3-7 Transparency of NDCs with BAU targets



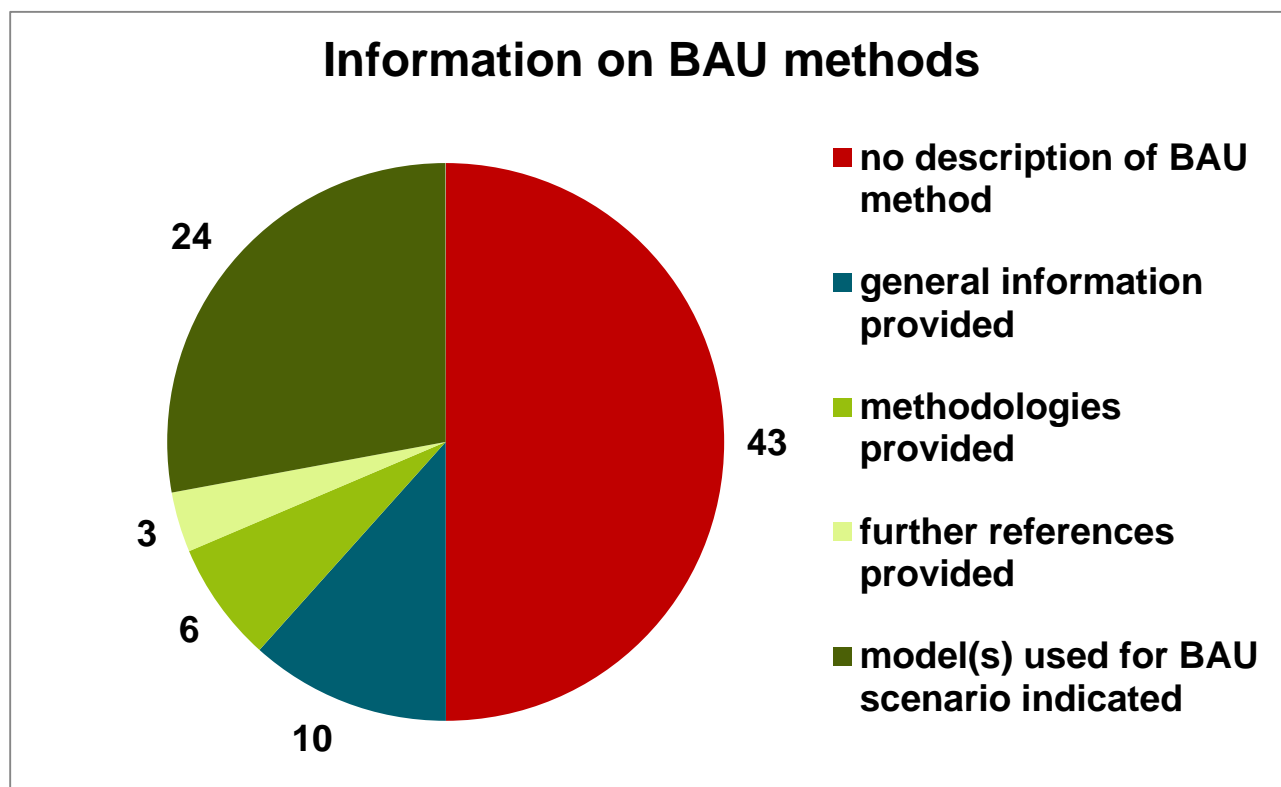
Source: compilation by Öko-Institut

28 out of 87 countries with BAU targets (31%) only provide a quantified BAU figure for the year 2030. For the tracking of progress, this means that only after 2030 an evaluation of progress can be made, while prior to 2030 there is no information which the actual GHG emissions can be compared to. Of course it would be possible to compare the actual emission trajectory with the 2030 emission reduction target against BAU, but for the tracking of progress during the period 2020-2030, it would be very useful if countries would also provide interim targets and BAU figures, e.g. for the years 2020 and 2025. However, only 5 out of the 90 countries with emission reduction targets against a BAU scenario provide BAU figures for the three years 2020, 2025 and 2030. This will not only make it difficult to assess progress at international level, also at domestic level it will be more difficult to evaluate the progress during the first commitment cycle under the Paris Agreement, if countries did not establish any interim targets and a quantified BAU scenario.

Not all of the countries with BAU targets provided detailed information regarding the methodologies, assumptions or models used for establishing the BAU scenario. 43 countries or 50% of countries with BAU targets do not provide information related to the methodologies or assumptions used for the BAU scenario as part of their NDC submission. 10 countries provide only very general information (see Figure 3-8). Only 6 countries provide detailed information on the methodologies used with regard to descriptions and/ or assumptions used for the BAU scenario and another 3 countries provide references to further documents where the methodology for the BAU scenario is described. 24 of the countries with BAU targets indicate one or several models used. The most common models or projection tools mentioned are LEAP (14 countries), GACMO (8 countries) and MAED (2 countries). GACMO is a simple tool for BAU projections promoted by the UNEP DTU partnership which is using simple annual growth factors for all sectors and fuel

consumption and allows the calculation of mitigation options. LEAP, the Long range Energy Alternatives Planning System, is a widely-used software tool for energy policy analysis and climate change mitigation assessment developed at the Stockholm Environment Institute. MAED is a model for analysis of energy demand which is published by the International Atomic Energy Agency.

Figure 3-8 Information on methods, assumptions and models used for BAU scenario



Source: compilation by Öko-Institut

Thus, while there is a large group of countries that express their NDCs as emission reductions compared to a BAU scenario, details on the methodology and assumptions used are lacking for a large number of BAU targets which makes them less transparent and difficult to understand. There seem to be two broad categories of countries: those that used simple growth factors and applied those growth factors to their most current GHG inventory emissions or activity data leading to a rather simple BAU projection that is not based on country- and sector-specific assumptions. The other category comprises developing countries that used more sophisticated modelling tools in each sector and sector-specific assumptions. The development of common, internationally agreed methodologies for establishing baseline scenarios thus remains a long way to go, and it will need a considerable additional effort to increase the transparency of the BAU scenarios included in the NDCs.

Out of the 87 countries with BAU targets, 43 countries provided sufficient information in their NDC submission that allows the calculation of the growth (or reduction) pathway until 2030 compared to the emissions of the base year indicated in the NDC submission. For these countries the emission levels achieved in 2030 in the BAU scenario as well as the conditional emission reduction scenarios were compared to the current base year emission levels indicated in the NDC submissions and a growth rate until 2030 was calculated. This growth rate covers different periods due to different base years. The results are presented in Table 3-3. This overview shows that for

10 countries emissions are expected to grow by more than 200% - 500% compared to current emission levels. Some countries project that their current large net sink will be converted in a large source of net emissions which makes the assessment of a growth rate compared to current emissions more complicated. This simple comparison with current emissions indicates that BAU projections are exaggerated in some countries and that it may not be very likely that such huge increases of emissions until 2030 are realistic scenarios.

Table 3-3 Growth rates implicit in BAU projections and conditional emission reduction scenarios

		Growth BAU emissions compared to base year	Growth emissions conditional reduction scenario compared to base year
	Base year	2030	2030
Congo	2015	549%	198%
Burkina Faso	2007	440%	377%
Ghana	2010	279%	108%
Comoros	2010	269%	212%
Bangladesh	2011	266%	209%
Oman	1995	248%	241%
Chad	2010	242%	-2%
Viet Nam	2010	219%	155%
Maldives	2010	217%	141%
Niger	2000	213%	105%
Paraguay	2011	197%	138%
Angola	2005	189%	45%
Turkey	2012	173%	116%
Cameroon	2010	167%	82%
Mauritania	2012	166%	29%
Sao Tome and Principe	2005	158%	-24%
Nigeria	2010	157%	29%
Afghanistan	2005	153%	121%
Georgia	2011	140%	77%
Madagascar	2010	135%	-10%
Mongolia	2010	134%	100%
Djibouti	2010	127%	-9%
Ivory Coast	2012	115%	54%
Saint Kitts and Nevis	2015	96%	27%
Kenya	2010	96%	37%
Togo	2010	90%	35%
Vanuatu	2010	85%	29%
Mexico	2013	83%	10%
Morocco	2010	82%	24%
Yemen	2000	81%	56%
Congo DR	2000	79%	50%
Mali	2010	79%	51%
Jordan	2006	78%	8%
Peru	2010	75%	22%
Guatemala	2005	71%	32%
Fiji	2013	67%	20%
Indonesia	2010	60%	-6%
Eritrea	2010	59%	-69%
Honduras	2012	53%	30%
Colombia	2010	50%	5%
Mauritius	2010	46%	2%
Jamaica	2005	37%	23%
Saint Lucia	2010	27%	-2%

Source: Compilation by Öko-Institut based on information provided in NDC submissions

13 countries expect emissions in the BAU projections to grow by more than 100% compared to current emission levels. For 20 countries, BAU projections assume a growth of emissions of less than 100% compared to current emission levels.

Most countries have not specified whether they intend to amend and update their BAU scenarios in the future. This means that there is a high uncertainty whether the countries have plans to change their BAU reference levels before they will start implementing the NDCs or during the implementation. Saudi Arabia explicitly mentions that the BAU scenario underlying its proposed policies and actions is a dynamic scenario, i.e. it can be adapted. Similarly, Mexico includes the possibility in its NDC to change the underlying reference scenario over the course of the commitment period.

For 5 countries, the conditional emission reduction pathway would still imply a growth of emissions of more than or close to 200% compared to current emission levels (Burkina Faso, Oman, Comores, Bangladesh, Congo). For 8 countries the conditional emission reduction scenario means that emissions are expected to increase by 100-150% compared to current levels. 7 countries presented NDCs for which the conditional targets against BAU mean an emission reduction compared to current emission levels (Chad, Saint Lucia, Indonesia, Djibouti, Madagascar, Sao Tomé; Eritrea). For 23 countries the emissions are expected to grow by 2-82% in the conditional reduction scenario compared to current levels. This indicates that even the conditional emission reduction scenario may be exaggerated in some countries and the significant emission growth assumed may not be very realistic. However, the calculation of the total growth or reduction is difficult in some developing countries with large forest areas and significant current net sinks. If these turn into sources in the projected BAU scenarios, rather strong emission growth rates can occur.

This comparison also shows that it would be essential that all countries with BAU targets also submit emissions for current years for the same scope as emissions in the BAU projections to enable the comparison with implicit emission growth rates. For 56% of the countries with BAU projections the calculation of the implicit emission growth rate in the BAU scenario was not possible due to a lack of data in the NDC submissions.

The large number of BAU scenarios with very high emission growth rates also implies that further methodological guidance or some type of good practice guidance for the establishment of BAU scenarios would be useful for a more credible cycle of NDCs under the Paris agreement. However, given the large number of possible approaches and the highly political nature of assumptions such as future economic growth, it will be very difficult to develop and agree on such guidance. It may be useful to develop good practice guidance for BAU projections, and use such guidance on a voluntary basis and in projects where the development of future NDCs is funded in bilateral and multilateral projects.

Another option to gather a very general understanding of the BAU targets included in the NDC submissions is by calculating the emissions per capita expected as part of the BAU scenario, the unconditional and conditional mitigation targets and compare those with the current per capita emissions. Such calculation is presented in Table 3-4 and sorted relative to the BAU emissions per capita. For this calculation, population projections from the UN Department of Economic and Social Affairs, Population Division have been combined with data included in NDC submissions. These results show that many BAU projections include the assumption of strongly increasing per capita emissions. Very high increases of per capita emissions are projected in the BAU scenario for 2030 for Bangladesh, Burkina Faso, Congo, Georgia, Viet Nam or Ghana. Declining per capita emissions as part of the BAU only occur for Democratic Republic of Congo, Niger, Yemen.

Table 3-4 NDC targets expressed as emissions per capita

	Base year	Base year emissions per capita	2030 BAU emissions per capita	2030 unconditional target emissions per capita	2030 conditional target emissions per capita
		t/capita	t/capita	t/capita	t/capita
Paraguay	2011	22.24	53.03	47.73	42.42
Oman	1995	11.86	17.28		16.94
Korea	2010	13.39	16.20	10.20	0.00
Mongolia	2010	8.07	14.55		12.48
Turkey	2012	5.74	13.40		10.59
Saint Kitts and Nevis	2015	7.67	13.24		8.60
Georgia	2011	3.82	9.93	8.44	7.32
Indonesia	2010	7.45	9.75	6.92	5.75
Peru	2010	5.81	8.09	6.48	5.67
Maldives	2010	3.13	7.55	6.80	5.74
Mexico	2013	4.91	7.49	5.60	4.50
Viet Nam	2010	2.79	7.48	6.88	5.99
Andorra	2010	6.48	7.47	4.74	0.00
Colombia	2010	4.88	6.30	4.72	4.41
Mauritius	2010	3.85	5.35		3.74
Congo	2015	1.15	5.09		2.34
Jamaica	2005	3.95	5.06	4.66	4.55
Angola	2005	3.73	4.91	3.19	2.46
Burkina Faso	2007	1.54	4.34	4.06	3.84
Morocco	2010	2.93	4.30	3.72	2.94
Djibouti	2010	2.38	4.25	2.55	1.70
Saint Lucia	2010	3.62	4.04		3.11
Togo	2010	3.20	3.70	3.29	2.63
Congo DR	2000	4.99	3.57		2.99
Nigeria	2010	2.20	3.43	2.67	1.71
Mauritania	2012	1.87	3.32	-9.20	1.61
Cameroon	2010	1.89	3.16		2.15
Honduras	2012	2.45	2.97		2.52
Niger	2000	2.74	2.68	2.59	1.75
Fiji	2013	1.70	2.66		1.91
Guatemala	2005	2.39	2.51	2.23	1.94
Kenya	2010	1.81	2.19		1.53
Ghana	2010	0.80	2.01	1.71	1.10
Chad	2010	0.70	1.31	1.07	0.37
Bangladesh	2011	0.42	1.25	1.19	1.06
Yemen	2000	1.36	1.21	1.19	1.04
Afghanistan	2005	0.79	1.12		0.97
Ivory Coast	2012	0.76	1.07		0.76
Sao Tome and Principe	2005	0.61	0.94		0.28
Eritrea	2010	0.85	0.87	0.53	0.17
Vanuatu	2010	0.55	0.68		0.47
Comoros	2010	0.20	0.48		0.41
Jordan	2006	0.23	0.42	0.31	0.26

Source: NDC submission for current emissions and BAU and target emissions, population data from UN Department of Economic and Social Affairs "Probabilistic Population Projections based on the World Population Prospects: The 2015 Revision" Median projection interval, 2015-2100). Negative figures represent the situation that countries have a total net sink of emission and removals.

26 countries with BAU targets also provided estimates of the international support needed to implement the conditional targets. These cost estimates can be compared to the emission reductions that are expected to be achieved in the conditional emission reduction scenario in 2030 compared to the BAU scenario. With the data on financial support required and expected emission reductions, implicit “mitigation costs” were calculated in Table 3-5 by dividing the support required by the expected emission reductions. This figure only includes the international support needed (in those cases where different figures for domestic and international support were given).

Table 3-5 Implicit mitigation costs in conditional emission reduction scenarios

	International support needed / ton CO ₂ eq reduced in 2030	Support need for conditional reduction scenario until 2030	Emission reduction between BAU and conditional reduction scenario in 2030
	US\$/ton	Mio US\$	kt CO ₂ eq
Niger	259,663	8,667,000	33,378
Congo DR	179,143	12,540,000	70,000
Comoros	4,613	375	81
Djibouti	2,048	5,500	2,685
Namibia	1,646	33,000	20,047
Saint Lucia	1,162	218	188
Afghanistan	1,061	6,620	6,240
Chad	877	17,920	20,430
Mauritania	846	8,200	9,695
Cameroon	769	25,388	33,000
Fiji	714	500	700
Mauritius	714	1,500	2,100
Morocco	648	35,000	54,000
Mongolia	479	3,500	7,300
Bangladesh	472	17,000	36,000
Mali	400	21,229	53,091
Sao Tome and Principe	348	59	169
Nigeria	316	142,000	450,000
Congo	314	5,860	18,669
Jordan	258	5,157	20,021
Ghana	234	7,790	33,278
Angola	152	14,700	96,625
Eritrea	136	694	5,103
Togo	98	1,100	11,234
Madagascar	70	6,370	91,464
Burkina Faso	55	756	13,766

Source: NDC submission for current emissions and emission reductions as well as financial support required.

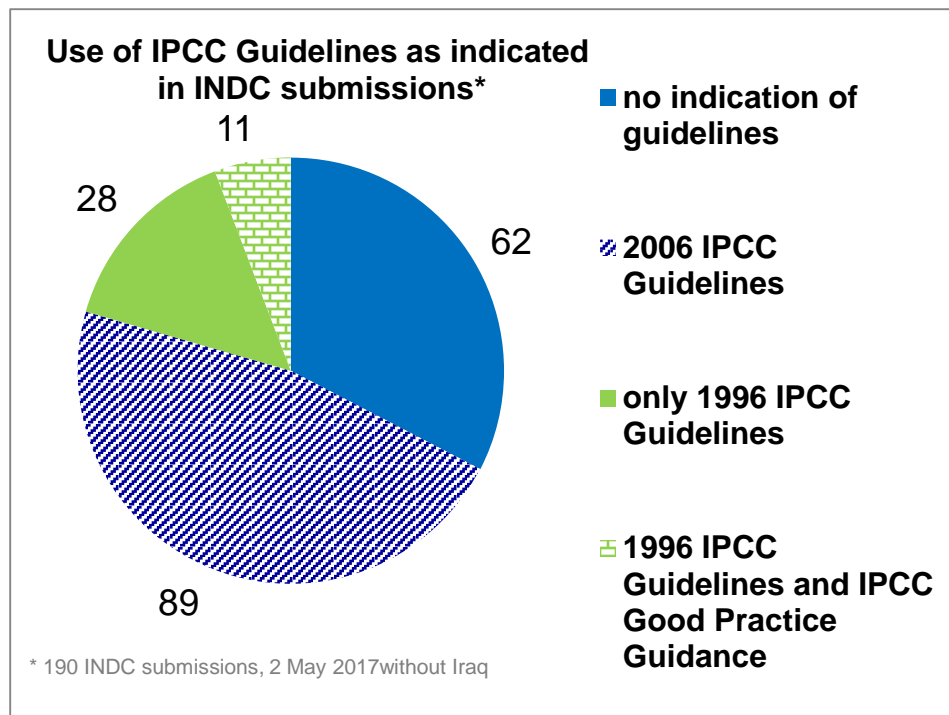
The very high values calculated for Nigeria and the Democratic Republic of Congo may be related to an assumption that large GHG sinks in forestry will turn into emission sources in the projected scenarios which is not indicated in a transparent way in the NDC submissions.

This overview shows that the cost assumptions in some NDCs seem to be very high compared to the emission reductions, in particular for seven countries where this calculation leads to implicit mitigation costs of > 1000 US\$/ton CO₂eq. In general, the mitigation costs assumed seem to be very high, as only for only three countries the emission reductions are achieved for less than US\$ 100 per ton emissions.

3.2.6. IPCC guidelines used

89 countries indicated that they used 2006 IPCC guidelines for GHG inventories as a basis for their NDC. 28 countries used 1996 IPCC Guidelines and 11 countries a mix of 1996 IPCC Guidelines and IPCC Good Practice Guidance. A large number of Parties (62) didn't specify the methodological basis for their GHG emissions and removals (Figure 3-9).

Figure 3-9 Use of IPCC inventory guidelines as indicated in NDC submissions



Source: Own analysis based on NDCs submitted under the UNFCCC

3.3. Accounting of emissions and removals from forestry and land use

3.3.1. General accounting approaches for the land use sector

102 countries included the LULUCF or land sector in some way in their NDC, 31 countries clearly excluded the sector, 9 indicated that a decision will be taken at a later stage and the remaining submissions are unclear related to this question. 76 countries integrated the land-use sector in a general economy-wide mitigation target (see Figure 3-10). However from these 76 countries, only 17 provided information on the quantitative contribution of the land-use sector to this overall target as part of their NDC submission. 37 countries included the land-use sector in an economy-wide absolute target and 39 countries included the sector in a BAU target. 21 countries specified a separate target for the LULUCF sector, a strategy that takes into account the potential uncertainties of the emissions and removals of the land-use sector as well as the difficulties for the tracking of progress if the LULUCF sector is included in an economy-wide target and offsets part of the emissions from other sectors. Of these 21 countries, 12 quantified the contribution from the land-use sector in terms of GHG emissions and removals and 9 countries used different quantitative indicators.

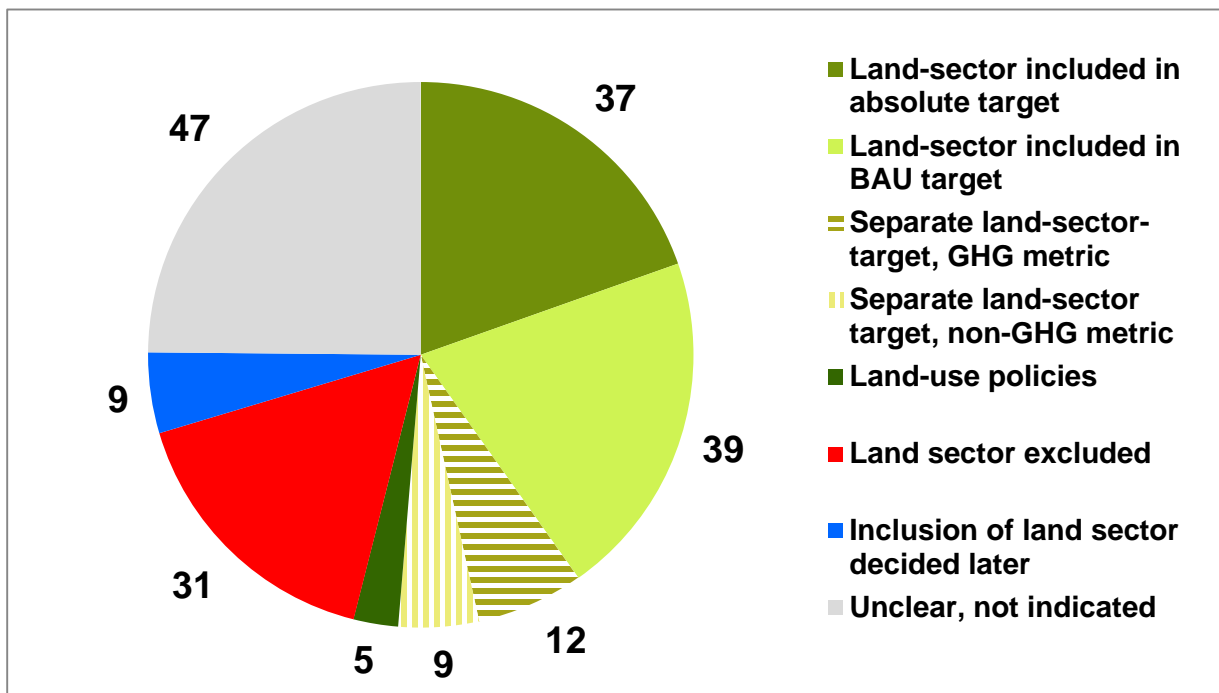
Many developing countries have poor information about the historic trends of the emissions and removals in the land-use sector because they have not prepared GHG inventories on a regular basis over many years. In the absence of the understanding of the past trends, it may be very

difficult to establish reliable and credible forest reference levels or land-use reference levels for a long period until 2030. Some countries have avoided the high uncertainty implied in reference emission levels, by indicating a quantified minimum net sink that they will maintain or achieve between now and 2030 (e.g. Chile, Bosnia and Herzegovina, India, Kiribati or Sao Tomé and Príncipe). This approach avoids the establishment of a reference level and considerably reduces the uncertainties related to the achievement of the target as no projection is necessary.

Of the countries with separate LULUCF targets, 10 countries indicated a target which was not expressed in terms of impacts on GHG emissions, but quantified in other ways, e.g. an increase in forest area to a certain share of the land area (e.g. Belarus, Bhutan, Georgia, Vietnam) or a defined area for afforestation/ reforestation (Chile, Honduras, Senegal) a quantified increase of forest stock volume (China). Many of these quantified non-GHG targets also avoid the establishment of reference levels as absolute targets are defined, e.g. in terms of total forest cover that should be achieved or the total increase in area by afforestation/ reforestation. This approach also reduces the large uncertainties that are implicit in the projection of emissions/ removals from the land-use sector. Furthermore, it is easier to integrate the targets with national strategies and plans in the forest and land-use sector.

The higher uncertainties to the level and past trends in net removals from the LULUCF sector resulted in the situation that 31 countries excluded the LULUCF sector from their overall target. 9 countries indicated that they will consider the inclusion of the LULUCF sector in their national target at a later stage, frequently this intention is linked to the gathering of improved monitoring data for the forest and land-use sector before a future quantification of the mitigation commitment. 5 countries indicated that they intend to implement general land use policies or REDD+ activities in the land-use sector. For a large number of NDCs, it is unclear from the submission whether the land-use sector is part of the NDC.

Figure 3-10 General accounting approaches for the land-use sector chosen in the submitted NDCs (Figures indicated number of countries)



Source: NDC submissions under the UNFCCC, analysis by Öko-Institut

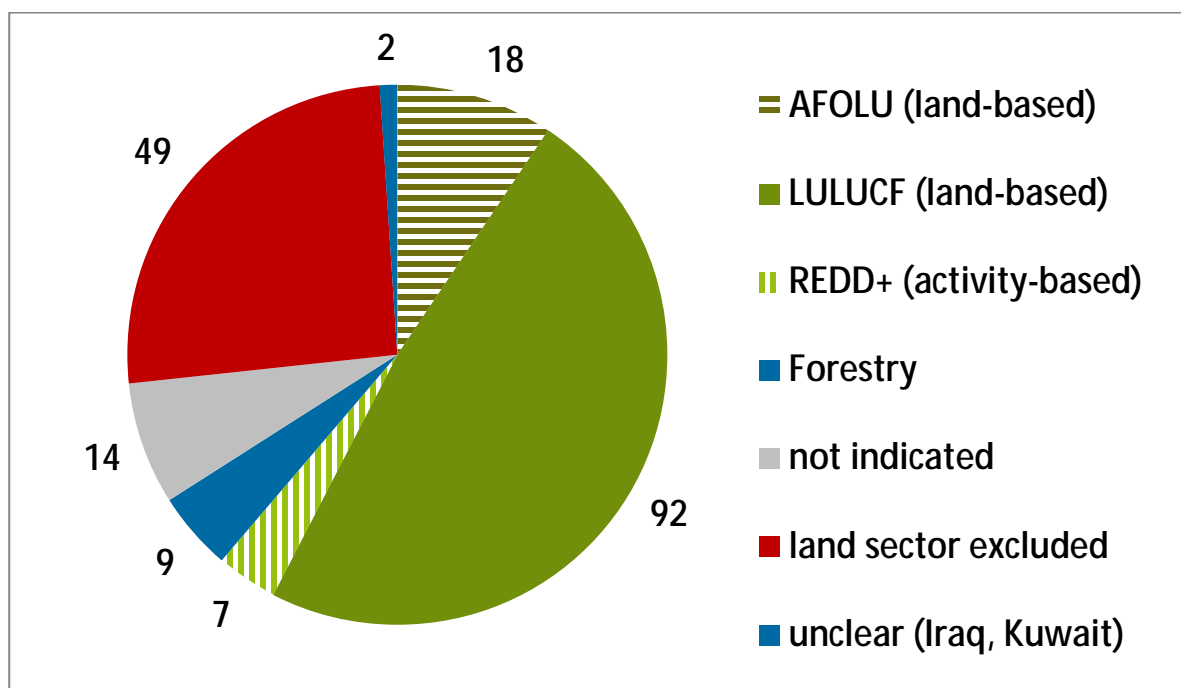
3.3.2. Definition of scope of the land-use sector

Few countries indicated clearly in their NDC submissions whether they have chosen an activity or land-based approach for the coverage of land-use categories (e.g. USA, Canada). Some countries have chosen the coverage of the most recent GHG inventory as the basis for the NDC and mention explicitly that the same coverage applies to their NDCs (e.g. USA, Costa Rica, Viet-Nam). Some countries (e.g. Mexico, Congo) clearly indicate that only some inventory land-use categories are part of their NDCs and not the entire sector. Some NDC submissions with economy-wide targets mention country-specific categories that do not appear in the inventories (e.g. mangroves, coastal areas, natural resource management, water resources, rural settlements, forestry) for which it is unclear whether these countries intend to use own categories for the tracking of progress with the NDCs. Several Parties mention that a decision whether to use a land-based or activity-based approach is still outstanding (e.g. EU). Those countries that refer to REDD+ in their NDCs, mostly do not specify very clearly which individual REDD+ activities they will include and whether the targets were defined on the basis of REDD+ activities.

Figure 3-11 shows that 93 countries used the LULUCF sector as reported under the Convention in GHG inventories to define the scope of the sector. Only 9 countries used an activity-based approach based on REDD+ activities. 17 countries used the AFOLU sector as defined in 2006 IPCC guidelines as a basis for the definition of the coverage whereas 9 countries only indicated the sector as “forestry” which potentially points at a reduced scope compared to the scope of the sectors LULUCF or AFOLU which include cropland or grassland areas. In 30 NDC submissions where the sector is not excluded, it is unclear whether the countries refer to LULUCF, AFOLU or REDD+.

Thus, related to the coverage of the land-use sector in the NDC submissions, additional information is necessary to clarify the scope of the sector for many countries.

Figure 3-11 Scope of the land-use sector in the NDCs submitted



Source: NDC submissions under the UNFCCC, analysis of Öko-Institut

3.3.3. Definition of references for the accounting of land use and forests

Several countries, mostly Annex I Parties, indicate that the detailed accounting approach for their NDC including any reference levels will be decided later after the development of agreed, common accounting rules. Five countries (Australia, Canada, USA, Moldova and Dominican Republic) intend to apply a net-net accounting approach where the net emissions and removals from the land-use sector in the target year/ period are compared to net emissions and removals in the base year.

For those countries that have chosen an NDC that defined emission reductions compared to a BAU projection for 2025 or 2030 and that included the LULUCF or AFOLU sector in their NDC, it is very likely that the chosen accounting approach for the land-sector is the comparison with the BAU scenario. This seems implicit in the choice of this type of NDC and those countries that provide a sectoral disaggregation of the BAU projection, usually explain the contribution of the LULUCF/ AFOLU/ forestry sector as part of the BAU scenario. However, most submissions that only provide aggregate BAU projections for all sectors of the economy usually do not explain this explicitly and it therefore remains uncertain whether this assumption is correct for all countries with NDCs compared to BAU projections.

10 countries indicate that the approach used for REDD+ activities with the definition of forest reference emission levels will be used under the Paris Agreement. Few countries refer to specific accounting elements under the Kyoto Protocol such as forest reference levels or gross-net accounting and one country intends to use CDM methodologies.

For a large majority of countries it remains unclear what exact reference they have chosen for the land-use sector or they explicitly report that they haven't established such reference yet.

Only 30 out of the 188 countries have provided information related to the expected quantitative contribution of the land-use sector to the country's target. This low share shows relative high uncertainty either in the available data and projected emissions and removals for the land-use sector or it can also indicate that Parties wait with such quantification because they expect the elaboration of future accounting rules in this area.

3.3.4. Separate presentation of accounting impact and LULUCF target

The previous sections have already shown that countries have a very large flexibility to integrate the LULUCF sector in their NDCs. For an assessment of the ambition and the effort of NDCs it would be important that the assumed contribution from the LULUCF sector is presented separately from the assumed mitigation targets in other sectors. If LULUCF and other sectors would be merged into one target that covers total emissions with LULUCF for 2030 using a new definition of the scope, new types of references or other new accounting elements, the contribution would lack transparency. Therefore it would be important to present the contribution of the LULUCF sector separately from the remaining sectors. Future requirements for the upfront information requirements accompanying the NDC should address such quantification.

However, in the submitted NDCs until April 2016, only 17 countries out of 93 countries that integrated the land-use sector in their overall economy-wide target quantified the contribution of the land-use sector to the overall target so far. 10 countries submitted a separate target for the land-use sector in GHG metrics and 10 countries submitted a separate target in a non-GHG metrics (e.g. forest cover to reach a certain area, deforestation rate to be reduced to a specified rate, afforestation/ reforestation of a specified area).

3.3.5. Accounting issues during the implementation of commitments

In the 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (IPCC 2013a) new methodologies have been developed to account for natural

disturbances from storms, pests or diseases. The accounting approach developed under the Kyoto Protocol takes the area on which such natural disturbances happened out of the accounting, provided that the impacts of single events are considerably larger than those of 'regular' events. This approach is bound to geographic explicit reporting which is only implemented under the Kyoto Protocol. Furthermore, it requires the establishment of background levels for such disturbances which require long time series of emissions and removals that include such disturbances.

Developing countries may have difficulties to implement these approaches because of lack of emissions and removals for long time-series and lack of geographically explicit data. But nevertheless such natural events can occur during the implementation of an NDC and have significant impacts on expected emissions and removals from land areas, in particular in smaller countries.

Few countries (6) have so far announced as part of their NDCs that they may exclude emissions/removals from natural disturbances if such events happen. The countries that indicated the intention to use such approaches are mostly Kyoto Protocol Parties that already needed to decide whether they intend to account for natural disturbances under the Kyoto Protocol and have to implement the IPCC's methodological approaches for this purpose. However, the accounting for natural disturbances is an issue which will become more important during the implementation of NDCs and more Parties may decide at a later stage that they will implement methods that address the effects of natural disturbances on emissions and removals.

Harvested wood products

If countries intend to include emissions and removals from HWPs in their NDCs, they should indicate the accounting approach proposed. So far only 7 countries provided information on the accounting approach for harvested wood products. These 7 countries opted for the production approach.

3.4. Accounting of credits from carbon markets

As part of their NDCs Parties also provided information related to their position and intention to use credits from international market mechanisms as a contribution to their NDC.

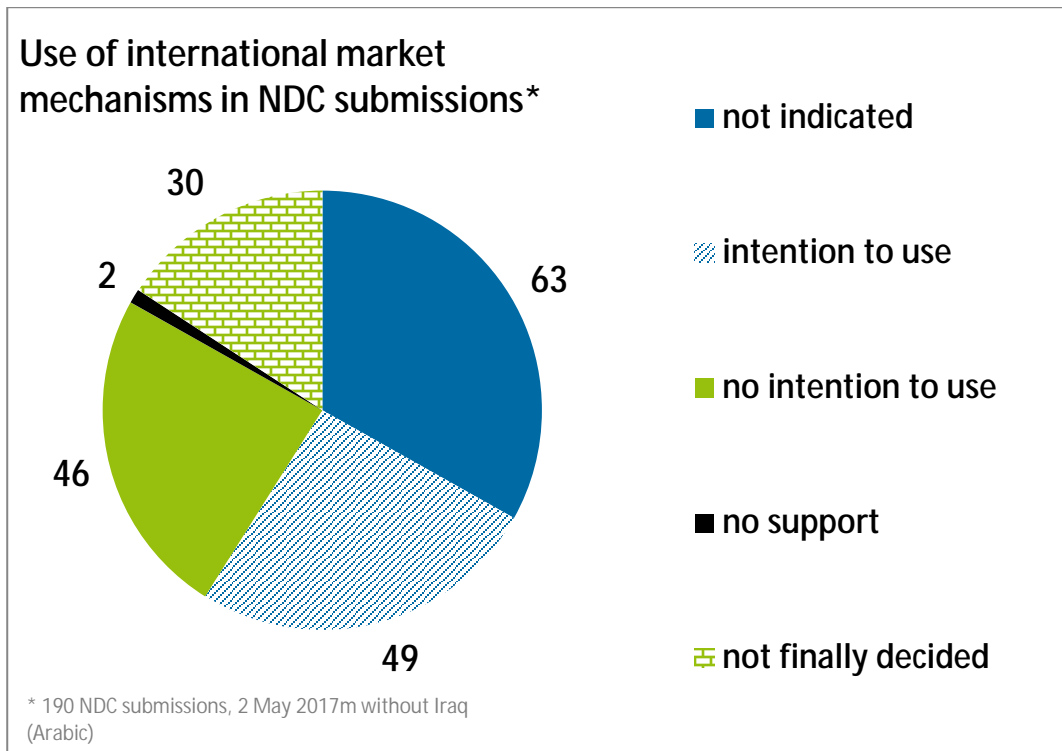
From 187 submissions analysed, 61 NDCs did not include information related to the use of credits from international market mechanism.

Some countries used the NDC to indicate the role of credits from carbon markets in the achievement of their submitted NDCs, other used the NDC more to express their general position towards the existence and development of international market mechanisms under the new agreement and some even elaborated about plans to establish domestic emission trading systems. This means that the information provided related to the use of carbon markets is not really comparable.

Figure 3-12 presents the information included in the NDC submissions. 49 countries or 26% expressed the intention that they would like to use international market mechanisms as part of the fulfilment of their NDCs. An analysis that took into account NDC submissions until 25.11.2015 by IETA indicates that 62 countries said that they intend to use markets (IETA 2016). However this large number also seems to include countries that express support for domestic or regional market mechanisms whereas our own analysis put a focus on international market mechanisms under a new agreement. These countries usually stressed that they prefer international market-based mechanisms to be developed under the new agreement and that these should be subject to stringent accounting rules. Almost the same number of countries (46) informed that they do not intend to use credits from international market mechanisms in relation to their NDC. 30 countries

were still undecided and reported that they will explore the potential, do not rule out the use or reserve their future position related to the use. Only two countries clearly indicated that they are against the use of international market mechanisms.

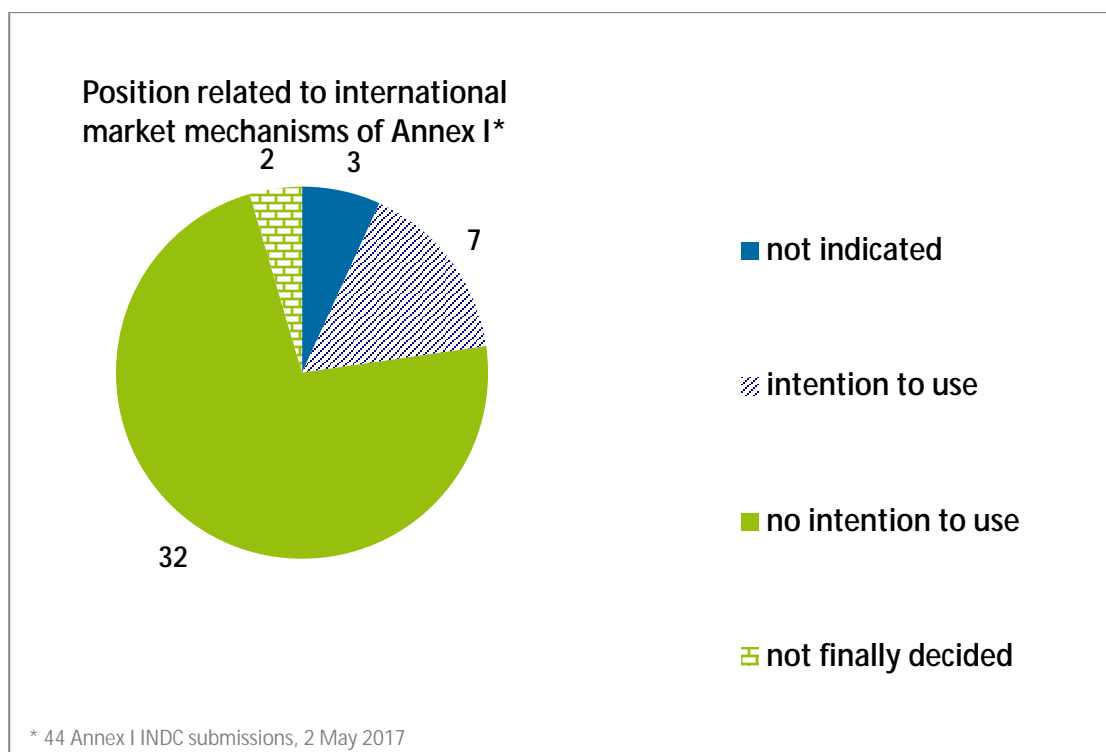
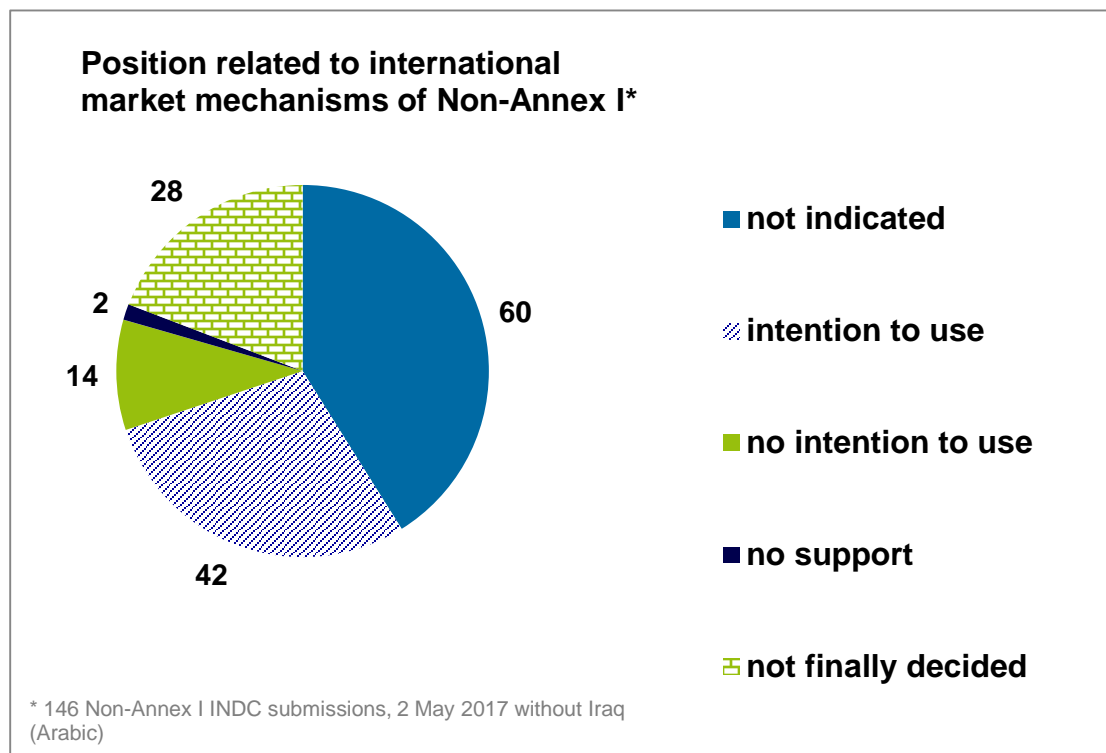
Figure 3-12 Position of countries related to the use of international market mechanisms as part of their NDCs



Source: Own analysis based on NDCs submitted under the UNFCCC

When the NDCs from developing countries and developed countries are separated, there are clear differences in the expected use of international carbon markets (see Figure 3-13). While 41 Non-Annex I Parties clearly indicated that they intend to use international carbon markets – mainly as a source of finance for mitigation actions and projects, only 7 Annex I Parties indicated that they intend to use emission reductions from international market mechanisms to comply with their NDCs. The intention not to use emission reductions from international market mechanisms does not mean that these countries do not support such mechanism. It may be more an indication of the uncertainties around the creation of a new international market mechanism. A precautionary approach would imply not to count on carbon markets for the achievement of NDCs until such mechanisms have been decided under the Paris Agreement. However, this uncertain situation during the establishment of NDCs may lead to a discrepancy between buyers and sellers on an international carbon market where developing countries assume that they may be able to sell emission reductions, but where developed countries refrain from using any traded emission reductions to achieve their targets because any international mechanisms had not yet been agreed when the NDC was established.

Figure 3-13 Position related to the use of international market mechanism as part of their NDCs separated between Annex I and Non-Annex I countries



Source: Own analysis based on NDCs submitted under the UNFCCC

From the developing countries that intend to use international market mechanisms, 24 indicate that they intend to use the CDM and assume that the CDM will continue under the new agreement.

The NDC submissions show that there is considerable interest in the development and participation in international market mechanisms. Many countries express as part of their NDCs that they would like to see strong accounting rules for international market mechanisms to ensure environmental integrity and avoid double counting and expect such work to take place after an agreement is achieved in Paris.

3.5. Accounting for specific types of NDCs

3.5.1. Intensity targets

No international guidance has been specified for intensity targets. This type of target requires new types of information to be reported in order to track progress towards implementing countries' NDCs. These new types of information include data and projections on GDP for intensity targets defined as emissions per unit of GDP; data and projections on population development for per capita targets; data and projection on energy use for energy intensity targets. Furthermore, for targets to reduce emissions intensity per unit GDP, assumptions on GDP methods regarding currency exchange rates, purchasing power parity, constant or fluctuating prices would also have to be determined. Information at this level of detail is currently not available in many countries' NDC submissions. The provision of paragraph 31(a) of decision 1/CP.21 that Parties shall "*ensure methodological consistency, including on baselines, between the communication and implementation of NDCs*" is also relevant related to the choice of GDP methodology.

3.5.2. Carbon neutrality targets/targets with fixed absolute emissions level

Carbon neutrality or GHG neutrality targets are also economy-wide targets which are less clear what they actually mean. In general carbon neutrality refers to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount of carbon sequestered or offset. However, for national targets it is also used in a way that it describes a target with a fixed or constant net emission level in absolute terms.

The methodologies required are a mix of existing and additional methodologies, inter alia:

- ▶ GHG emission inventories;
- ▶ LULUCF inventory methodologies for C sequestration in forests;
- ▶ CDM and JI methodologies or methodologies related to international trading of emission reductions or mitigation outcomes under Article 6 if the neutrality target includes the use of flexible mechanisms;
- ▶ Domestic methodologies for compensation activities in different sectors (companies, organisations, services) or domestic trading systems.

3.5.3. Sectoral mitigation targets

For **quantified sectoral targets in non-GHG units** such as renewable energy targets, energy efficiency targets or forest-related targets, neither methodologies exist under the UNFCCC that provide guidance how the achievement of these targets should be measured, nor related reporting requirements exist, nor a review procedure specific for such methodologies and reporting elements. Thus, new information requirements arise from such targets for which MRV procedures would need to be developed for a new agreement.

3.5.4. Actions and policies

For **policies and measures**, there is already a reporting and review process, both for quantified and non-quantified policies. However, no methodologies exist so far under the UNFCCC that underpin the assessment of quantified ex-ante or ex-post impacts. For the assessment of progress

with NDCs an ex-post assessment would be more relevant than analysis how announced mitigation policies have really been implemented and which impacts were achieved.

For Parties with contributions in terms of quantified policies and measures (either in terms of GHG or other quantified indicators) the Paris agreement should establish the requirement that Parties provide an ex-post assessment of the implementation of their policies or mitigation actions. Such ex-post assessment should on the one hand simply assess whether the adopted policies or mitigation actions were really implemented. This is not always straightforward when mitigation programmes are adopted, e.g. when funds are created to support energy efficiency measures, the legislators do not know to what extent such funds will be used in practice. A second step of ex-post assessment would be to quantify the emission reductions achieved. Such quantified ex-post assessment would also require establishing new methodologies that do not exist so far under the UNFCCC to guide Parties. Such methodologies are relatively straightforward in some areas (e.g. the enhancement of renewable energies), but rather complex in other areas and it may not be possible to develop such methodologies for all types of policies and mitigation actions that may be included in Parties' contributions. Nevertheless, this lack of potential completeness should not be an argument for not assessing those policies ex-post in quantitative terms where this can be implemented.

3.6. Information related to conditional targets and financial support needs

A large number of NDC submissions by non-Annex I countries include an unconditional component (i.e. what the country is ready to do on the basis of domestic resources) and a conditional component (i.e. what it would do if it received international support). While a total number of 116 countries (from 185) have submitted NDCs with conditional components, only 25 non-Annex I countries have submitted NDCs that they intend to fulfil only on the basis of domestic resources.⁷ This new situation presents a challenge for the accounting of progress towards countries' targets.

Firstly, it is not defined under which circumstances a condition would be considered to be fulfilled and whether it would be the receiving country, the donor country or any international body to take this decision.

Secondly, many countries have not clearly defined the condition in terms of the quantity of resources needed and the part of its target which needs support. 20 NDCs do not make a clear distinction between the conditional and the unconditional part of the target so that it can hardly be specified how many and what kind of resources would have to be provided in order to enable the country to fulfil its NDC. More than half of those countries with conditional elements in their NDC did provide direct references to quantified financial needs. However, 50 countries have generally referred to the need for financial support, without quantifying the level of support which they require.

Thirdly, more than 70 NDCs with conditional elements make the fulfilment of the target dependent on the provision of technology development and transfer and mention capacity building as a precondition for the implementation of their target. However, no internationally agreed methodologies for tracking technology transfer and capacity building exist. Also, the reporting by Annex I countries on the provision of technology transfer and capacity building has shown that these two elements are understood as integral parts of climate finance projects and are not being provided on top of the provision of financial resources, but integrated in many projects.

Against this background it remains very unclear how the conditional parts of NDCs will be tracked and assessed in the future. Developing countries will either need to precisely specify the conditions

⁷ Further conditions which countries have attached to their NDCs include e.g. the conclusion of an ambitious agreement.

under which they will implement their proposed targets or rely on the continuation and enhancement of the general provision of climate finance.

4. Conclusions

This paper examined the NDCs submitted under the Paris Agreement and highlighted those areas in which information is lacking in order to track progress towards the implementation of the NDCs. While most countries have submitted NDCs that are roughly quantified at a first glance, many specific pieces of information are missing in order to precisely quantify the mitigation impact of NDCs. On the one hand, such information has not been provided by the countries in their NDC submissions. Therefore the guidance under Article 13 of the Paris Agreement, in particular the modalities, procedures and guidelines under Article 13, paragraph 7(b) should provide more detailed guidance on the NDCs to enable the tracking of progress. In the future also clearer and more detailed guidance on the information communicated together with the NDCs is also essential to improve the information available.

The diversity of NDCs and the information gaps revealed in this paper show that a more complex system of reporting, review and assessment of NDCs will be required in the future that collects information specific for the types of NDCs chosen by Parties. Reporting guidelines should be elaborated that address the specific information requirements for the different types of NDCs which have been submitted by Parties in order to make it possible to track progress towards their implementation.

For economy-wide NDCs that include emissions and removals from all sectors, GHG inventories will remain the most important element for tracking of progress with the NDCs. It would strongly facilitate the transparency and comparability of tracking of progress when all Parties under the Paris Agreement would agree to use the same IPCC methodological guidance document as a basis for their GHG inventories as well as the same metric to convert individual gases to CO₂equivalents for the calculation of aggregate emissions. If such rules were agreed, no further information for NDCs of this type of target would be necessary.

About 87 Parties have submitted NDCs with emission reductions compared to a BAU projection. Apart from some methodological guidance related to forest reference levels, no rules and guidance exist so far under the UNFCCC related to this type of target. This will be one of the areas where additional guidance should be conducted to ensure a credible and transparent implementation of this NDC type. While it seems unlikely that Parties would agree on methodologies how BAU projections should be established, it is nevertheless important to establish guidance

- that ensures consistency related to emission methodologies used and the coverage between the BAU projections and the GHG emissions and removals reported in the period 2020 to 2030.
- that addresses whether and how BAU projections can be updated or revised and what type of information should be communicated related to such revisions.
- that ensures that sufficient information and data is available related to the BAU scenario that enables the tracking of progress and achievement.
- that ensures transparency about the methodologies that have been used in the establishment of the BAU projection to enhance clarity and understanding of the NDCs with BAU targets.

Other types of NDCs such as intensity targets or renewable targets require in particular that some additional information is provided in the reporting after 2020 to enable the tracking of progress,

such as information related to GDP, population or renewable shares in the electricity generation. Such information is not yet part of the current reporting system. As this information is already collected and available, it should be straightforward to complement the existing system with the necessary additional elements.

Few countries (e.g. USA or Canada) have already taken clear decisions related to the accounting approach for the land sector and many countries have communicated in their NDCs that they expect that further accounting rules will be elaborated and that they will provide more information related to the accounting of emissions and removals from the land-use sector after such rules are agreed. This shows that accounting rules and reporting requirements related to the land-use sector will also be a key area of further work.

The NDC submissions show that there is considerable interest in the development and participation in international market mechanisms. However, the outstanding agreement on cooperative approaches and mechanisms under Article 6 made it difficult for Parties to address the potential use of transferred mitigation outcomes or traded emission reductions as part of their NDCs.

A potential new element of accounting and transparency guidance will result from the NDCs conditional of support from developing countries. This new situation presents a challenge for the accounting of progress towards countries' targets because a number of issues regarding the provision of international support still remain unclear.

- Firstly, it is not defined under which circumstances a condition would be considered to be fulfilled and whether it would be the receiving country, the donor country or any international body to take this decision.
- Secondly, many countries have not clearly defined the condition in terms of the quantity of resources needed and the part of its target which needs to be supported.
- Thirdly, more than 70 NDCs with conditional elements make the fulfilment of the target dependent on the provision of technology development and transfer and mention capacity building as a precondition for the implementation of their target. However, no internationally agreed methodologies for tracking technology transfer and capacity building exist.

Against this background it remains very unclear how the conditional parts of NDCs will be tracked and assessed in the future.

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