



RECOMMENDATIONS FOR ACCOUNTING FOR MITIGATION COMPONENTS OF NATIONALLY DETERMINED CONTRIBUTIONS (NDCs) UNDER THE PARIS AGREEMENT

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EXECUTIVE SUMMARY

Highlights

- As part of the Paris Agreement, adopted in 2015, accounting guidance will be developed to support countries in accounting for their Nationally Determined Contributions (NDCs).
- Accounting is critical for assessing advancement toward and achievement of the mitigation components of NDCs and participating in the transfer of Internationally Transferred Mitigation Outcomes (ITMOs).
- Accounting gives countries a clear picture of whether they are on track to achieve their NDCs. It can inform course corrections and the establishment of new mitigation policies to help achieve the NDCs.
- Accounting guidance must accommodate the variety of mitigation components in NDCs that Parties have put forward. Parties are to account for them in line with the principles described in the Paris Agreement and its accompanying decision text.
- This paper provides recommendations related to accounting for greenhouse gas targets, non-greenhouse gas targets, and policies and actions. For greenhouse gas targets, it uses a balance sheet to illustrate how various aspects of accounting can be performed and how progress toward and achievement of the NDCs can be assessed.

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Background

The Paris Agreement provides for the development of accounting guidance for NDCs. Over the course of 2018, Parties are negotiating the details of this guidance. Although there is a significant foundation of accounting-related experience to build on, the NDCs and the Paris Agreement provide a new context under which all Parties are to account for their NDCs.

The variety of NDCs, resulting from their nationally determined nature, creates a new level of complexity for accounting. Even among the NDCs that include quantified greenhouse gas targets, there is a range of target types. Moreover, some NDCs include specific actions rather than quantified targets or non-greenhouse gas targets. Because of this diversity, Parties will need to develop guidance that accommodates all types of NDCs yet pursue commonalities in the overall approach, to the extent possible, in order to enable quantification in comparable terms.

Robust accounting guidance is central to the integrity of the Paris Agreement. Accounting guidance is necessary for understanding advancement toward and achievement of NDCs. Without clear and strong accounting guidance, it will be difficult for Parties to uphold the principles and ambition of the Paris Agreement, which in turn will lead to challenges related to understanding individual effort, planning future actions, and forming a common understanding of what will be counted toward the aggregation of effort.

About This Working Paper

The goal of this paper is to inform the development of the accounting guidance under the Paris Agreement. The audience is primarily Parties negotiating such guidance. A secondary audience is decision-makers charged with accounting for NDCs. Some Parties have experience accounting for targets; others will be taking on this responsibility for the first time.

The primary research foundation for the paper is the Greenhouse Gas Protocol *Mitigation Goal Standard*, developed by the World Resources Institute (WRI) through a multistakeholder process, building on existing accounting guidance under the Convention and the Kyoto Protocol. It was developed to provide further guidance on accounting for mitigation targets in the absence of more comprehensive guidance under the United Nations Framework Convention on Climate Change (UNFCCC).

This paper provides recommendations for developing accounting guidance under the Paris Agreement that can be applied to the variety of mitigation components in Parties' NDCs. It outlines key decisions to be made regarding NDC accounting and reporting of accounting-related information and provides approaches to address those issues.

Key Findings and Recommendations

Given the number of issues that still need to be resolved, advancing the accounting negotiations is critical. The Conference of the Parties (COP) 24 in Katowice, which will take place December 3–18, 2018, provides an important milestone for Parties to establish robust accounting guidance for NDCs. There are many decisions regarding the accounting guidance elements and details that Parties have yet to make (Table ES-1).

This paper describes key concepts related to accounting for all types of mitigation components in NDCs and provides recommendations for each step of accounting. The paper recommends that the accounting guidance agreed under the Paris Agreement require Parties to use a balance sheet to account for mitigation components, such as the one provided in Table ES-2, which can also support several of the Paris Agreement’s principles for accounting.

Recommendations are made throughout the paper, covering greenhouse gas targets (chapter 3) and non–greenhouse gas targets, policies, and actions (chapter 4). For greenhouse gas targets, the paper explains how to calculate and compare the target level of emissions (the maximum quantity of emissions that may be emitted in the target year or target period consistent with achieving the NDC) with accounted emissions (the quantity of emissions and removals in the target year, including any adjustments related to market mechanisms and land sector emissions, applied toward achieving the target). Appendices B (for accounting) and C (for communicating accounting-related information) compile all of the paper’s recommendations.

Accounting need not be complex, especially for Parties with simpler NDCs and Parties that do not use ITMOs or treat the land sector differently from other sectors. For Parties that plan to use and transfer ITMOs and/or apply accounting approaches for the land sector that differ from national inventory approaches, accounting will be more challenging.

Table ES-1 | **Issues to Consider in Developing Accounting Guidance for Parties’ Nationally Determined Contributions**

ACCOUNTING ISSUE	ASPECTS TO BE ADDRESSED BY GUIDANCE
General	<ul style="list-style-type: none"> ■ What constitutes a “second” or “subsequent” NDC, given that accounting guidance is voluntary for the first NDC ■ Whether accounting guidance applies to the entire NDC implementation period (to inform the tracking of progress) rather than only after the NDC implementation period is complete (to determine achievement) ■ When a Party communicates multiple mitigation components of the NDC and whether one or more components are the headline NDC for the purposes of accounting (and others do not need to be accounted for, as they are for informational or implementation purposes only) ■ Whether conditional contributions within NDCs need to be accounted for separately and if so how
Quantification	<ul style="list-style-type: none"> ■ Whether Parties with greenhouse gas targets will be required to quantify their NDC and calculate emissions levels in the target year(s) consistent with target achievement (or emissions intensity in the target year, in the case of a base year intensity target)
Methodologies and metrics	<ul style="list-style-type: none"> ■ Which IPCC inventory guidelines are to be used for the national inventory, the basis for accounting ■ Which GWP values are to be used for accounting
Scope and coverage	<ul style="list-style-type: none"> ■ Whether significant sources of emissions or removals can be excluded from accounting (these sources are currently nationally determined, but as countries increase the scope and coverage of their NDCs over time, guidance could specify further details on how they do so)
Target timeframe	<ul style="list-style-type: none"> ■ Whether single year targets will be accommodated or whether they will have to be converted into multiyear targets and if so how ■ How to account for single year targets if they are accommodated, especially with regard to the use of ITMOs
Reference level: base year target	<ul style="list-style-type: none"> ■ Whether the guidance recommends the choice of a base period of multiple consecutive years in order to smooth out fluctuations and track progress against a more representative emissions level ■ Whether the guidance recommends avoiding the selection of a year or years with atypically high or low emissions ■ Whether the guidance recommends that Parties choose a single base year or base period for all sectors and gases included in the target boundary

Table ES-1 | **Issues to Consider in Developing Accounting Guidance for Parties' Nationally Determined Contributions (Ct'd)**

ACCOUNTING ISSUE	ASPECTS TO BE ADDRESSED BY GUIDANCE
Reference level: intensity target	<ul style="list-style-type: none"> ■ Whether there will be guidance for the choice of data source for the unit of output (e.g., GDP)
Reference level: baseline scenario target	<ul style="list-style-type: none"> ■ Whether Parties with baseline scenario targets can use dynamic baseline scenarios ■ If dynamic baseline scenarios can be used, whether Parties will need to establish in advance a policy for recalculating updates and whether there will be guidance for doing so ■ Which policies and measures should be included in the baseline scenario, the cut-off year for inclusion, and the estimation method ■ Whether there will be any guidance on projection methods, assumptions, and/or data sources for key drivers
Land sector accounting	<ul style="list-style-type: none"> ■ Whether Parties can account for the land sector using land-based or activity-based accounting ■ Whether coverage of particular land-use categories, activities, carbon pools, gases, and/or fluxes will be mandatory or left to the discretion of the Party ■ How reference levels are to be constructed and reviewed ■ How the change in net land sector emissions/removals is to be calculated (e.g., net-net, gross-net, forward-looking baseline) and whether it will need to be calculated in a manner consistent with the target type ■ Whether guidance will require or encourage Parties to minimize risks associated with accounting (e.g., by using a cap or conservative methods and data) ■ How to account for legacy effects ■ How to account for natural disturbances ■ How to account for harvested wood products ■ Which definitions to use ■ How to define managed land
ITMOs	<ul style="list-style-type: none"> ■ How to develop and use a system of accounting, underpinned by double-entry bookkeeping, that ensures that ITMOs are used only toward the achievement of one NDC and are not double counted ■ How to ensure that ITMOs are used in a manner that is robust in relation to the target year/period ■ The approach to the corresponding adjustments ■ Types of ITMOs ■ Mechanisms to avoid double counting
Recalculation of emissions and other values	<ul style="list-style-type: none"> ■ Conditions under which recalculations can be made ■ Which recalculations would constitute a new NDC versus a revised NDC ■ Which recalculations need to be made when there is a revision to ensure consistency
Sectoral (non-greenhouse gas) targets	<ul style="list-style-type: none"> ■ Whether Parties with headline mitigation contributions consisting of both greenhouse gas emissions targets and non-greenhouse gas targets or multiple non-greenhouse gas targets should account for each target separately ■ How Parties with headline mitigation contributions consisting of non-greenhouse gas targets should account for them (e.g., by monitoring relevant sectoral indicators using consistent methods at regular intervals)
Policies and actions	<ul style="list-style-type: none"> ■ How Parties with headline mitigation contributions consisting of policies and actions should account for those actions, including whether to account for policy implementation, sectoral outcomes, and/or greenhouse gas emissions outcomes
Reporting of accounting-related information	<ul style="list-style-type: none"> ■ The vehicle for reporting aspects that are appropriate for guidance on facilitating clarity, transparency, and understanding; reporting under Article 13, paragraphs 7(a) and (b); or other reporting vehicles ■ What will need to be reported and when ■ Whether a balance sheet will be used to help account for progress toward and achievement of the NDC

Table ES-2 | **Sample Balance Sheet for Accounting for Single Year Greenhouse Gas Targets**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7
	IMPLEMENTATION PERIOD						TARGET YEAR
	2020	2021	2022	2028	2029	EXAMPLE: 2030
I. CALCULATE THE TARGET LEVEL OF EMISSIONS							
A	Target level of emissions in the target year (MtCO ₂ e) <i>For base year emissions targets: base year emissions – [base year emissions x percent reduction]</i> <i>For fixed-level targets and trajectory targets: absolute quantity of emissions specified by target level (MtCO₂e)</i> <i>For baseline scenario targets: projected baseline scenario emissions in target year – [projected baseline scenario emissions in target year x percent reduction]</i>	n/a	n/a	n/a	n/a	n/a	n/a
B	Target level of emissions intensity in the target year (MtCO ₂ e/level of output) <i>For base year intensity targets: Base year emissions intensity – [base year emissions intensity x percent reduction]</i>	n/a	n/a	n/a	n/a	n/a	n/a
II. CALCULATE ACCOUNTED EMISSIONS							
Emissions and removals (MtCO₂e)							
C	Total net emissions in the national greenhouse gas inventory ^a						
D	Total emissions in target boundary, if different from the national inventory ^b						
Net land sector emissions/removals (MtCO₂e)^c							
E	Total emissions in target boundary, excluding the land sector						
F	Net land sector emissions/removals in target boundary						
G	Change in net land sector emissions/removals (MtCO ₂ e) (For Parties that calculate the change in land sector emissions and removals separately from other sectors)						
For intensity targets							
H	Level of GDP or other metric						
I	Calculation of emissions intensity = D / H <i>For Parties that calculate the change in land sector emissions and removals separately from other sectors = (E + G) / H</i>						

Table ES-2 | **Sample Balance Sheet for Accounting for Single Year Greenhouse Gas Targets (Ct'd)**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7
	IMPLEMENTATION PERIOD						TARGET YEAR
	2020	2021	2022	...	2028	2029	EXAMPLE: 2030
Internationally Transferred Mitigation Outcomes (ITMOs) (MtCO₂e)^d							
J	Total ITMOs used						
K	Total ITMOs transferred						
L	Net ITMOs used = J - K						
Accounted emissions							
M	Accounted emissions (MtCO ₂ e) <i>For targets that do not calculate the change in land sector emissions and removals separately and do not use ITMOs = D</i> <i>For targets that do not calculate the change in land sector emissions and removals separately and use ITMOs = D + L^e</i>	n/a	n/a	n/a	n/a	n/a	n/a
N	Accounted emissions intensity = M / H (for base year intensity targets only)	n/a	n/a	n/a	n/a	n/a	n/a
III. ACCOUNTING BALANCE: Calculate difference between the target level of emissions and accounted emissions to determine whether target was achieved (MtCO₂e)							
O	Difference between the target level of emissions and accounted emissions to determine whether target was achieved = A7 - M7	<i>Positive figure means target was achieved; negative figure means target was not achieved.</i>					
P	Difference between the target level of emissions intensity and accounted emissions intensity to determine whether target was achieved = B7 - N7	<i>Positive figure means target was achieved; negative figure means target was not achieved.</i>					

Notes:
^a This quantity—total net emissions/removals in the national greenhouse gas inventory—represents an aggregated summary. National inventory reports will need to follow reporting requirements agreed upon under the Paris Agreement.
^b Other information related to the NDC (e.g., covered sectors and greenhouse gases, GWP values) could be reported in an accounting balance sheet (not shown here) or in other documents.
^c The reporting requirements related to accounting for land sector emissions and removals have yet to be determined but likely will be detailed and disaggregated, requiring information on gross and net land sector emissions/removals for each selected land-use category, activity, pool, and flux, as relevant, among other information.
^d The reporting requirements for ITMOs have yet to be determined but will likely include information on types and vintages, among other factors.
^e The rules for accounting of ITMOs have yet to be decided. It remains to be seen, for example, what accounting procedures will be put in place for single year targets, how corresponding adjustments will be made, and which vintages will be eligible. This is a simplified illustration.

Source: Adapted from WRI 2014a.

ABBREVIATIONS

CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CO₂e	carbon dioxide equivalent
COP	Conference of the Parties
GWP	global warming potential
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally Transferred Mitigation Outcome
LULUCF	land use, land-use change, and forestry
MtCO₂e	metric tons of carbon dioxide equivalent
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
REDD+	Efforts to reduce emissions from deforestation and forest degradation and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks
SDG	Sustainable Development Goal
TACCC	transparency, accuracy, completeness, comparability, and consistency
UNFCCC	UN Framework Convention on Climate Change

1. ACCOUNTING UNDER THE PARIS AGREEMENT

1.1 Objective of This Paper

This paper is intended to serve as a resource for Parties to the Paris Agreement in accounting for mitigation components of their Nationally Determined Contributions (NDCs). The paper includes recommendations for the guidance for accounting for Parties' NDCs to be adopted by the Conference of the Parties, serving as the meeting of the Parties to the Paris Agreement (CMA) at its first session. Recommendations for the guidance are organized into two categories: (a) steps that should be taken by Parties to account for their NDCs and (b) accounting-related information that should be communicated internationally. The chapters in the paper provide recommendations, which are summarized in Appendices B and C. Appendix D provides a summary of issues the accounting guidance should address.

The paper provides accounting approaches in line with the principles described in the Paris Agreement and its accompanying decision text, building on existing approaches under the UN Framework Convention

on Climate Change (UNFCCC) and its related legal instruments and the Intergovernmental Panel on Climate Change (IPCC). The ideas and guidance provided in this paper build on the work of the Greenhouse Gas Protocol.¹

1.2 Advancing Accounting Guidance under the Paris Agreement

Accounting related to greenhouse gas emissions and removals is an important foundational step in managing the world's response to climate change. Accounting methodologies help one understand the quantity of emissions released and sequestered, the extent to which interventions are having an impact, and whether emissions targets or other mitigation goals have been achieved. Greenhouse gas accounting existed long before adoption of the Paris Agreement. It is an evolving practice, as the nature of climate commitments and interventions changes and improvements are regularly made to methods and guidance as science advances.

Accounting is related to but separate from transparency within the negotiations. Accounting covers the "how" in terms of systems or processes to account for Parties' NDCs (see chapter 2). Transparency and associated reporting under Article 13 cover the "what" in terms of what information is to be communicated. Parties are highly encouraged to align accounting and transparency in order to accurately assess and understand NDC progress and achievement (Hood et al. 2017).

With the adoption of the Paris Agreement, new accounting guidance is needed to support countries in accounting for their NDCs. Under Article 4.13, Parties agreed to "account for their nationally determined contributions" and follow certain principles (Table 1-1) when accounting for anthropogenic emissions and removals corresponding to their NDCs.² The COP requested the elaboration of guidance, drawing on existing approaches under the Convention and its related legal instruments.³ This accounting guidance will be applicable to all Parties starting with their second NDC, although they can elect to apply it to their first NDC.⁴ Parties will need to decide what constitutes a "second" or "subsequent" NDC and how accounting guidance applies to the entire time period covered by the NDC to inform the tracking of progress, not only after the NDC implementation period is complete, to determine achievement. All Parties are to perform

accounting for NDCs, notwithstanding the fact that each NDC is nationally determined, reflects the Party's highest possible ambition, and reflects common but differentiated responsibilities and respective capabilities in the light of different national circumstances.

1.3 Principles and Other Specifications of Accounting under the Paris Agreement

Articles 4.13 and 4.14 instruct Parties on the principles they are expected to uphold when accounting for their NDCs, including accounting for anthropogenic emissions and removals. Consistent with the quality standards for national greenhouse gas inventories,⁵ Parties are required to promote “transparency, accuracy, completeness, comparability, and consistency.” Known as TACCC, these principles have a well-established history within the context of greenhouse gas inventories under the UNFCCC. Application of them is designed to increase confidence in the information Parties report, helping to build trust among Parties. Article 4.14 emphasizes that Parties should take into account existing methods and guidance under the Convention, as appropriate. In this sense, the Paris accounting guidance does not need to reinvent the wheel. Existing guidance does not accommodate the diversity of NDCs, however.

Parties must also promote “environmental integrity,” which embodies the idea that actual environmental gains are reflected in the outcomes Parties communicate (Hood and Soo 2017). Parties must also “ensure the avoidance of double counting,” counting any emissions reduction only once. The concept is still being discussed within negotiations and may cover a broad range of domestic and international applications, including double claiming, double issuance, double registration, and double use.⁶ These two principles are also referenced in Article 6, related to the use of Internationally Transferred Mitigation Outcomes (ITMOs) in achieving NDCs and should inform the development of the modalities, procedures, and guidelines for the transparency framework under Article 13.⁷

There are additional specifications for the design of accounting guidance, per the Paris Agreement's accompanying Decision 1/CP.21.⁸ All Parties are to apply “methodologies and common metrics assessed by the IPCC and adopted by the Conference of the Parties serving

as the meeting of the Parties to the Paris Agreement” (CMA). Parties are to “ensure methodological consistency, including on baselines, between the communication and implementation of nationally determined contributions.” Upholding this practice would suggest that accounting guidance is applicable at earlier stages of the NDC cycle, to inform the tracking of progress toward a target, not only during ex-post evaluation of NDC achievement. Parties are also to “strive to include all categories of anthropogenic emissions or removals in their NDCs and, once a source, sink, or activity is included, continue to include it” and “provide an explanation of why any categories of anthropogenic emissions or removals are excluded.”

Table 1-1 provides an overview of key principles and other specifications for accounting in the Paris Agreement and its accompanying decision.

1.4 Building on a Strong Foundation but Creating Something New

To inform the development of new accounting guidance, the Paris Agreement says that Parties should “take into account, as appropriate, existing methods and guidance.”¹⁰ In addition, Parties are requested to develop guidance for accounting that draws on “approaches established under the Convention and its related legal instruments as appropriate.”¹¹

Parties do not need to start from scratch; approaches already exist that are relevant to the development of guidance for accounting under the Paris Agreement. Approaches were established under the Kyoto Protocol; the Convention may also have relevant calculations or methods to draw on, including related to reducing emissions from deforestation and forest degradation and improving forest management in developing countries (REDD+). These accounting approaches can inform the development of accounting guidance under the Paris Agreement for certain types of commitments in the NDCs.

New approaches will also be required, however, given the diversity of NDCs and the new conditions that apply under the Paris Agreement. Table 1-2 highlights key differences in accounting between the Kyoto Protocol and the Paris Agreement. Accounting under the Paris Agreement is still evolving; some aspects may change as guidance takes shape and negotiations progress.

Table 1-1 | Key Principles and Other Specifications for Accounting for Mitigation Contributions Under The Paris Agreement and Decision 1/CP.21

PRINCIPLE	DEFINITION	REFERENCE	
Parties shall promote environmental integrity	Although there is no agreed upon definition, environmental integrity can generally be understood to encompass the concept that genuine environmental gains (e.g., a real reduction in greenhouse gas emissions) are reflected in the outcomes communicated by Parties (Hood and Soo 2017).	Paris Agreement, Article 4.13	
Parties shall promote transparency	Clear and sufficient information is provided for reviewers to assess the credibility and reliability of reported information related to a mitigation target or action. The information should be sufficient to enable a reviewer to derive the same results if provided with the same source data, assumptions, and methodologies (WRI 2014a, UNFCCC 2003).		
Parties shall promote accuracy	The greenhouse gas measurements, estimates, or calculations and data are neither over nor under the actual value, as far as can be judged, and are provided with as few biases or uncertainties as possible (WRI 2014a, UNFCCC 2003).		
Parties shall promote completeness	Information provided accounts for all greenhouse gas emissions and removals within the target boundary and does not exclude any emissions or removals that would compromise the relevance of the assessment. ^a Any and all exclusions are disclosed and justified (WRI 2014a, IPCC 2006). Completeness may also refer to all the information needed to understand the target itself and progress toward the target.		
Parties shall promote comparability	Information is provided in a way that allows it to be compared with information from other countries, including through the use of agreed upon methodologies and formats (IPCC 2006).		
Parties shall promote consistency	The same methods, data sources for assumptions, and calculations are used throughout a Party's NDC implementation period, to ensure the generation of comparable greenhouse gas emissions data over time, so that results represent a coherent assessment of progress toward the target (WRI 2014a).		
Parties shall ensure the avoidance of double counting	Double counting means that the same emissions reduction is claimed and applied more than once or counted toward the mitigation targets of more than one Party's NDC, which should be avoided (WRI 2014a). Debate on the definition of double counting is ongoing and could be interpreted more broadly to include double counting of emissions reductions outside the NDC or outside the Paris Agreement (e.g., under the Carbon Offsetting and Reduction Scheme for International Aviation [CORSIA]) (Hood and Soo 2017).		
Parties should take into account, as appropriate, existing methods and guidance under the Convention, in the light of the provisions of paragraph 13	The principles and concepts used in greenhouse gas estimation and accounting under the Convention remain relevant for the purposes of accounting under the Paris Agreement.		Paris Agreement, Article 4.14

Table 1-1 | **Key Principles and Other Specifications for Accounting for Mitigation Contributions Under the Paris Agreement and Decision 1/CP.21 (Ct'd)**

OTHER SPECIFICATIONS	DEFINITION	REFERENCE
Parties account for anthropogenic emissions and removals in accordance with methodologies and common metrics	The concept of adopting methodologies and common metrics is not new; it was applied under Article 5 of the Kyoto Protocol and the second commitment period of the Kyoto Protocol (Decision 4/CMP.7), for example. Guidance under the Paris Agreement is expected to ensure that Parties use greenhouse gas estimation methodologies and common metrics assessed by the IPCC and adopted by the CMA.	Decision 1/CP.21, paragraph 31 (a)
Parties [are to] ensure methodological consistency, including on baselines, between the communication and implementation of nationally determined contributions	Methodological consistency is a more specific articulation of consistency under the TACCC (transparency, accuracy, completeness, comparability, and consistency) principles. It suggests that the same method and data sources for assumptions that were used for ex-ante calculations also be used to calculate progress toward a target as well as the final target level (Hood and Soo 2017). If recalculations are made, they should be handled in a manner that produces a consistent time series.	Decision 1/CP.21, paragraph 31 (b)
Parties strive to include all categories of anthropogenic emissions or removals in their NDCs and, once a source, sink, or activity is included, continue to include it	Guidance for accounting should encourage all Parties to strive for more comprehensive NDCs that include all carbon pools and categories of anthropogenic emissions or removals and, once a source, sink, or activity is included, continue to include it. This encouragement may be considered complementary to Article 4, paragraph 4, which encourages developing country Parties to move toward economy-wide reduction or limitation targets. This guidance would support more comprehensive accounting over time and facilitate comparison with national inventories.	Decision 1/CP.21, paragraph 31 (c)
Parties shall provide an explanation of why any categories of anthropogenic emissions or removals are excluded	Guidance is expected to ensure that Parties explain or provide justification for any excluded categories in their NDCs in the event that not all categories of emissions or removals are included. This consideration is also linked to the principles of transparency and completeness.	Decision 1/CP.21, paragraph 31 (d)

Notes: These definitions summarize some of the literature and guidance to date. Actual definitions will depend on the guidance agreed upon to operationalize the Paris Agreement's transparency and accounting requirements.

^a The target boundary in the context of the Paris Agreement refers to the sectors and greenhouse gas emissions covered by the mitigation component of the NDC.

Table 1-2 | **Key Accounting Differences Between the Kyoto Protocol and the Paris Agreement**

ACCOUNTING UNDER THE KYOTO PROTOCOL	ACCOUNTING UNDER THE PARIS AGREEMENT
"Unitized" greenhouse gas targets to establish a budget	"Nonunitized" greenhouse gas targets and other target types
Applicable to Annex I Parties	Applicable to all Parties
Cooperation through Joint Implementation and the Clean Development Mechanism and international emissions trading	Cooperation under Article 6, which may include cooperative approaches, a mechanism to contribute to the mitigation of greenhouse gas emissions, and support for sustainable development, including through internationally transferred mitigation outcomes (ITMOs) and nonmarket approaches
Achievement linked to compliance	Achievement not yet explicitly linked to compliance but to understanding progress
Common greenhouse gas target type (base year target) converted into carbon budgets calculated using a common methodology	Accounting needs to accommodate diverse target types
Common base year (for most Parties) and commitment periods	Different base year and implementation periods; issue of common timeframes is under negotiation
Transfers of allowances and units representing emission reductions through corresponding adjustments are reported, tracked, and recorded through a compilation and accounting database	System for tracking (including reporting, recording and review of corresponding adjustment) ITMOs to be determined
Coverage mandated and controlled through accounting rules (e.g., mandatory greenhouse gas sources listed in Annex A and land use, land-use change, and forestry [LULUCF] included a mixture of mandatory and elective measures)	Coverage nationally determined, with general encouragement for developed countries to take the lead with absolute economy-wide targets and developing countries to move toward economy-wide targets over time
Land sector subject to specific accounting rules (e.g., activity-based, caps, reference levels)	Land sector accounting rules not yet prescribed

2. DEFINITION AND PURPOSE OF ACCOUNTING FOR NATIONALLY DETERMINED CONTRIBUTIONS

2.1 Definition of Accounting

It is important to have a clear understanding of what accounting means, as all Parties are expected to participate in this activity. Historically, the term *accounting* referred to a system for calculating and recording financial transactions pertaining to a particular period or purpose. Recently, it has been incorporated into discourse about calculations of greenhouse gas emissions reductions and enhancement of sinks. Although there is no agreed-upon definition of what accounting means in this context, a broad definition could include a wide range of activities, including collection and management of greenhouse gas inventory data over single or multiple years, calculations to determine the greenhouse gas impacts of various mitigation activities, the measurement of progress toward a target, calculations to determine whether a target has been met, and reporting or communicating information related to any of the aforementioned activities.

A more traditional definition may be the overlay of methods or rules on top of inventory data (or other data) that set out what parts of the inventory counts toward a target and how contributions toward the target are added or subtracted. Prag et al. (2013) define accounting as the accurate measuring of progress toward and achievement of emissions reduction and limitation targets. However, some Parties make a distinction between “accounting” and “accounting for,” as written in Article 4.13, with some Parties understanding accounting as being accountable or responsible for one’s own commitments (in the context of the Paris Agreement, their NDCs).

Accounting for NDCs is separate from but related to transparency under the Paris Agreement and thus separate from reporting of a national inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases. Although the national inventory may be identical to what is covered within NDCs with economy-wide mitigation targets, some Parties’ NDCs may cover only a subset of greenhouse gas emissions and removals reported in the national inventory.

This paper defines accounting as the process of (a) determining the quantity of emissions, removals, transactions related to ITMOs, and land sector emissions and removals that may be applied toward a mitigation contribution within an NDC; (b) calculating the target level of emissions specified by the contribution; (c) comparing the two quantities, to evaluate NDC progress and achievement; and (d) recording and communicating the results. This definition draws on the approaches established under the Convention and its related legal instruments, in line with Decision 1/CP.21, paragraph 31.

2.2 Purpose of Accounting

Accounting is an important tool to support the understanding of greenhouse gas emissions activities and how countries and specific mitigation efforts are performing. It is a clear complement and contribution to the enhanced transparency framework, as accounting can help establish a clear understanding of the state of climate action. Accounting is relevant before, during, and after implementation of the NDCs:

- **Before implementation**, accounting helps Parties determine “what counts” and lay out a clear framework for monitoring progress and achievement.
- **During implementation**, accounting defines how Parties track and report progress toward their contributions in a comparable and transparent manner (“how to count”), which can build confidence and accountability regarding implementation.
- **After implementation**, accounting helps Parties demonstrate whether their contributions have been achieved (Levin et al. 2015).

Accounting can serve both international and domestic purposes. At the international level, accounting is critical for monitoring progress toward targets, participating in the exchange of ITMOs, enabling the comparability of effort, and supporting the aggregation of global emissions and emissions reductions. Accounting is also a critical step in evaluating whether an NDC has been achieved, which is useful, for example, to help assess collective progress toward achieving the purpose of the Paris Agreement under the global stocktake.

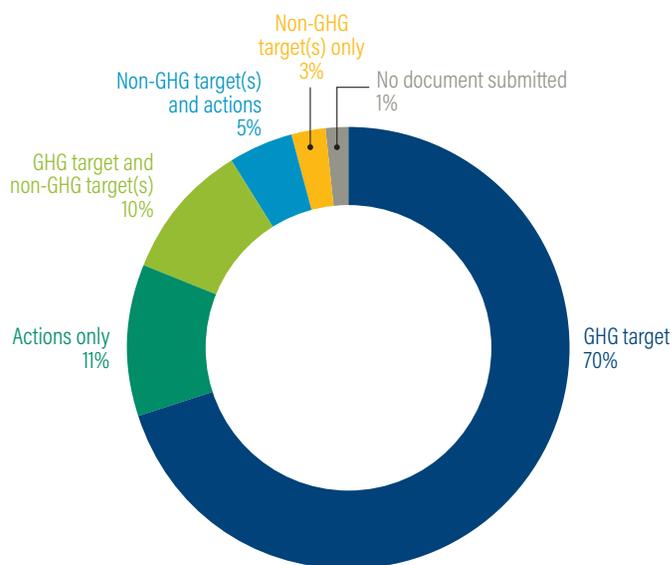
Domestically, accounting helps countries understand changes in emissions and removals corresponding to their NDCs, which may inform course corrections or the establishment of new mitigation policies. Accounting can help countries understand whether a policy or action is performing as intended. It can help assess and monitor specific effects of climate change measures, such as sustainable development impacts (Singh et al. 2016). Applying a robust and transparent accounting framework can also help improve the enabling environment for application for and receipt of multilateral funding to support mitigation action.

2.3 Accounting for the Diversity of Mitigation Components in Nationally Determined Contributions

The nationally determined nature of NDCs adds a new level of complexity for accounting. As of August 3, 2018, 194 Intended Nationally Determined Contributions (INDCs) or NDCs have been submitted (separately counting the individual European Union [EU] member states and the European Union itself) representing a wide diversity of commitment types. The majority of submissions (81 percent) include a target for greenhouse gas mitigation (Fransen et al. 2017), though there is a range of target types. Many NDCs also include specific actions and non-greenhouse gas targets.

Given this diversity, Parties need to develop guidance that accommodates all types of mitigation targets yet pursues commonalities in the overall approach, to the extent possible, in order to enable quantification in comparable terms. Figure 2-1 provides an overview of mitigation targets contained in the NDCs. Table 2-1 disaggregates target types contained in the NDCs, recognizing that some NDCs contain more than one target.

Figure 2-1 | **Share of Nationally Determined Contributions by Type of Mitigation Contribution**



Source: WRI 2018.

Table 2-1 | **Number of Each Type of Mitigation Contribution in the Intended Nationally Determined Contributions or Nationally Determined Contributions**

TARGET TYPE	DESCRIPTION	NUMBER ^a
Base year emissions target	Mitigation target that aims to reduce, or control the increase of, emissions relative to an emissions level in a historical base year.	61
Base year intensity target	Mitigation target that aims to reduce emissions intensity (emissions per unit of another variable, typically GDP) by a specified quantity relative to a historical base year.	10
Baseline scenario target	Mitigation target relative to a reference case that represents future events or conditions most likely to occur in the absence of activities taken to meet the mitigation target.	80
Fixed-level target	Mitigation target that aims to reduce, or limit the increase of, emissions to an absolute emissions level in a target year.	6
Trajectory target	Mitigation target to reduce, or control the increase of, emissions to specified quantities in multiple target years or periods over a long timeframe (such as targets for 2020, 2030, and 2040 over the period 2020–50). Trajectory targets also include emissions peaking targets; “peak-and-decline” targets; and “peak, plateau, and decline” targets, which specify that emissions remain constant for a period after peaking then decline.	3
Sectoral non-greenhouse gas targets and/or actions (without a greenhouse gas target) ^b	Non-greenhouse gas targets are framed in terms of energy efficiency, renewable energy, forest cover, or other targets not expressed in terms of greenhouse gas emissions or emission reductions. Actions are commitments to implement specific interventions (e.g., policies, strategies, or projects), including laws, regulations, and standards; taxes, charges, subsidies, and incentives; information instruments; voluntary agreements; implementation of new technologies, processes, or practices; and public or private sector financing and investment, among others.	36

Notes:

^a This column counts the number of each type of mitigation contribution in the 194 INDCs/NDCs that have been submitted (separately counting the individual EU member states and the EU itself). China and Singapore have both trajectory targets that aim to peak emissions by 2030 and intensity targets, which are counted twice in this table.

^b This row excludes INDCs/NDCs with both greenhouse gas and non-greenhouse gas targets.

Source: WRI 2018. Descriptions adapted from WRI 2014a.

2.4 What to Account for in Nationally Determined Contributions

Because NDCs contain a diversity of mitigation targets and some NDCs contain more than one target as well as specified actions, Parties need to clarify what specifically to account for in their NDCs. Most NDCs contain an overarching (“headline”) greenhouse gas target. This target may be viewed as the primary mitigation contribution and should be applicable to the requirement to account for anthropogenic emissions and removals corresponding to the NDC. Although the inputs and calculations required will differ depending on the type of greenhouse gas target, the exercise can still produce results that can be measured using comparable metrics.

Some NDCs include headline targets that include non-greenhouse gas targets and actions. They may also be considered the primary mitigation contributions that should be accounted for, although the accounting methods differ from the ones used for greenhouse gas targets.

Parties may set more than one mitigation target, non-greenhouse gas target, or action that can be accounted for. In such cases, they should clarify whether it is provided for “accounting” or “informational” purposes. If it is provided as a separate component of the contribution, accounting guidance should apply, and each component should be accounted for separately. If it is provided for informational purposes—or the emissions outcome from the non-greenhouse gas target or action will be reflected in progress toward the headline greenhouse gas target—the Party could still report on implementation progress, under Article 13.7b; it may not need to account separately for each informational component.

Another consideration is whether Parties separately account for conditional contributions within their NDCs, if applicable. Doing so would be challenging, at least during implementation, given that specific actions and associated emissions reductions would have to be attributed to certain financial support. It would be helpful to assess whether support is having its intended impact. It remains to be seen whether the guidance provided will address this issue.

3. ACCOUNTING FOR GREENHOUSE GAS EMISSIONS TARGETS

This chapter provides recommendations for accounting for and reporting on the greenhouse gas emissions targets included in NDCs.¹² It provides accounting and reporting recommendations for various aspects of accounting. Each box of reporting recommendations notes whether the accounting-related information is more appropriate to be reported as part of (a) the information provided to facilitate clarity, transparency, and understanding or (b) the reporting of tracking progress and achievement under Article 13, paragraph 7 (b). If Parties did not previously provide information under (a) when submitting their initial NDCs, they can provide it through an NDC update or in the first report on tracking progress under the transparency framework (b).

3.1 Accounting Concepts

For greenhouse gas targets (excluding base year intensity targets, which are addressed later), accounting involves calculating the target level of emissions (the maximum quantity of emissions that may be emitted in the target year or target period consistent with achieving the NDC) and accounted emissions (the quantity of emissions and removals in the target boundary in the target year, taking into account net land sector emissions/removals and any ITMOs Parties can apply toward achieving the target).¹³

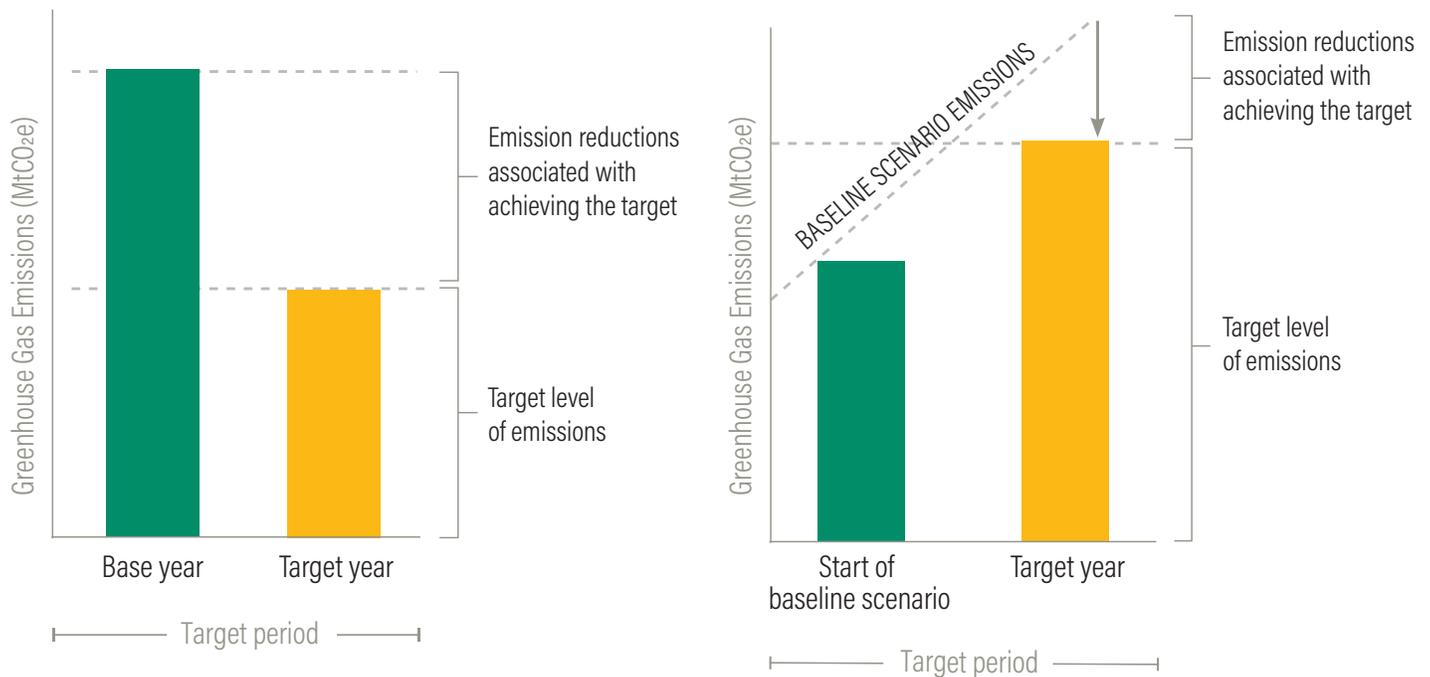
When accounting for NDCs during the implementation period, Parties can track whether emissions are on track to achieve the target level and what level of additional reductions needs to be pursued. At the end of the target year/period, the accounted emissions are compared. If accounted emissions are equal to or less than the target level of emissions in the target year/period, the target has been achieved.

Target Level of Emissions

Calculating the target level of emissions enables Parties to identify the emissions level that must be met in the target year(s) to achieve the target. It also helps Parties assess progress and determine target achievement.

How this quantity is calculated varies by target type. Figure 3-1 illustrates the target level of emissions for a single year base year emissions target and baseline scenario target. Section 3.3 explains how to calculate the target level of emissions intensity for intensity targets.

Figure 3-1 | Target Level of Emissions for Two Types of Targets



Source: WRI 2014a.

Accounted Emissions

Accounted emissions are the quantity of emissions and removals that Parties count toward achieving the target, including any adjustments for ITMOs and the land sector,¹⁴ if applicable. In the simple case of a country that has not used accounting approaches for the land sector that differ from the national greenhouse gas inventory and has not engaged in ITMOs, accounted emissions are equal to the reported emissions and removals in the national greenhouse gas inventory within the target boundary (the greenhouse gases and sectors covered by the target) in the target year/period. If accounted emissions are lower than the target level of emissions, the mitigation target has been achieved.

Parties may require more complicated accounting, for two primary reasons. First, if Parties voluntarily choose to participate in cooperative approaches and use or transfer international mitigation outcomes, calculating accounted emissions will need to take into account the international sales and acquisitions or use of ITMOs, if applicable. Second, if Parties calculate net land sector emissions/removals in a manner that differs from the national inventory, calculating accounted emissions will need to take into account the change in net land sector emissions/

removals.¹⁵ (Section 3.4 provides additional information.)

Figure 3-2 illustrates how accounted emissions are calculated in the two cases. In the first case, accounted emissions are adjusted for ITMOs. In the second, accounted emissions are adjusted for both ITMOs and changes in net land sector emissions/removals. The quantity of emissions is compared with the target level of emissions to determine whether the mitigation target has been achieved.

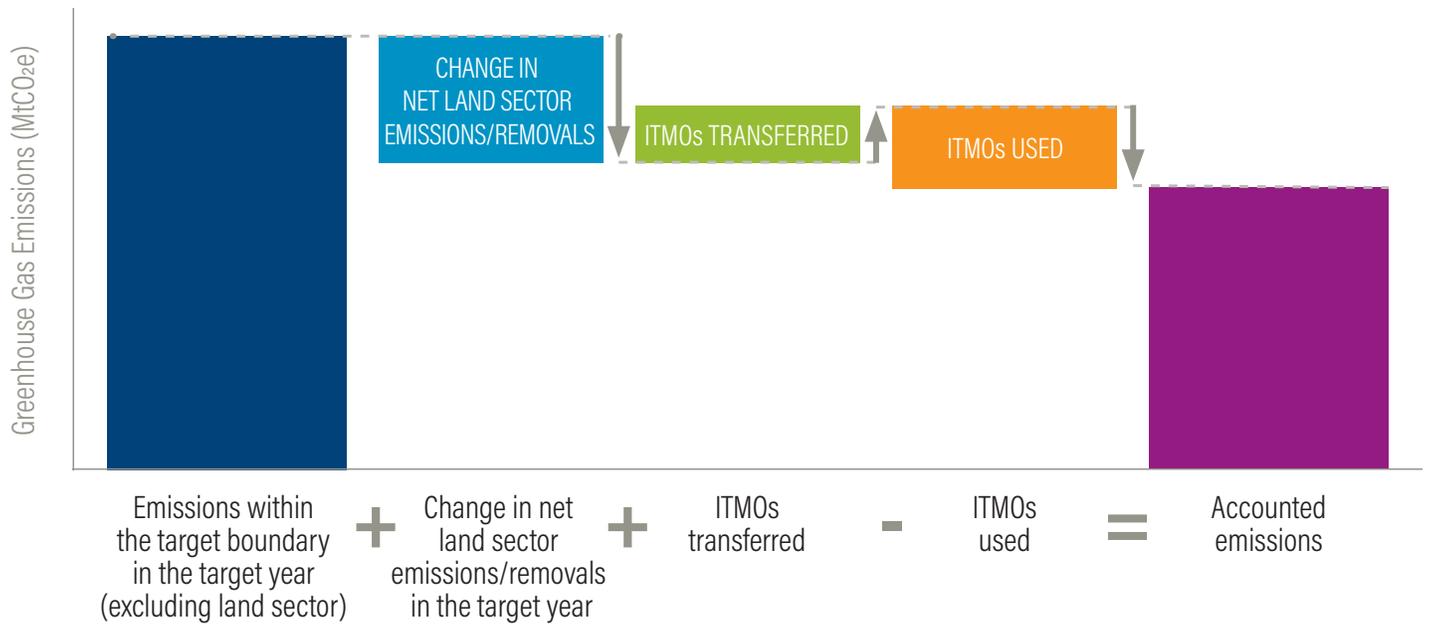
There is a spectrum of complexity related to calculating accounted emissions, depending on target design and accounting choices (Figure 3-3). The calculation is very simple for fixed-year targets and base year emissions targets in cases where ITMOs are not used and inventory approaches are used for the land sector. In this case, calculating accounted emissions mirrors an inventory approach, as accounted emissions are simply the target year's emissions in the target boundary. The calculation is most complex for baseline scenario targets in which ITMOs are used and accounting approaches are used for the land sector that differ from inventory-based approaches. These choices require additional equations and data requirements, as depicted in the balance sheet and explained in the sections below.

Figure 3-2 | **Adjustments to the Calculation of Accounted Emissions to Reflect the Use of Internationally Transferred Mitigation Outcomes (ITMOs) and Changes in Net Land Sector Emissions/Removals**

A. ADJUSTING ONLY FOR ITMOS (FOR TARGETS THAT DO NOT CALCULATE THE CHANGE IN NET LAND SECTOR EMISSIONS/REMOVALS SEPARATELY)



B. ADJUSTING FOR ITMOS AND CHANGES IN NET LAND SECTOR EMISSIONS/REMOVALS



Note: In this example, the majority of emissions in the target boundary are non-land sector emissions, and the land sector is a net sink.
 Source: Adapted from WRI 2014a.

There are many gradations of simple to complex. In the most complex case, a Party would have a dynamic baseline scenario, use and/or transfer ITMOs, and apply accounting approaches for the land sector that differ from inventory-based approaches. This case would be data intensive and require capacity and robust accounting and transparency systems.

Calculating Accounted Emissions and the Target Level of Emissions to Monitor Progress During Implementation

During the NDC implementation period, monitoring and reporting on progress involves comparing emissions within the target boundary for the most recent year at the time of reporting (based on the national greenhouse gas inventory) with the target level of emissions in the target year (Figure 3-4). (For countries with base year intensity targets, monitoring involves comparing the most recent statistics on emissions intensity, using consistent data and methods, with the target level of emissions intensity.)

Table 3-1 | **Assessing Target Achievement**

IF...	THEN...
Accounted emissions \leq target level of emissions	Target is achieved
Accounted emissions $>$ target level of emissions	Target is not achieved

Source: WRI 2014a.

Calculating Accounted Emissions and the Target Level of Emissions to Monitor Achievement at the End of the Implementation Period

At the end of the implementation period, Parties can compare accounted emissions with the target level of emissions in the target year/period. If accounted emissions are equal to or less than the target level of emissions in the target year(s), the target has been achieved (Table 3-1 and Figure 3-5).

Figure 3-3 | **Spectrum of Complexity Involved in Accounting Depending on Target Design and Accounting Choices**

TARGET DESIGN/ACCOUNTING CHOICES	Simpler → MORE COMPLEX			
	Target type	Fixed-level	Base year emissions	Base year intensity
Use/transfer of ITMOs	No use/transfer of ITMOs		Use/transfer of ITMOs	
Land sector accounting	Inventory-based approach ^a		Accounting approach unique to land sector ^b	

Notes:

^a In an inventory-based approach, estimates from the national greenhouse gas inventory are used directly in the accounting.

^b Accounting approaches and methods can differ from the inventory approach (because of differences in reference levels, activity-based accounting methods, calculations of harvested wood products, inclusion of natural disturbances, and other factors), as described in section 3.3.

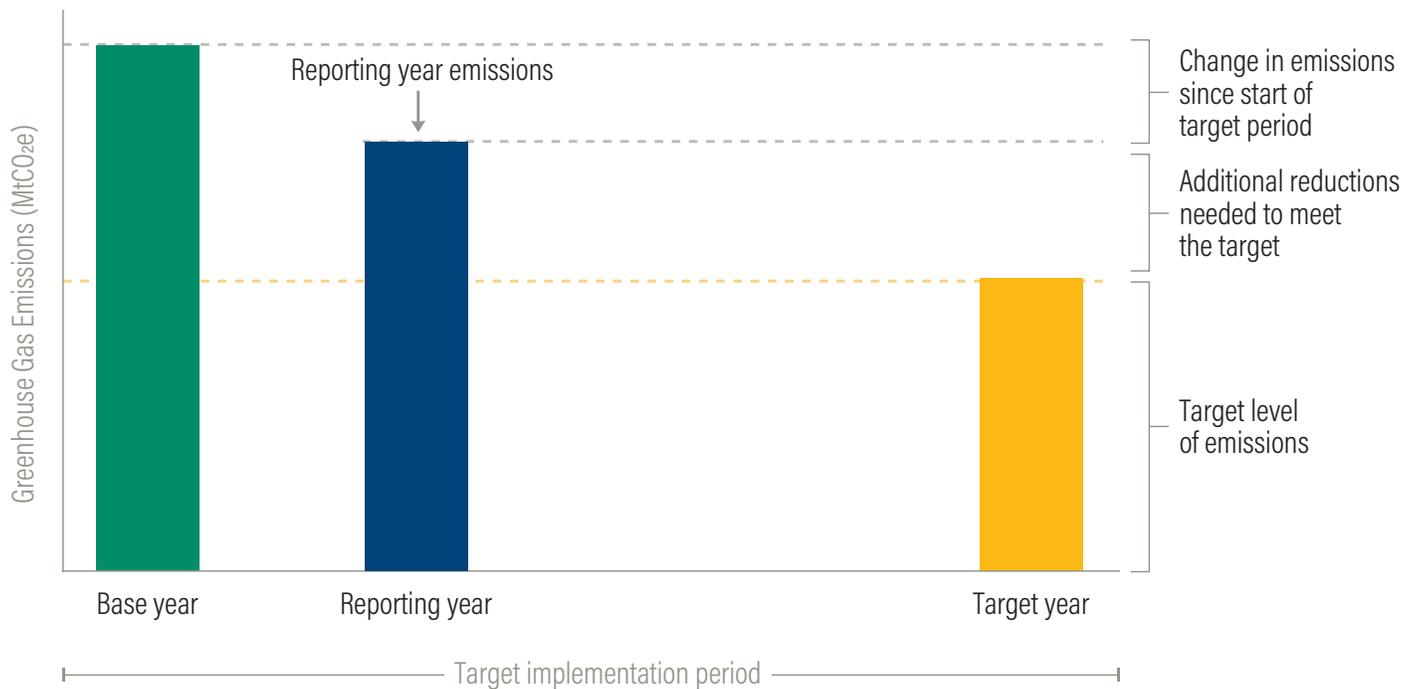
Using a Balance Sheet

A balance sheet (sometimes referred to as an accounting balance or a summary table) can capture regularly updated information on emissions and removals, calculations of net land sector emissions/removals (if relevant), and transfer and use of ITMOs (if relevant). It is used in the Greenhouse Gas Protocol, including the *Mitigation Goal Standard*, and referenced in other literature related to NDC accounting.¹⁶ This format can be a very useful tool domestically for accounting and can facilitate the comparison of accounted emissions and the target level of emissions. Table 3-2 (in section 3.3) provides a sample balance sheet for a single year target. Appendix A provides a balance sheet for a multiyear target.

This paper uses the balance sheet to illustrate how various aspects of accounted emissions and the target level of emissions can be calculated and how progress toward and achievement of the NDC can be assessed. The use of a balance sheet supports the Paris Agreement’s principles for accounting, especially transparency and avoidance of double counting.

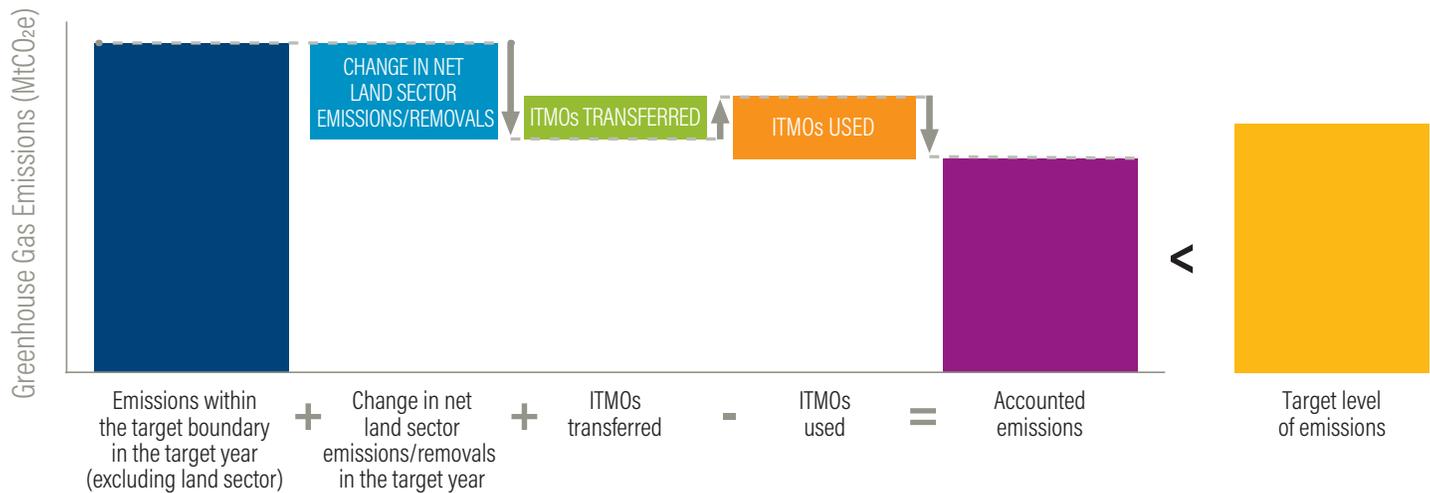
The balance sheet shown in Table 3-2 is simplified. Other information related to the NDC—such as covered sectors and greenhouse gases, global warming potential (GWP) values, and other information related to emissions and removals that provides clarity on how the accounting has been done—could also be reported in an accounting balance sheet and/or other document.

Figure 3-4 | **Monitoring Progress Toward the Target Level of Emissions in a Single Year Target**



Source: Adapted from WRI 2014a.

Figure 3-5 | **Assessing Target Achievement**



Source: Adapted from WRI 2014a.

3.2 Clarification of Target Design Choices

In order to account for their greenhouse gas targets, Parties will need to clarify their target design and associated accounting assumptions, which can have implications for the calculation of the target level of emissions and accounted emissions. They can do so as part of the information provided to strengthen the clarity, transparency, and understanding of their NDCs or as part of their reporting under the Paris Agreement transparency framework. Parties that did not provide sufficient information with their NDCs can provide this information through an NDC update or in the first report on tracking progress under the transparency framework. Regardless of the means for communicating this information, Parties need to consider various issues related to the target design and associated accounting assumptions, which will in part dictate how the NDC is accounted for. It is possible that future accounting guidance could set parameters for such choices. Such guidance has yet to be determined; it will be applied only voluntarily during implementation of the first NDCs.

Scope and Coverage

The scope and coverage, or target boundary, refer to the sectors and greenhouse gases covered by the target. For the land sector, they refer to the covered categories, activities, pools, gases, and fluxes (depending on the accounting approach used). The target boundary may differ from the greenhouse gas inventory boundary,

RECOMMENDATIONS ON SCOPE AND COVERAGE

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- greenhouse gas inventory
- the sectors and categories included in the target boundary, including the definitions of covered sectors and categories if they are different from those in the inventory and any sectors excluded from the target boundary, with an explanation of why they are excluded (per Decision 1/CP.21, paragraph 31 [d])
- the greenhouse gases included in the target boundary and, if not all greenhouse gases in the national boundary are included, an explanation of why certain gases are excluded
- the percentage of national greenhouse gas inventory emissions included in the target boundary in the base year
- an explanation of how previously covered categories continue to be covered and a justification for the exclusion of a previously covered sector

because the greenhouse gas inventory boundary could cover more greenhouse gases and sectors than the target boundary. The calculation of accounted emissions and the target level of emissions will take into account only covered sectors and greenhouse gases.

Target Timeframe

Discussion is ongoing in the negotiations regarding whether common timeframes (e.g., 5-year or 10-year implementation periods) will be used across Parties' NDCs. If common timeframes are not used, Parties will have different implementation periods for their NDCs.

Another dimension of timeframes is the time associated with target achievement. Single year targets are designed to achieve emission reductions (or reductions in intensity) by a single future year. Multiyear targets are designed to achieve emission reductions (or reductions in intensity) over several years. Multiyear targets may be defined as an average, annual, or cumulative target (Box 3-1).

Because single year targets are more vulnerable to interannual fluctuations, a significant risk associated with single year targets is that emissions can increase during the target period and then be reduced just before the target year, which would result in a larger amount of cumulative emissions than if emissions were capped year-over-year by a multiyear target. Therefore, adopting multiyear targets

will give Parties a better chance of limiting cumulative emissions over the target period. Multiyear targets also facilitate understanding of anticipated emissions levels over multiple years, which provides more clarity about the expected emissions pathway and reveals whether cumulative emissions are limited sufficiently to meet temperature targets. It is also likely that multiyear targets will lead to transformed emissions pathways in which emissions continue to be reduced after the target period. Single year targets may be easier to meet without requiring necessary transformations in emissions-intensive sectors.¹⁷

Reference Level

The reference level is the level against which a target is set. Depending on the type of target, the reference level may be historical emissions (for a base year target), historical emissions intensity (for a base year intensity target), or a projected future level of emissions (for a baseline scenario target), or it may include no reference level (for a fixed-level target). Table 3-3 shows reference levels for different target types. (Section 3.3 discusses reference levels for the land sector.)

RECOMMENDATIONS ON THE TARGET TIMEFRAME

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- whether the target is a single year or a multiyear target
- for multiyear targets, whether the target is an average, annual, or cumulative target
- the target year (for single year targets) or target period (for multiyear targets); if coupled short-term and long-term targets are chosen (e.g., a trajectory target), the various target years or periods

Table 3-3 | **Reference Levels for Various Target Types**

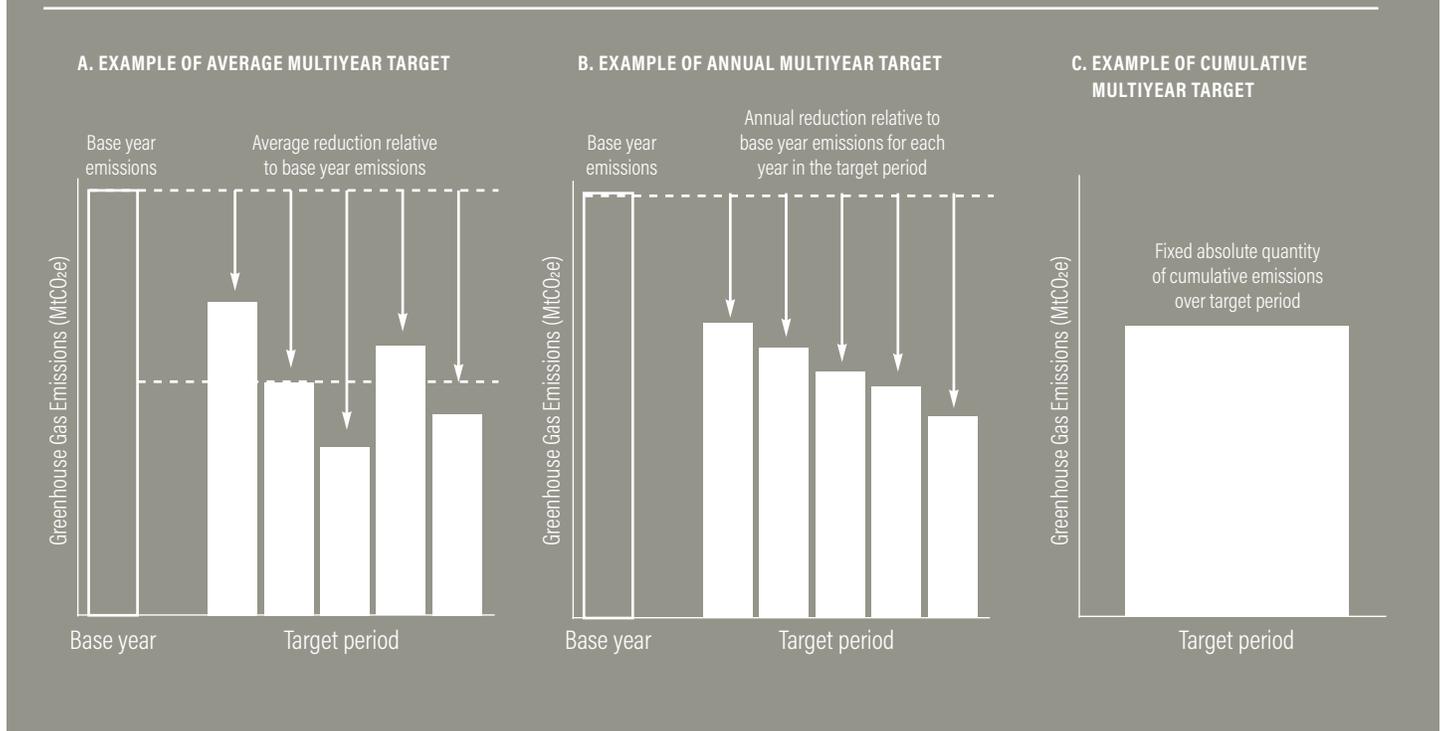
REDUCTIONS RELATIVE TO WHAT	TYPE OF REDUCTION	
	EMISSIONS	EMISSIONS INTENSITY
HISTORICAL BASE YEAR	Base year emissions target	Base year intensity target
PROJECTED BASE-LINE SCENARIO	Baseline scenario target	As very few NDCs have been framed as a reduction in intensity relative to a baseline scenario or with no reference level, this paper does not comprehensively address these cases (for an example of such a target, see Israel's interim target of 8.8 MtCO ₂ e per capita by 2025).
NO REFERENCE LEVEL	Fixed-level target	

Source: WRI 2014a.

Box 3-1 | Types of Multiyear Targets

An average multiyear target is a commitment to reduce, or control the increase of, annual emissions (or emissions intensity) by an average amount over a target period (Box Figure 3-1-1, panel a). An annual multiyear target is a commitment to reduce, or control the increase of, annual emissions (or emissions intensity) by a specific amount each year over a target period (e.g., a reduction below base year emissions of 20 percent by 2020, 22 percent by 2021, 24 percent by 2022, and so on) (Box Figure 3-1-1, panel b). A cumulative multiyear target is a commitment to reduce, or control the increase of, cumulative emissions over a target period to a fixed absolute quantity (Box Figure 3-1-1, panel b)

BOX FIGURE 3-1-1 | EXAMPLES OF MEASUREMENT OF AVERAGE MULTIYEAR, ANNUAL MULTIYEAR, AND CUMULATIVE MULTIYEAR TARGETS



BASE YEAR EMISSIONS OR EMISSIONS INTENSITY

A base year is a specific year of historical emissions and other relevant data. Base year emissions are used as a reference level to set base year emissions targets. Base year emissions intensity is used as a reference level for base year intensity targets.

The calculation of base year emissions should be based on the national greenhouse gas emissions inventory from the base year, using the IPCC Guidelines for National Greenhouse Gas Inventories. If a country's target does not cover all sectors and greenhouse gases covered by the inventory (e.g., if the target excludes the land sector or covers only a limited number of greenhouse gases), only the portion of the national greenhouse gas emissions covered by the target in the base year should be used to calculate base year emissions.

A base year is also relevant to Parties with base year intensity targets, because these targets are also tracked against historical data. However, in the case of base year intensity targets, progress is tracked in terms of emissions per GDP (or unit of another variable, such as population). Accordingly, Parties with base year intensity targets will need to calculate GDP (or another relevant metric, such as population) in the base year in addition to greenhouse gas emissions covered by the target, in order to calculate base year emissions intensity.

For Parties that have yet to determine their base year, and where emissions fluctuate significantly from year to year, the guidance should recommend the choice of a base period of multiple consecutive years in order to smooth out fluctuations and track progress against a more representative emissions level.¹⁸ The guidance should recommend avoiding the selection of a year or years with uncharacteristically high or low emissions. It should also recommend that Parties choose a single base year or base period for all sectors and gases included in the target boundary, if they have not chosen such already.

RECOMMENDATIONS ON THE REFERENCE LEVEL

Recommendations for accounting guidance

- For Parties that have base year or base year emissions intensity targets, calculate base year emissions or base year emissions intensity by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary.
- For Parties that calculate net land sector emissions/removals separately from other sectors (see p. 26) and account relative to base year/period emissions, calculate net base year emissions in the land sector separately from other sectors, as well as base year emissions excluding the land sector.

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties with base year emissions targets and base year intensity targets should report the following information:

- the base year or base period
- the complete greenhouse gas inventory for the base year or base period and the calculation methods used
- base year emissions separately by gas (in tonnes) and in tonnes of carbon dioxide equivalent (CO₂e), as well as the sources of the data and the calculation methods used

Parties accounting for net land sector emissions/removals relative to a historical base year (see p. 28 for discussion of how the land sector can be treated in an NDC) should report the following information:

- emissions, removals, and net emissions/removals for all selected land use categories, activities, pools, gases, and fluxes in the base year
- net base year emissions/removals for the land sector
- all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, or other approaches that differ from inventory-based approaches
- net emissions/removals from each selected land use category or activity (for activity-based accounting)

Parties with base year intensity targets should also report information on:

- base year emissions intensity, the level of GDP or other metric in the base year, and the data sources used.

BASELINE SCENARIO EMISSIONS

Baseline scenario emissions are used as a reference level to set baseline scenario targets. A baseline scenario is a projected reference case that represents future events or conditions most likely to occur in the absence of activities taken to meet a mitigation target. Baseline scenarios are sometimes referred to as business-as-usual scenarios.

Developing a baseline scenario depends on a wide variety of inputs, such as data on factors that drive emissions (economic activity, energy prices, population growth, etc.); assumptions about how emissions drivers are expected to change over the target implementation period; and data on the effects of policies and actions included in the baseline. The accounting guidance developed under the Paris Agreement may guide choices related to the development of the scenario (e.g., the cut-off year after which policies and actions should be included in the baseline).

Baseline scenarios may be static or dynamic. A static baseline scenario is developed and fixed at the start of the target implementation period and not recalculated over time. A dynamic baseline scenario is developed at the start of the target implementation period and recalculated during the implementation period. Any guidance related to such recalculations remains to be developed under the UNFCCC or the Paris Agreement. In line with the principle of methodological consistency, guidance should require that any Party with a dynamic baseline target be required to report a baseline scenario recalculation policy at the start of the target implementation period, including which factors will trigger a recalculation, and apply it in a consistent manner (See Section 3.4 for more information on recalculation.)

Land Sector Accounting

This section explains possible methods for land sector accounting based on existing approaches that could be included in future guidance.¹⁹ The recommendations are designed to work both in conjunction with existing accounting frameworks, including the Kyoto Protocol and the mechanism for reducing emissions from deforestation and forest degradation, including forest conservation, sustainable forest management and the enhancement of carbon stocks (REDD+), but it is not necessarily bound by them.

The land sector includes forest land, cropland, grassland, wetlands, settlements, and other land, as well as emissions from agricultural practices such as livestock and manure management and emissions from managed soils (IPCC 2006).²⁰ Parties including agriculture, forestry, and other land use (AFOLU) in the target should separately report agriculture and land use, because special accounting rules may apply to the latter.

The nature of the land sector differs significantly across countries. In many global North countries, for example, the sector has been a net sink. In many global South countries in the tropics, land sector emissions have been the largest contribution to economy-wide emissions, and investments have been made in REDD+ monitoring and reporting systems. These circumstances will lead to the guidance affecting countries differently; Parties may therefore have particular interests in certain desired outcomes of the guidance.

The simplest method for accounting for land sector emissions and removals is to compare net land sector emissions/removals from different reporting years of the national greenhouse gas inventory. However, some

RECOMMENDATIONS ON THE BASELINE SCENARIO

(relevant only for Parties with baseline scenario targets)

Recommendations for accounting guidance

- Develop a baseline scenario that covers the same sectors and gases as in the target boundary.
- For Parties that calculate the change in net land sector emissions/removals separately from other sectors and choose the forward-looking baseline accounting method (see p. 28), calculate baseline scenario emissions for the land sector separately from other sectors.
- For Parties with dynamic baseline scenario targets, develop a policy for recalculating the baseline scenario at the start of the target implementation period, including a threshold for determining whether changes in emissions drivers are significant enough to trigger a recalculation of the dynamic baseline scenario (see p. 40) on recalculations for other types of updates, such as improvements or corrections to the national inventory).
- To reflect the most likely future emissions pathway under a baseline scenario, the guidance should encourage Parties to include the impacts of all policies and actions in the baseline scenario that (a) have a significant effect on greenhouse gas emissions (either increasing or decreasing them) and (b) are implemented or adopted (and planned if chosen) up to the time the baseline scenario is developed.

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- for baseline scenario targets, whether the baseline scenario is static or dynamic
- for dynamic baseline scenario targets, the baseline scenario recalculation policy at the start of the target implementation period, including which drivers will trigger a recalculation
- baseline scenario emissions in the target year/period
- for Parties including the land sector in the target boundary or as a sectoral target, net baseline scenario emissions for the sector in the target year/period
- for Parties that calculate the change in net land sector emissions/removals separately and apply a forward-looking baseline accounting method:
 - net baseline scenario land sector emissions in the target year(s)
 - all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and other approaches that differ from inventory-based approaches
- a description of the model used to develop the target baseline scenario
- the timeframe for the baseline scenario, including the start year/period
- emissions within the target boundary in the start year/period, the complete greenhouse gas inventory for the start year/period, and the data sources and calculation methods used
- key emissions drivers included in the baseline scenario and assumptions and data for key emissions drivers included in the baseline scenario
- justification of the choice of whether to develop new data and assumptions for the baseline scenario or use published data and assumptions
- the cutoff year for the inclusion of policies (the year after which no new policies or actions are included in the baseline scenario) and justification for choosing it
- key policies and actions included in the baseline scenario and any significant policies excluded from the baseline scenario, with justification
- any additional methods and assumptions used to estimate the effects of key policies and actions included in the baseline on emissions
- a quantitative estimate or qualitative description of the uncertainty of the baseline scenario results, as well as the range of results from sensitivity analysis for key parameters and assumptions

Parties have historically chosen to account for the land sector differently from other sectors, because of its unique characteristics, particularly the fact that the sector both emits greenhouse gases and sequesters carbon and the fact that natural disturbances can have significant, uncontrollable impacts on the sector. Natural disturbance-related emissions and the size and arbitrariness of legacy effects (where past management or natural disturbance have an effect on emissions and removals even in the presence of sustainable management) may require a more complex accounting approach than simply comparing emissions from inventory years. Although IPCC greenhouse gas inventory guidelines provide guidance on how to deal with these issues, Parties may choose to account for the land sector separately.

Choices related to accounting for the land sector include the treatment of the land sector in the target, the choice of activity-based or land-based accounting approaches, coverage of activities or land-use categories, the choice of the reference level and how to account for the net change in land sector emissions or removals, and other decisions unique to the land sector, such as the treatment of natural disturbances, harvested wood products, and legacy effects, among others.

TREATMENT OF LAND SECTOR IN TARGET

Including the land sector in the target boundary maximizes mitigation opportunities by ensuring that land sector emissions and removals are included in mitigation strategies and can minimize the potential for leakage of emissions from covered sectors to the land sector (such as the use of biomass for energy production). How countries choose to treat the land sector in the NDC can have significant implications for the target coverage, the emissions reductions and enhanced removals they achieve by implementing the target, and their ability to meet the target. Parties may treat emissions and removals from the land sector in one of four ways (UNDP and WRI 2015):²¹

- **Include the land sector in the economy-wide target boundary, along with other sectors:** Emissions and removals in the sector are accounted for in a manner consistent with the target type and other sectors.

- **Establish a sectoral greenhouse gas target for the land sector:** A greenhouse gas target for the land sector is designed and assessed separately. If the land sector is treated as a sectoral target, only emissions and removals in the land sector are included within the sectoral target boundary.
- **Calculate change in net land sector emissions/removals separately from other sectors:** The change in net land sector emissions/removals is added to emissions from sectors included in the target boundary. If the change in net land sector emissions/removals is negative (net removals), this value will offset emissions from other sectors within the target boundary. (This approach is akin to how the land sector is treated under the Kyoto Protocol.)
- **Do not include the land sector in the greenhouse gas target (instead, establish non-greenhouse gas target(s) and/or actions for the land sector):** The land sector is not included in the greenhouse gas target boundary, and the change in net land sector emissions/removals is not calculated separately from other sectors. Mitigation in the land sector could be achieved through specific actions without setting a greenhouse gas target for the sector. Parties may also establish one or more non-greenhouse gas targets for the land sector (e.g., to increase forest cover by a certain amount), a topic addressed in chapter 4. Not having a greenhouse gas target may not provide an adequate signal to reduce land sector emissions, depending on the nature of other commitments in the sector.

RECOMMENDATIONS ON THE TREATMENT OF THE LAND SECTOR IN THE TARGET

Recommendations for communicating accounting-related information provided to facilitate clarity, transparency, and understanding

- Parties should report how emissions and removals from the land sector are treated in the target (included in the economy-wide target boundary, treated as a sectoral target, change in net land sector emissions/removals calculated separately, or not included in the greenhouse gas target); if it is not included in the greenhouse gas target, a justification should be provided.

ACTIVITY-BASED VERSUS LAND-BASED ACCOUNTING APPROACH

After deciding on the treatment of emissions and removals from the land sector, the next step is to choose the land sector accounting approach. There are two common approaches: a land-based accounting approach and an activity-based approach.²²

Land-based accounting assesses emissions and removals across all land-use categories. Activity-based accounting assesses emissions and removals of selected land-use activities. The underlying purpose of both approaches is the same: to delineate the geographic areas, pools, gases, and fluxes included in the target boundary. The land-based approach implies use of the IPCC inventory categories; the activity-based approach implies use of the Kyoto Protocol or REDD+ activities. Parties can build upon current methodologies (e.g., for REDD+). It is important that approaches for accounting for the land sector be consistent within a country. In some instances, Parties may wish to use the managed land proxy in conjunction with land-based accounting. Under this approach, the managed land proxy uses “lands subject to human management” as a proxy for distinguishing which areas are subject to anthropogenic influence and can be used to determine which lands are within or outside the target boundary.

After choosing an approach, Parties must determine which land-use categories or suite of activities to include in the accounting. Given the principles in Decision 1/CP.21, Parties should strive for comprehensive coverage of all anthropogenic emissions and removals within each selected land-use category or suite of activities. Parties must increase coverage over time and cannot remove categories or activities that have previously been accounted for. Once there is comprehensive coverage, the distinction between land- and activity-based approaches becomes immaterial.

Some Parties may also choose to account for harvested wood products. As no single accounting approach is currently being used, there is no guarantee of consistency with the treatment of other Parties. Because harvested wood products are traded internationally, it is impossible to assess this sector’s net emissions/removals (nationally or globally) if countries report different approaches.²³ Ideally, Parties should develop accounting guidance that specifies a single accounting approach for harvested wood products, or relevant trading Parties should adopt agreements to use a common approach.

RECOMMENDATIONS ON THE ACCOUNTING APPROACH FOR THE LAND SECTOR

Recommendations for accounting guidance

- Account for emissions and removals arising from land use and land-use change within all covered land-use categories or activities.
- Separately account for emissions, removals, and net emissions/removals.
- In line with the principles of Decision 1/CP.21, the guidance should encourage Parties to strive for comprehensive coverage of all anthropogenic emissions and removals within each selected land-use category or suite of activities and to include all land-use categories or suites of activities in accounting.
- Account for changes in all significant land-based carbon pools, gases, greenhouse gas fluxes, and subcategories/activities within selected land-use categories or suites of activities.
- Account for harvested wood products using one of the relevant IPCC methodologies and/or good-practice guidance, taking account of any relevant UNFCCC or other decisions. The accounting guidance should specify a single accounting approach to harvested wood products, or relevant trading Parties should adopt agreements to use a common approach.

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- whether land-based accounting or activity-based accounting is used
- any use of a managed land proxy that has been adopted, including the definition of “managed land” and the locations and geographic boundaries of managed and unmanaged lands
- land sector categories or activities included in land sector accounting, as well as carbon pools, gases, greenhouse gas fluxes, and categories/activities included within selected land sector categories or suites of activities
- percentage of total inventory emissions from the land sector included in the target boundary in the base year/period or baseline scenario, as relevant
- whether harvested wood products, including wood, paper products, and other biogenic materials such as wood pellets, are included in the accounting and the accounting approach

SETTING OF THE REFERENCE LEVEL WHEN CALCULATING NET LAND SECTOR EMISSIONS/REMOVALS

It will be necessary to assess changes in net emissions/removals within each land use category or activity. The choice of reference level for such a calculation may have a significant impact on the assessment of progress toward and achievement of the target.

Three methods are used to calculate net emissions/removals by the land sector: (a) accounting relative to base year/period emissions (also known as net-net accounting), (b) accounting without reference to base year/period or baseline scenario emissions (also known as gross-net accounting), and (c) accounting relative to a forward-looking baseline. Figures 3-6–3-8 give examples of each approach. It remains to be seen whether accounting guidance will require or encourage Parties to use a method that is consistent with accounting for the target and the same for all land categories or activities.

Parties may also choose to reduce the risks associated with choosing an accounting method that leads to a target that is too lenient or fails to encourage mitigation. Inclusion of nonadditional emissions or removals (i.e., those emissions or removals would have occurred in the absence of a mitigation target) in the accounting may compromise the integrity of the target. Such emissions and removals may have been locked in by previous events and do not reflect current mitigation efforts. Whether a Party should address the risks of nonadditional accounting depends on the treatment of the land sector in relation to the mitigation target, the reference level chosen, and other factors, such as whether the Party is participating in a compliance regime (outside the Paris Agreement).

One option under each method is to set a cap, which limits the amount of emissions or removals that can be accounted in the sector. Caps have been used under the Kyoto Protocol. However, the cap may reduce Parties' incentives to mitigate net emissions/removals in the land sector. Instead of using caps, when possible, Parties may apply alternative techniques, such as using jurisdiction-specific practices for maximizing additionality, adopting conservative methods and data, or increasing the target level to counteract the effects of nonadditional accounting.

RECOMMENDATIONS ON SETTING THE REFERENCE LEVEL WHEN CALCULATING NET LAND SECTOR EMISSIONS/REMOVALS

Recommendations for accounting guidance

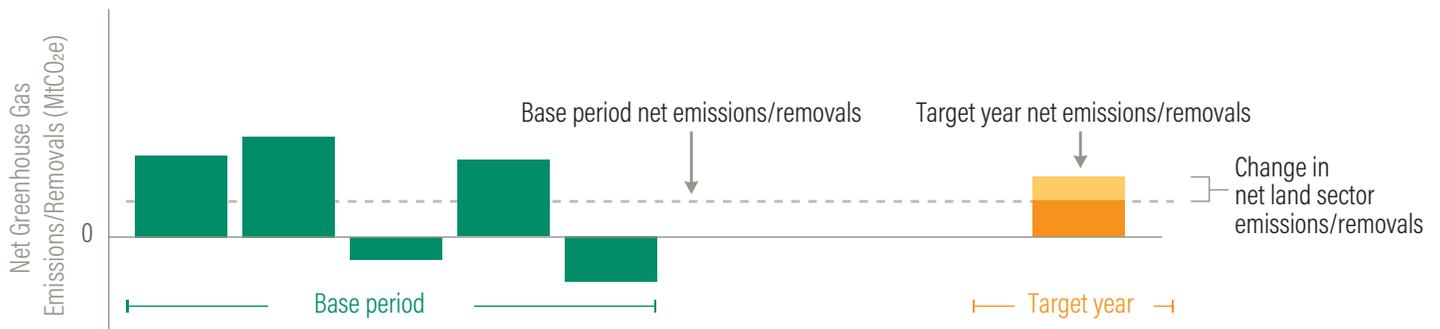
- For Parties that include the land sector in the target boundary, the guidance should recommend an accounting method for calculating net land sector emissions/removals that is consistent with accounting for the target, depending on the chosen target type for all land categories or activities:
 - Base year emissions target: Account relative to base year/period emissions (also known as net-net accounting).
 - Fixed-level target: Account in the target year/period, without reference to base year/period or baseline scenario emissions (also known as gross-net accounting).
 - Base year intensity target: Account for emissions intensity relative to a base year/period (also known as net-net accounting).
 - Baseline scenario target: Use forward-looking baseline accounting method.
- Parties should also be encouraged to minimize the risks associated with choosing an accounting method for calculating net land sector emissions/removals that leads to targets that are too lenient or do not incentivize mitigation.

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- the reference level for net land sector emissions/removals and an explanation of how it was constructed
- how the change in net land sector emissions/removals will be calculated (relative to a base year/period, without reference to a base year/period or baseline, or relative to a forward-looking baseline), with a justification if it differs from other covered sectors
- potential risks associated with the chosen approach for calculating net land sector emissions/removals and how those risks are minimized
- if part or all of a land category or a land-use activity is excluded from the target boundary to minimize potential risks, the exclusion, the reason for the exclusion, and the reason for any alternative accounting approach chosen
- if a cap on removals is adopted, the level of the cap

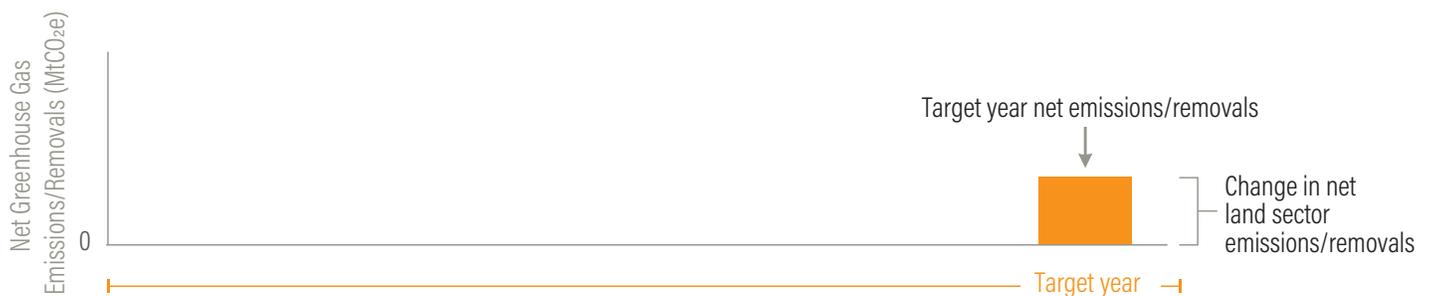
Figure 3-6 | Accounting for the Land Sector Relative to Base Period Emissions



Note: A base period was used to smooth out fluctuations in emissions. The light orange bar above the dotted line represents what counts toward the calculation of net land sector emissions/removals (the amount that is greater than base period emissions).

Source: WRI 2014a.

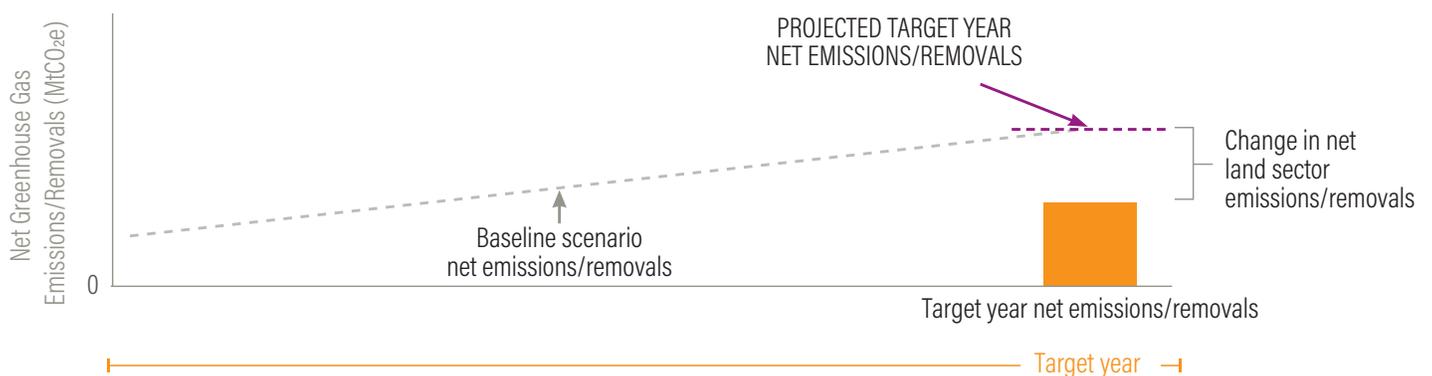
Figure 3-7 | Accounting for the Land Sector in the Target Year without Reference to a Base Year/Period or Baseline Scenario Emissions



Note: The orange bar represents what counts toward the calculation of net land sector emissions/removals. It is calculated without reference to a base year/period or baseline scenario.

Source: WRI 2014a.

Figure 3-8 | Forward-looking Baseline Accounting



Note: In this figure, the quantity between the dotted line (projected target year emissions) and the top of the orange bar represents what counts towards the calculation of net land sector emissions/removals, as this accounting approach is relative to projected emissions.

Source: WRI 2014a.

TREATMENT OF NATURAL DISTURBANCES

Natural disturbances are nonanthropogenic events or circumstances such as fire, severe drought, and windstorms that cause significant emissions and are beyond the control of, and not materially influenced by, the jurisdiction. When natural disturbances have the potential to affect net emissions/removals from the land sector, Parties may seek to establish mechanisms to exclude the associated emissions and removals from accounting.

Depending on the accounting guidance developed under the UNFCCC, Parties may choose to use a natural disturbance mechanism for individual categories or activities or for the land sector as a whole. Excluding emissions and removals associated with natural disturbances can be a highly complex and data-intensive process. Exclusion of any removals on lands affected by a natural disturbance from accounting will need to balance the quantity of emissions caused by the disturbance.²⁴ This approach upholds environmental integrity by preventing a jurisdiction from factoring out the emissions from a natural disturbance and also taking credit for the resulting removals as the land recovers. Accordingly, a natural disturbance mechanism should exclude from accounting not only the emissions but also the subsequent removals resulting from the recovery of carbon stocks after the disturbance event or circumstance or a new target has been set that takes account of the condition of the land where the natural disturbance took place. Natural disturbances could be addressed in the national inventory rather than during the accounting.

For more information on land sector accounting approaches, see Prag et al. (2013), Briner and Konrad (2014), Hood et al. (2014), WRI (2014a), and UNDP and WRI (2015).

RECOMMENDATIONS ON THE TREATMENT OF NATURAL DISTURBANCES

Recommendations for accounting guidance

To factor out natural disturbances, Parties should:

- exclude any removals on lands affected by a natural disturbance from accounting until they have balanced the quantity of emissions caused by the natural disturbance
- if relevant, ensure consistency with the treatment of natural disturbances in the base year, base period, or baseline scenario, including by excluding removals associated with the previously disturbed land in the base year/period or baseline
- do not exclude emissions associated with salvage logging or emissions from natural disturbances on lands that are subject to land-use change following the disturbance. Further guidance should be developed to assist Parties in doing so

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- all lands subject to the natural disturbance mechanism, including their geo-referenced location, year, and types of disturbances
- how annual emissions resulting from disturbances and the subsequent removals in those areas are estimated
- demonstration that no land-use change has occurred on lands for which the mechanism is applied and an explanation of the methods and criteria for identifying any future land-use changes on those land areas during the target implementation period
- demonstration that the occurrences were beyond the control of, and not materially influenced by, the Party during the target implementation period by demonstrating practicable efforts to prevent, manage, or control the occurrences that led to the application of the mechanism
- demonstration of efforts taken to rehabilitate, where practicable, the land for which the mechanism applied
- demonstration that emissions associated with salvage logging on forestland subject to natural disturbance were not and will not be excluded from accounting

Internationally Transferred Mitigation Outcomes

Under the Paris Agreement, some Parties have indicated that they will use market-based mechanisms to contribute to achieving their NDCs. These mechanisms are known as Internationally Transferred Mitigation Outcomes (ITMOs) under Article 6.2 of the Paris Agreement. Parties can, on a voluntary basis, engage in cooperative approaches that involve the use of ITMOs toward NDCs. If any Party has used or transferred ITMOs, it must account for them when assessing progress toward and achievement of the NDC. Accounting ensures that, among other things, the underlying mitigation outcome cannot be counted toward more than one NDC. Avoidance of double counting is a stated aim of the Paris Agreement cited in Articles 4 and 6 and the decisions framing Article 13.

In order to robustly account for ITMO trading, a system of double-entry bookkeeping is required. When one country acquires or uses an ITMO generated abroad, the generating or transferring jurisdiction must also account for the trade: A “plus” in one jurisdiction requires a “minus” in another jurisdiction. Under the Kyoto Protocol, these adjustments were referred to as “additions” and “subtractions.” In the Paris Agreement, they are referred to as “corresponding adjustments.”

Two main approaches to accounting, with variations on each, are being considered in the context of Article 6:

- **Budget-based accounting:** Adjustments are made as additions and subtractions to an “initial budget” of the target level of emissions under the NDC, in order to arrive at an “adjusted budget,” which is then compared with actual emissions reported in the greenhouse gas inventory. This accounting system was used under the Kyoto Protocol and is used in domestic and regional emissions trading systems.
- **Emissions-based accounting:** Adjustments are made to emissions totals to arrive at an “adjusted emissions” figure, which is then compared with a quantified NDC. The emissions totals are taken from the inventories, but the inventories themselves are not altered. Instead, adjustments are reflected in parallel for comparison purposes.

These methods of applying the corresponding adjustments to emissions or emission budgets are equivalent; transactions that result in additions under one approach result in subtractions under the other. For example, the acquisition of allowances is an addition under budget-based accounting, indicating that the jurisdiction is able to emit more during the relevant period. Under emission-based accounting, it is reflected as a subtraction, indicating that emissions to be compared to the target are less than the actual emissions shown in the greenhouse gas inventory.

Parties are considering two main variations to these methods: (a) an emissions reductions–based approach, whereby the initial budget is determined on the basis of the amount of reductions required by an NDC rather than by emissions allowed under the NDC and (b) a buffer registry approach, in which the accounting rules under Article 6 would determine the net result of transfers and acquisitions and the result would be counted toward an NDC in line with the relevant rules determined under Article 4.13. For the latter, the accounting guidance being elaborated for Article 4.13 is mandatory only from the second NDC; the guidance being elaborated under Article 6 is mandatory from the outset for relevant Parties.

Parties would participate in cooperative approaches on a voluntary basis, either selling or using ITMOs. It is at the discretion of the Party whether all of their domestic emissions mitigation will support achievement of their own NDC targets, some of the reductions will instead be transferred to support the achievement of an NDC elsewhere (and not counted toward their own targets), or some of the reductions needed to achieve the Party’s own NDC will be sourced internationally through the acquisition of mitigation outcomes from abroad. Article 6.3 ensures that the use of ITMOs is authorized by the Parties involved. It ensures that only authorized transfer and acquisition/use can be counted toward an NDC and that a Party is not held accountable for transfers it does not support.

Most of the initial NDCs contain single year targets, raising the question of whether special provisions are needed in the Article 6 accounting rules to ensure that ITMOs are accounted for in a robust manner. In the

absence of such rules, it would be possible for a Party to accumulate ITMOs over the NDC implementation period (e.g., 10 years) and use them toward the single year target. It would also be possible for a transferring Party to transfer ITMOs throughout the NDC implementation period while having to account for them only in the target year. Ultimately, different NDC periods may lead to a situation in which adjustments do not correspond to one another, potentially undermining the integrity of the accounting system.

Several measures are being considered to address this concern. They include a vintage limitation, in which ITMOs counted toward an NDC are restricted to vintages within the target year; a mandatory annualization of transfers/use, in which ITMO transfer/use is averaged over the NDC implementation period and the result is applied to the single year target; and a multiyear trajectory, in which Parties assign a multiyear trajectory to traded sectors for the purposes of accounting without requiring a change to the NDC itself.

The accounting rules for ITMOs, as well as tracking systems, have not yet been determined. Although Parties may be able to determine the approaches they will take to track transactions (e.g., the registry system or transaction log associated with the cooperative approach), international rules will likely determine the appropriate accounting approach(es) to prevent double counting of mitigation outcomes. Several additional decisions are

needed concerning, for example, Parties having different sector coverage, metrics, and target years.

In addition to accounting, it is critical that Parties be transparent about their assumptions. If a Party plans to use ITMOs to achieve its NDC, it should estimate the expected quantity that will be applied toward the target. International rules may determine limits on the use of ITMOs, as well as the types and quality of mitigation outcomes that can be used, including how they ensure environmental integrity and promote sustainable development. If these parameters are not determined by international rules, it will be crucial that Parties ensure transparency on each issue in their reporting on progress if ITMOs are used to meet their NDC.

For more information on accounting for ITMOs, see Prag et al. (2013), Hood et al. (2014), WRI (2014a), and UNDP and WRI (2015).

Specific guidance for accounting for ITMOs is being developed under Article 6. The recommendations below are not comprehensive. The ones listed have particular relevance to the link between accounting guidance under Articles 4 and 6.

RECOMMENDATIONS ON INTERNATIONALLY TRANSFERRED MITIGATION OUTCOMES

Recommendations for accounting guidance

Parties that use ITMOs should:

- adopt a system of accounting, underpinned by double-entry bookkeeping, that ensures that ITMOs are used only toward the achievement of one NDC and are not double counted
- use ITMOs that are real, additional, permanent, transparent, verified, owned unambiguously, and address leakage
- use allowances that come from emissions trading systems with rigorous monitoring and verification protocols, transparent tracking and reporting, and stringent caps
- ensure that any ITMOs are consistent with the Paris Agreement's principles and are generated and used in a manner that is robust in relation to the target year/period

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- the anticipated amount of ITMOs to be used to meet the target, if known
- the maximum, if defined, and anticipated amount of ITMOs to be used from time periods before the target ("banked" units) (flexibility to be determined by the Article 6 guidelines)
- the anticipated issuance of ITMOs that will be valid for use by another Party, if known
- the approach to the corresponding adjustments, if more than one is elaborated under the Article 6.2 guidance
- whether the ITMOs will be used only toward the Party's NDCs and at which stage
- the anticipated net transfers of allowance units between emissions trading systems, if known
- the types of ITMOs eligible to be applied toward the target (flexibility to be determined by the Article 6 guidelines), including whether they are from sectors covered by the NDC/target boundaries
- the accounting method applicable to ensure that all reductions are accounted for in the NDC implementing period and that ITMOs used toward a single year target are robustly counted (approaches to be determined by the Article 6 guidelines)
- the mechanisms in place to prevent double counting of ITMOs (if more than one approach is elaborated under the Article 6 guidelines; provisions to be determined by the Article 6 guidelines)
- the implementation period the ITMOs apply to (flexibility to be determined by Article 6 guidelines)

3.3 Calculating the Target Level of Emissions

Sections 3.3–3.6 refer to sections of the balance sheet (Table 3-2). They walk through each line to show how the target level of emissions and accounted emissions are calculated and then compared to assess NDC progress and achievement.

After the target design and accounting assumptions are clarified, the target level of emissions (or the target level of emissions intensity for base year intensity targets) can be calculated. The target level of emissions is calculated in Row A of the balance sheet. The target level of emissions intensity for base year intensity target is calculated in Row B. (Not all cells in the balance sheet are relevant to all Parties; Parties should fill in only the cells relevant to their NDC.)

The calculations will depend on the reference level (section 3.2) and the percent reduction of the target. Table 3-4 presents equations used to calculate the target level of emissions for a single year target.

Parties with annual and average multiyear targets should use the equations in Table 3-4 to calculate the target level of emissions for each year of the target period. For Parties with cumulative multiyear targets, the target level of emissions is the maximum quantity of cumulative emissions to be emitted over the target period, as specified by the target level.²⁵

For Parties with emissions intensity targets, while tracking achievement of the NDC is based on the performance of emissions intensity over time, understanding the expected level of emissions in the target year can reveal the extent of reductions needed. This calculation requires projections for the unit of output (such as GDP) in the target year.²⁶

Table 3-2 | **Sample Balance Sheet for Accounting for Single Year Greenhouse Gas Targets**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7
	IMPLEMENTATION PERIOD						TARGET YEAR
	2020	2021	2022	...	2028	2029	EXAMPLE: 2030
I. CALCULATE THE TARGET LEVEL OF EMISSIONS							
A	Target level of emissions in the target year (MtCO ₂ e) <i>For base year emissions targets: base year emissions - [base year emissions x percent reduction]</i> <i>For fixed-level targets and trajectory targets: absolute quantity of emissions specified by target level (MtCO₂e)</i> <i>For baseline scenario targets: projected baseline scenario emissions in target year - [projected baseline scenario emissions in target year x percent reduction]</i>	n/a	n/a	n/a	n/a	n/a	n/a
B	Target level of emissions intensity in the target year (MtCO ₂ e/level of output) <i>For base year intensity targets: Base year emissions intensity - [base year emissions intensity x percent reduction]</i>	n/a	n/a	n/a	n/a	n/a	n/a
II. CALCULATE ACCOUNTED EMISSIONS							
Emissions and removals (MtCO₂e)							
C	Total net emissions in the national greenhouse gas inventory ^a						
D	Total emissions in target boundary, if different from the national inventory ^b						
Net land sector emissions/removals (MtCO₂e)^c							
E	Total emissions in target boundary, excluding the land sector						
F	Net land sector emissions/removals in target boundary						
G	Change in net land sector emissions/removals (MtCO ₂ e) (for Parties that calculate the change in land sector emissions and removals separately from other sectors)						
For intensity targets							
H	Level of GDP or other metric						
I	Calculation of emissions intensity = D / H <i>For Parties that calculate the change in land sector emissions and removals separately from other sectors = (E + G) / H</i>						

Table 3-2 | **Sample Balance Sheet for Accounting for Single Year Greenhouse Gas Targets (Ct'd)**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7
	IMPLEMENTATION PERIOD						TARGET YEAR
	2020	2021	2022	2028	2029	EXAMPLE: 2030
Internationally Transferred Mitigation Outcomes (ITMOs) (MtCO₂e)^d							
J	Total ITMOs used						
K	Total ITMOs transferred						
L	Net ITMOs used = J – K						
Accounted emissions							
M	Accounted emissions (MtCO ₂ e) <i>For targets that do not calculate the change in land sector emissions and removals separately and do not use ITMOs = D</i> <i>For targets that do not calculate the change in land sector emissions and removals separately and use ITMOs = D + L^e</i> <i>For targets that calculate the change in land sector emissions and removals separately and do not use ITMOs = E + G</i> <i>For targets that calculate the change in land sector emissions and removals separately and use ITMOs = E + G + L^e</i>	n/a	n/a	n/a	n/a	n/a	n/a
N	Accounted emissions intensity = M / H (for base year intensity targets only)	n/a	n/a	n/a	n/a	n/a	n/a
III. ACCOUNTING BALANCE: Calculate difference between the target level of emissions and accounted emissions to determine whether target was achieved (MtCO₂e)							
O	Difference between the target level of emissions and accounted emissions to determine whether target was achieved = A7 – M7	<i>Positive figure means target was achieved; negative figure means target was not achieved.</i>					
P	Difference between the target level of emissions intensity and accounted emissions intensity to determine whether target was achieved = B7 – N7	<i>Positive figure means target was achieved; negative figure means target was not achieved.</i>					

Notes:

^a This quantity—total net emissions/removals in the national greenhouse gas inventory—represents an aggregated summary. National inventory reports will need to follow reporting requirements agreed upon under the Paris Agreement.

^b Other information related to the NDC (e.g., covered sectors and greenhouse gases, GWP values) could be reported in an accounting balance sheet (not shown here) or in other documents.

^c The reporting requirements related to accounting for land sector emissions and removals have yet to be determined but likely will be detailed and disaggregated, requiring information on gross and net land sector emissions/removals for each selected land-use category, activity, pool, and flux, as relevant, among other information.

^d The reporting requirements for ITMOs have yet to be determined but will likely include information on types and vintages, among other factors.

^e The rules for accounting of ITMOs have yet to be decided. It remains to be seen, for example, what accounting procedures will be put in place for single year targets, how corresponding adjustments will be made, and which vintages will be eligible. This is a simplified illustration.

Source: Adapted from WRI 2014a.

Table 3-4 | **Equations for Calculating the Target Level of Emissions in the Target Year**

TYPE OF TARGET	CALCULATION METHOD
Base year emissions target	Target level of emissions (MtCO ₂ e) = base year emissions (MtCO ₂ e) – [base year emissions (MtCO ₂ e) x percent reduction]
Fixed-level target	Target level of emissions (MtCO ₂ e) = absolute quantity of emissions specified by target level (MtCO ₂ e)
Base year intensity target	Target level of emissions intensity (MtCO ₂ e/level of output) = base year emissions intensity (MtCO ₂ e/level of output) – [base year emissions intensity (MtCO ₂ e/level of output) x percent reduction] Estimated target level of emissions (MtCO ₂ e) = target level of emissions intensity in target year x projected level of output in target year ^a
Baseline scenario target	Target level of emissions (MtCO ₂ e) = projected baseline scenario emissions in target year (MtCO ₂ e) – [projected baseline scenario emissions in target year (MtCO ₂ e) x percent reduction]
Trajectory target	Target level of emissions (MtCO ₂ e) = absolute quantity of emissions specified by target level (MtCO ₂ e) (insofar as emissions levels for various milestones along the emissions trajectory, such as an emissions peak and the level of emissions at the peak, have been defined)

Note: For dynamic baseline scenario targets, emissions will be subject to change from recalculation of the baseline scenario (described in sections 3.2 and 3.4). For base year intensity targets, it remains to be seen whether Parties will need to estimate the target level of emissions or account only for the target level of emissions intensity.

Source: Adapted from WRI 2014a.

RECOMMENDATIONS ON THE TARGET LEVEL OF EMISSIONS

Recommendations for accounting guidance

Parties should:

- calculate the target level of emissions in the target year(s)
- for Parties with base year intensity targets, calculate the target level of emissions intensity in the target year(s)

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- the target level of emissions in the target year (for single year targets), in each year of the target period (for annual or average multiyear targets), or over the target period (for cumulative multiyear targets)
- for Parties with base year intensity targets, the estimated level of output in the target year(s) and the data sources or method used to estimate it
- for Parties with base year intensity targets only, the target level of emissions intensity in the target year or each year of the target period

3.4 Calculating Accounted Emissions

Once target design choices have been clarified, Parties can calculate accounted emissions. This section follows the structure of the sample balance sheet to facilitate the calculation of accounted emissions.

Row C Total net emissions in the national greenhouse gas inventory

The Paris Agreement (Article 13, paragraph 7) states that each Party shall regularly provide a national inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases, prepared using good-practice methodologies accepted by the IPCC and agreed upon by the COP serving as the meeting of the Parties to the Paris Agreement (CMA). The national greenhouse gas inventory is the primary source of information for tracking progress toward mitigation contributions.

On the sample balance sheet, Row C reports only the high-level summary of the inventory. National greenhouse gas inventories need to be reported following agreed upon reporting requirements.

Row D Total emissions in target boundary, if different from the national inventory

If the target boundary covers fewer sectors and/or greenhouse gases than the national inventory, Parties can use Row D to report annual emissions within the covered sectors and/or greenhouse gases in the NDC.

Row E Total emissions in target boundary, excluding the land sector

For Parties that, for accounting purposes, net land sector emissions/removals differ from the national inventory, it will be necessary to track emissions in the target boundary excluding the land sector, as the net land sector emissions/removals will be added to this value.

Row F Net land sector emissions/removals in target boundary

Net land sector emissions/removals are land sector emissions plus removals (removals are expressed as a negative number):

RECOMMENDATIONS ON THE GREENHOUSE GAS INVENTORY

Recommendations for accounting guidance

Parties should:

- Use the IPCC Guidelines for National Greenhouse Gas Inventories to develop a national greenhouse gas inventory that is the basis for NDC accounting. The guidance should specify that Parties with sufficient capacity use the most recent IPCC guidelines.
- Apply GWP values provided by the IPCC based on a 100-year time horizon. The guidance should specify that Parties use the most recent GWP values from the IPCC or at least a common GWP, in line with the principle of comparability.

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should report the following information:

- whether the most recent IPCC Guidelines will be used for the national greenhouse gas inventory that is the basis of NDC accounting and if not an explanation of why the most up-to-date IPCC Guidelines were not used and capacity needs related to their use
- the GWP values used

EQUATION 1: NET LAND SECTOR EMISSIONS/REMOVALS

Net land sector emissions/removals (MtCO₂e) = emissions + removals from selected land-use categories, activities, pools, gases, and fluxes (MtCO₂e)

The reporting requirements related to accounting for land sector emissions and removals have yet to be determined but likely will be detailed and disaggregated, requiring information on gross and net land sector emissions/removals for each selected land-use category, activity, pool, and flux, as relevant, among other information.

Row G

Change in net land sector emissions/removals (MtCO₂e) (for Parties that calculate the change in land sector emissions and removals separately)

For Parties that calculate the change in net land sector emissions/removals separately from other sectors, the change in net land sector emissions/removals will be calculated from selected land-use categories, activities, pools, gases, and fluxes based on the land-use accounting method chosen. This value will be added to the value in Row E, the total emissions in the target boundary excluding the land sector, to assess NDC progress and achievement.

Depending on the accounting method used (see section 3.2), the change in net land sector emissions/removals refers to the following:

- For accounting relative to a base year/period: The difference between net land sector emissions/removals in the reporting year and net land sector emissions/removals in the base year (equation 2)
- For accounting without reference to a base year/period or baseline scenario: The net land sector emissions/removals in the reporting year relative to a reference case of zero²⁷ (equation 3)
- For forward-looking baseline accounting method: The difference between net land sector emissions/removals in the reporting year and net land sector emissions/removals in the baseline scenario in the reporting year (equation 4)

EQUATION 2: ACCOUNTING RELATIVE TO A BASE YEAR/PERIOD

Change in net land sector emissions/removals (MtCO₂e) = net land sector emissions/removals in the reporting year (MtCO₂e) – net land sector emissions/removals in the base year (MtCO₂e)

EQUATION 3: ACCOUNTING WITHOUT REFERENCE TO A BASE YEAR/PERIOD OR BASELINE SCENARIO

Change in net land sector emissions/removals (MtCO₂e) = net land sector emissions/removals in the reporting year (MtCO₂e)

EQUATION 4: FORWARD-LOOKING BASELINE ACCOUNTING METHOD

Change in net land sector emissions/removals (MtCO₂e) = net land sector emissions/removals in the reporting year (MtCO₂e) – net land sector emissions/removals in the baseline scenario in the reporting year (MtCO₂e)

When calculating the change in net land sector emissions/removals using these equations, Parties may choose to minimize any risks associated with the chosen accounting method, as discussed in section 3.2.

For Parties applying a cap on the change in net land sector emissions/removals not using a forward-looking baseline:

- If the cap amount is equal to or greater than the change in net land sector emissions/removals, the change in net land sector emissions/removals should be added to reporting year emissions from all other sectors, not the cap amount
- If the cap amount is less than the change in net land sector emissions/removals, the cap amount should be added to reporting year emissions, not the change in net land sector emissions/removals

Row H

Level of GDP or other metric

Emissions intensity refers to emissions per unit of another variable, which is typically economic output but may also be population, energy use, or a different variable. The balance sheet approach allows for tracking of emissions separately from the unit of output (i.e., level of GDP or other metric), which is necessary for intensity targets.

Row I	Calculation of emissions intensity = D / H For Parties that calculate the change in land sector emissions and removals separately = $(E + G) / H$
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To track emissions intensity, Parties use the emissions level as the numerator and the unit of output or other variable as the denominator. In the simple case, emissions intensity will be the values in Row D/H in the balance sheet. However, if a Party is calculating the change in net land sector emissions/removals separately, emissions intensity will be calculated as follows: $(E + G)/H$.

Row J	Total ITMOs used
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In Row J of the sample balance sheet, the quantity of ITMOs acquired from other Parties and used toward achievement of the NDC can be tracked. Until the guidance for accounting for ITMOs under Article 6 is established, it remains to be seen whether ITMOs used in each year or only ITMOs used in the target year can be applied toward the target.

Row K	Total ITMOs transferred
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In Row K in the sample balance sheet, the quantity of ITMOs transferred to other jurisdictions can be tracked.

Row L	Net ITMOs used = $J - K$
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Net ITMOs used can then be calculated by subtracting ITMOs transferred from ITMOs used. In the simplest case—targets that do not calculate the change in net land sector emissions/removals separately from other sectors and do not use ITMOs—accounted emissions are simply equal to D, total emissions in the target boundary, if different from the national inventory.

Row M	Accounted emissions ($MtCO_2e$) For targets that do not treat land sector as an offset and do not use ITMOs = D For targets that do not calculate the change in land sector emissions and removals separately and use ITMOs = $D + L$ For targets that calculate the change in land sector emissions and removals separately and do not use ITMOs = $E + G$ For targets that calculate the change in land sector emissions and removals separately and use ITMOs = $E + G + L$
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For targets that do not calculate the change in net land sector emissions/removals separately from other sectors but use ITMOs, accounted emissions = $D + L$.

(The reporting requirements for ITMOs have yet to be determined but will likely include information on types and vintages, among other factors. It also remains to be seen which accounting procedures will be put in place for single year target, how corresponding adjustments will be made, and which vintages will be eligible. This illustration is therefore a simplified one.)

For targets that calculate the change in net land sector emissions/removals separately from other sectors and do not use ITMOs, accounted emissions = $E + G$.

In the most complicated accounting case—targets that calculate the change in net land sector emissions/removals separately from other sectors and use ITMOs—accounted emissions = $E + G + L$ (see equation 5).

EQUATION 5: CALCULATING ACCOUNTED EMISSIONS FOR PARTIES THAT CALCULATE THE CHANGE IN NET LAND SECTOR EMISSIONS/REMOVALS SEPARATELY FROM OTHER SECTORS

Accounted emissions ($MtCO_2e$) = change in net land sector emissions/removals ($MtCO_2e$) + target year emissions (excluding the land sector) ($MtCO_2e$) + ITMOs transferred in the target year ($MtCO_2e$) – ITMOs used in the target year ($MtCO_2e$)

Parties with average or cumulative multiyear targets should calculate accounted emissions for each year of the target period and then sum the results, as shown in Appendix A.

Row N	Accounted emissions intensity = M / H (for base year intensity targets only)
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For intensity targets, accounted emissions intensity will be equal to the value in Row M divided by the value in Row H (equation 6).

EQUATION 6: CALCULATING ACCOUNTED EMISSIONS INTENSITY

$$\text{Accounted emissions intensity} = \frac{\text{Accounted emissions (MtCO}_2\text{e)}}{\text{Level of output (or relevant variable) in the target year}}$$

3.5 Accounting for Progress toward Nationally Determined Contributions

ASSESSING PROGRESS AND EFFORT REMAINING

As Parties record their emissions and removals in their target boundary, they can begin to assess how close they are to achieving the target. By assessing progress regularly during the NDC implementation period, countries can determine how much progress has been made and how much additional progress is needed to achieve the NDC. Parties report this information under Article 13, paragraph 7(b) during the implementation period to showcase their progress. The balance sheet can be used to report interim estimates throughout the implementation period. They will not constitute a final assessment of target achievement but will be helpful for assessing progress.

An estimate of progress at each interval should include the following information:

- Assessment of progress made so far: Compare national greenhouse gas emissions from the start date of the NDC implementation period to the current date.
- Assessment of effort still needed to achieve the NDC: Compare current greenhouse gas emissions from the national inventory to the target level of emissions in the target year to understand the scale of emission reductions or limitations needed.

RECALCULATING EMISSIONS AND OTHER VALUES

To maintain the consistency of time series data and enable meaningful comparisons of emissions over the NDC implementation period, countries may need to recalculate emissions and other values if the methodologies, emissions drivers (for Parties with dynamic baseline scenarios), or the target itself change. Doing so is necessary if the guidance is to be aligned with the principle of consistency.

Methodological changes that may require recalculation include changes in inventory calculation methods, emissions projection models, the accuracy of emission factors or activity data, GWP values, a significant change to the base year value of the unit of output (such as GDP) for countries with base year intensity targets, and discovery of significant errors in the original calculations. It remains to be seen whether the accounting guidance will allow for recalculation under all of these circumstances. It

RECOMMENDATIONS ON ACCOUNTING FOR PROGRESS TOWARD NATIONALLY DETERMINED CONTRIBUTIONS

Recommendations for accounting guidance

Parties should:

- use a balance sheet (such as the one in Table 3-2) during implementation
- calculate reporting year emissions by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary
- for Parties with base year intensity targets, calculate reporting year emissions intensity
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, calculate the change in net land sector emissions/removals in the reporting year from selected land-use categories, activities, pools, gases, and fluxes based on the chosen land-use accounting method

Recommendations for reporting under Article 13, paragraph 7(b)

Parties should report the following information:

- information such as that included in Table 3-2 during implementation
- a complete national greenhouse gas inventory for the reporting year, as per Article 13.7(a) and guidelines under development
- reporting year emissions by gas (in tonnes) and in tonnes of CO₂e
- for Parties that include the land sector in the target boundary or treat it as a sectoral target, land sector emissions and removals separately for each land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, and including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, the change in net land-use emissions in the reporting year, separately reported for each land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, and including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties with base year intensity targets, reporting year emissions intensity, the level of output in the reporting year, and the data sources used to determine the level of output

RECOMMENDATIONS ON RECALCULATING EMISSIONS AND OTHER VALUES

Recommendations for accounting guidance

- If significant changes are made to methods used and/or significant errors in original calculations are discovered, recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; and/or (c) reporting year emissions.
- For Parties with dynamic baseline scenario targets, recalculate baseline scenario emissions by replacing forecasted values with observed values for all significant emissions drivers.
- If base year or baseline scenario emissions are recalculated, recalculate the target level of emissions to ensure consistency.
- The following could constitute a change in the NDC (but is yet to be determined), requiring recalculation:
 - If significant revisions are made to the target boundary (e.g., changes in sectors, gases, or geographic area), explain how the change to the NDC increases ambition and recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; and (c) reporting year emissions.
 - If the target type or target level is changed or the target is changed from a single year target to a multiyear target, explain how the change to the NDC increases ambition and recalculate the target level of emissions or emissions intensity and reporting year emissions.
- If land sector accounting is revised, undertake all relevant land sector accounting and reporting steps again if Parties (a) change the land sector accounting approach during the target implementation period or (b) add a land category, subcategory, or activity to accounting or change the treatment of an existing land category, subcategory, or activity.
- If land sector accounting is revised, revise the target level to compensate for nonadditional emissions or emission reductions.

Recommendations for reporting under Article 13, paragraph 7(b)

Parties should report the following information:

- any emissions recalculations, including recalculations of base year emissions, base year emissions intensity, baseline scenario emissions, and the target level of emissions or emissions intensity, as well as the recalculated values alongside the original values
- for Parties with dynamic baseline scenarios:
 - any recalculations made during the target implementation period, the significance threshold used, and recalculated emissions alongside the original values
 - any recalculations of the target level of emissions and the recalculated target level of emissions alongside the original values
- the following could constitute a change in the NDC (but is yet to be determined) that would require recalculations and changes that would warrant reporting:
 - any revisions to the target boundary and any changes to the target type, target level, or a change from a single year to a multiyear target, and any recalculations made, including recalculated and original values
 - any changes resulting from recalculations for Parties that:
 - add a land category, subcategory, or activity to accounting, or change the treatment of an existing land category, subcategory, or activity
 - revise the target level to compensate for nonadditional emissions or emission reductions
- for Parties that change the land sector accounting approach during the target period, the reasons for changing approaches and the quantitative and qualitative effects on land sector accounting and overall target accounting, including:
 - any changes to included land sector categories, activities, carbon pools, gases, or greenhouse gas fluxes that significantly affect net land sector emissions/removals
 - any changes to the treatment of the land sector or the target level (to compensate for nonadditional emissions or removals)

will be important to report any recalculations of base year emissions, base year emissions intensity, baseline scenario emissions, and the target level of emissions or emissions intensity, presenting the recalculated values alongside the original values.

Dynamic (rather than static) baseline scenario targets involve additional recalculations during and at the end of NDC implementation. The accounting guidance under the Paris Agreement has yet to be determined; it will be important for Parties to define how to operationalize the principle of methodological consistency, including for baselines. Recalculations could be limited to the replacement of forecasted values with observed values for all significant exogenous emissions drivers (i.e., drivers that are unaffected by mitigation policies or actions implemented to meet the target, such as GDP, population, international energy prices, weather, and structural changes in economic sectors). Other changes, such as changes to the model itself, would not be allowed during the NDC implementation period.

If baseline scenario emissions are recalculated, countries should also recalculate the target level of emissions, to ensure consistency. For transparency, it is important to report any recalculations of dynamic baseline scenario emissions made during the NDC implementation period, including which drivers were updated, updated values for each driver alongside the original values and recalculated baseline scenario and target level emissions alongside the original values.

3.6 Accounting for Achievement of Nationally Determined Contributions

Row O

Difference between the target level of emissions and accounted emissions to determine whether target was achieved = $A7 - M7$

Parties need to calculate the difference between the target level of emissions and accounted emissions to determine whether the target was achieved. They should report this information after the end of the target period. A positive figure means the target was overachieved. A negative figure means the target was not achieved.

Row P

Difference between the target level of emissions intensity and accounted emissions intensity to determine whether target was achieved = $B7 - N7$

Parties with base year intensity targets need to calculate the difference between the target level of emissions intensity and accounted emissions intensity to determine whether the target was achieved. A positive figure means the target was achieved. A negative figure means the target was not achieved.

RECOMMENDATIONS ON ACCOUNTING FOR ACHIEVEMENT OF NATIONALLY DETERMINED CONTRIBUTIONS

Recommendations for accounting guidance

Parties should:

- use a balance sheet (such as the one in Table 3-2) at the end of the target implementation period
- calculate target year/period emissions by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary
- do not double count, double sell, or double claim ITMOs
- correct relevant registries, accounts, and reported emissions in the event that double counting is observed
- calculate accounted emissions
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, calculate the change in net land sector emissions/removals from selected land-use categories, activities, pools, gases, and fluxes based on the land-use accounting method chosen
- for Parties that have chosen to cap the quantity of land sector emissions and removals that can be applied toward the target, apply the cap when calculating accounted emissions
- for Parties with base year intensity targets, calculate accounted emissions intensity
- if significant changes are made to methods used and/or significant errors in original calculations are discovered, recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; (c) reporting year emissions; and (d) target year(s) emissions
- for Parties with dynamic baseline scenario targets, recalculate baseline scenario emissions by replacing forecasted values with observed values for all emissions drivers
- if base year or baseline scenario emissions are recalculated, recalculate the target level of emissions to ensure consistency
- compare accounted emissions with the target level of emissions in the target year(s) to assess achievement at the end of the implementation period
- for Parties with base year intensity targets, compare accounted emissions intensity with the target level of emissions intensity in the target year(s)

Recommendations for reporting under Article 13, paragraph 7(b)

Parties should report the following information:

- information such as that included in Table 3-2 at the end of the target implementation period
- target achievement at the end of the target year (for single year targets), at the end of each year of the target period (for annual and average multiyear targets), or at the end of the entire target period (for cumulative multiyear targets)
- complete greenhouse gas inventory for the target year (for single year targets), the relevant year of the target period (for annual multiyear

and average multiyear targets), or over the target period (for cumulative multiyear targets)

- target year emissions (for single year targets), the relevant year of the target period (for annual and average multiyear targets), or over the target period (for cumulative multiyear targets) separately by gas (in tonnes) and in tonnes of CO₂e
- accounted emissions in the target year (for single year targets), the relevant year of the target period (for annual and average multiyear targets), or over the target period (for cumulative multiyear targets) separately by gas (in tonnes) and in tonnes of CO₂e
- for Parties that use ITMOs (in line with Article 6 guidelines):
 - the type, vintage, country of origin, and quantity (in tonnes of CO₂e) of ITMOs used and transferred in the target year, relevant year of the target period, or over the target period
 - whether the ITMO is generated from a sector/greenhouse gas covered by a national mitigation target
 - additional information on program standards of a crediting mechanism or design of an emissions trading scheme used toward the NDC, the permanence of the ITMO, the contribution to promotion of sustainable development, and how “higher ambition” under Article 6.1 is achieved (generated within or outside the scope of the NDC) (La Hoz Theuer et al. 2017)
- for Parties that include the land sector in the target boundary or treat it as a sectoral target, emissions and removals separately for each selected land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, the change in net land-use emissions in the target year(s), separately reported for each selected land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties with base year intensity targets, accounted emissions intensity, the level of output in the target year/period, and the data sources used to determine the level of output
- any emissions recalculations, including recalculations of base year emissions, base year emissions intensity, baseline scenario emissions, and the target level of emissions or emissions intensity, as well as the recalculated values alongside the original values
- any dynamic baseline scenario recalculations made during the target implementation period and recalculated emissions, alongside the original values
- any recalculations of the target level of emissions and the recalculated target level of emissions, alongside the original values
- the difference between accounted emissions (or emissions intensity) and the target level of emissions (or emissions intensity)
- whether the target was achieved

4. ACCOUNTING FOR SECTORAL (NON-GREENHOUSE GAS) TARGETS AND POLICIES/ACTIONS

Of the 194 INDCs or NDCs that have been submitted (separately counting the individual EU member states and the EU itself), 36 (19 percent) have mitigation contributions in the form of sectoral (non-greenhouse gas) targets and/or individual actions, without a broader greenhouse gas emissions target (WRI 2018). Examples of non-greenhouse gas targets include energy efficiency targets, renewable energy targets, and forest cover targets. Individual actions include renewable energy laws and forestry policies. Nepal's mitigation contribution, for example, is in the form of sectoral targets and actions rather than a greenhouse gas emissions target (Box 4-1).

Box 4-1 | Selected Non-Greenhouse Gas Targets from Nepal's Nationally Determined Contribution

- By 2050, Nepal will achieve 80 percent electrification through renewable energy sources having an appropriate energy mix. Nepal will also reduce its dependency on fossil fuels by 50 percent.
- By 2020, Nepal intends to expand its energy mix focusing on renewables by 20 percent and diversifying its energy consumption pattern to more industrial and commercial sectors.
- By 2020, Nepal aims to increase the share of electric vehicles up to 20 percent above its 2010 level.
- By 2050, Nepal will decrease its dependency on fossil fuels in the transport sector by 50 percent through effective mass public transport while promoting energy efficient and electrical vehicles.
- Nepal will maintain 40 percent of the total area of the country under forest cover, and forest productivity and products will be increased through sustainable management of forests; emphasis will equally be given to enhance carbon sequestration and forest carbon storage and improve forest governance.

Source: Government of Nepal 2016.

It remains to be seen whether the guidance for accounting for Parties' NDCs under Article 4, paragraph 13 of the Paris Agreement will apply to non-greenhouse gas targets and policies and actions or only to greenhouse gas targets. Quantitative approaches to monitoring non-greenhouse gas targets and individual policies and actions could fall within the scope of accounting for NDCs.

As described in chapter 2, Parties should clarify which mitigation contribution(s) in their NDC are intended to be accounted for (i.e., the "headline" mitigation contributions) and which targets or actions in the NDC are provided for informational purposes only. Many Parties with mitigation contributions in the form of greenhouse gas targets have also provided information on sectoral targets and/or policies and actions in their NDCs to demonstrate how they intend to reduce emissions and achieve their greenhouse gas target. For Parties with greenhouse gas targets, monitoring progress of sectoral indicators (such as the share of renewable energy in the electric mix or the percentage of land covered by forests) and tracking implementation and impacts of key policies and actions is a useful means of assessing progress, but it may not necessarily form the basis for accounting for NDCs. Instead, accounting may be based on national emissions following the approaches presented in chapter 3.

Parties with headline mitigation contributions consisting of both greenhouse gas emissions targets and non-greenhouse gas targets (such as Bhutan, Chile, China, and India) should account for the targets separately. For example, a Party with a greenhouse gas reduction target for all sectors excluding land use, land-use change, and forestry (LULUCF) and a separate non-greenhouse gas target to increase forest cover should account for each target separately. In the case of Nepal's non-greenhouse gas targets in Box 4-1, each target would be accounted for separately.

For Parties with mitigation contributions in the form of sectoral targets and/or policies and actions, tracking national emissions through the national greenhouse gas inventory can help identify which targets and actions to prioritize and help understand the impacts of targets and actions on national emissions.

4.1 Accounting for Sectoral (Non-Greenhouse Gas) Targets

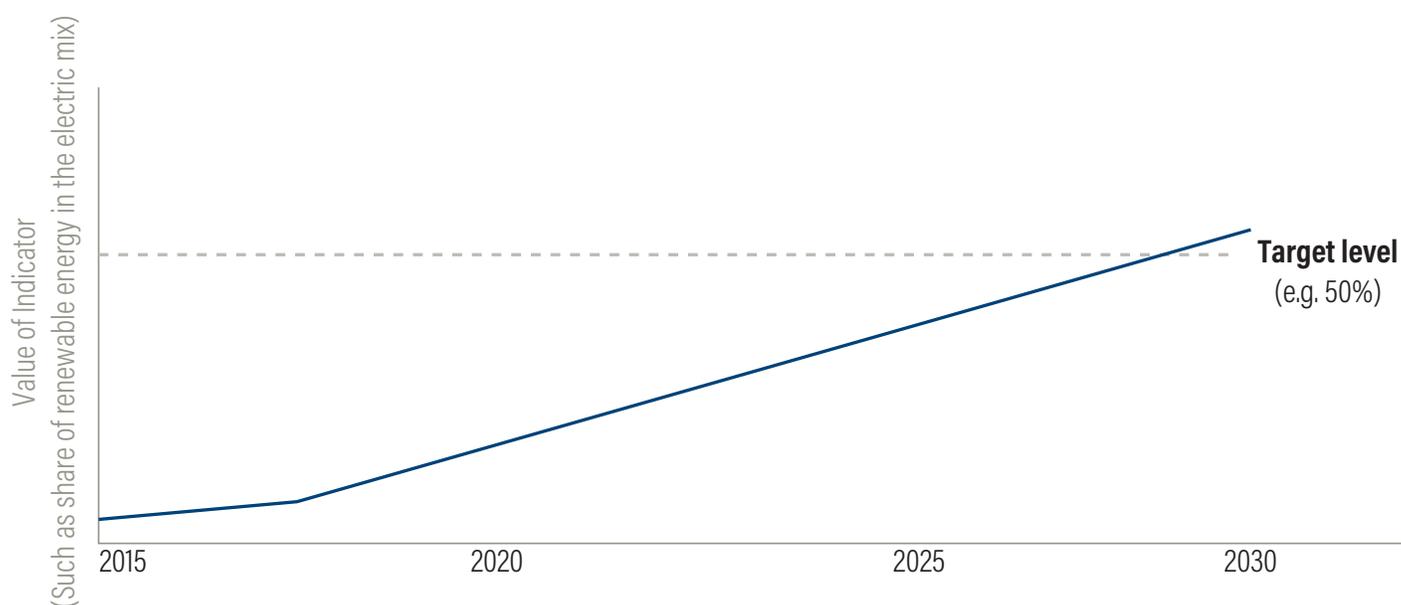
For Parties with mitigation contributions in the form of sectoral (non-greenhouse gas) targets, accounting for NDCs involves monitoring relevant indicators to demonstrate progress in achieving desired outcomes. Indicators may include the share of renewable energy in the electricity mix, national fossil fuel consumption, the share of electric vehicles in the total vehicle stock, and the percentage of land covered by forests. Table 4-1 provides additional examples of non-greenhouse gas targets and indicators.

Indicators should be tracked relative to historical values of the indicator and relative to the target-level value of that indicator in the NDC (as illustrated in Figure 4-1). Doing so requires national statistics on the relevant indicators, such as national energy, transportation, and forest statistics. Table 4-2 provides an example of a template for monitoring indicator values over time.

Table 4-1 | **Examples of Sectoral (Non-Greenhouse Gas) Targets and Indicators**

TYPE OF TARGET	EXAMPLE OF TARGET	EXAMPLES OF INDICATORS
Renewable energy	Increase the share of renewable energy in the energy mix to 50 percent by 2025	<ul style="list-style-type: none"> ■ Percentage of electricity generated by source ■ Total generation by source ■ Installed capacity by source
Energy efficiency	Increase energy efficiency by 50 percent by 2030	<ul style="list-style-type: none"> ■ Total energy demand or consumption ■ Energy intensity of the economy
Forest cover	Increase forest cover to 70 percent of land area by 2025	<ul style="list-style-type: none"> ■ Percentage of land covered by forest ■ Hectares of land covered by forest ■ Hectares of land restored or reforested ■ Volume of forest stock ■ Tonnes of CO₂ sequestered per year

Figure 4-1 | **Monitoring Progress of Sectoral (Non-Greenhouse Gas) Targets**



Note: This figure is illustrative. A sectoral target could also be intended to decrease the value of an indicator (such as the share of fossil fuels in the energy mix), not only to increase it.

Table 4-2| **Sample Template for Monitoring Indicators of Sectoral (Non-Greenhouse Gas) Targets**

TARGET	INDICATOR	SOURCE OF DATA	COMMENTS OR REFERENCES	MONITORING FREQUENCY	HISTORICAL VALUE IN 2015	ANNUAL MONITORED VALUES	MONITORED VALUE IN 2025
1: Increase the share of renewable energy in the energy mix to 50 percent by 2025	Share of renewable energy in the national energy mix	National energy statistics provided by the Ministry of Energy	See online report for more information on indicator definition and methodology	Annually	30 percent	34 percent (2016)	52 percent
2:							
3:							
4:							

Sustainable development indicators related to each target can be tracked to monitor progress toward achieving the Sustainable Development Goals (SDGs) as well as the NDCs. For guidance and examples of SDG indicators that can be used, see the UN Sustainable Development

Goals website (<https://sustainabledevelopment.un.org/sdgs>), the UN SDG indicators website,²⁸ and *Indicators of Sustainable Development: Guidelines and Methodologies* (UN 2007).

RECOMMENDATIONS ON SECTORAL (NON-GREENHOUSE GAS) TARGETS

Recommendations for accounting guidance

Parties should:

- monitor relevant sectoral indicators using consistent methods at regular intervals (e.g., annually)
- if headline mitigation contributions consist of both greenhouse gas emissions targets and non-greenhouse gas targets or multiple non-greenhouse gas targets, account for each target separately

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should:

- clarify whether the non-greenhouse gas targets included in the NDC will be accounted for (as opposed to being provided for informational purposes)

Recommendations for reporting under Article 13, paragraph 7(b)

Parties should report the following information:

- the performance of relevant sectoral indicators, in relation to both historical values and the target values included in the NDC

of the following elements, on a spectrum from simpler to more complex:

- implementation of actions
- indicators related to the impacts of actions
- estimated greenhouse gas impact of policies and actions, as well as other sustainable development impacts or cobenefits achieved, relative to a baseline scenario

Some Parties have committed to implementing specific actions while acknowledging that the resulting impacts may deviate from the estimated greenhouse gas reduction impacts provided in the NDC. In this case, accounting would refer to ensuring that implementation occurs as planned, while not necessarily accounting for the outcomes achieved. Where possible, Parties should track the outcomes of actions, including sectoral indicators and greenhouse gas reductions, to ensure that the actions are having the desired impacts.

Tracking implementation is important to ensure that actions are being implemented as planned. Progress of actions can be tracked along a policy implementation process from planned actions to adopted actions to implemented actions (Table 4-3).

To track implementation, it can be useful to identify milestones for policy implementation and track the progress of indicators related to implementation activities, such as financing of actions; licensing, permitting, and procurement; information monitoring; compliance and enforcement; or other policy administration activities necessary to ensure the effective implementation of actions. In addition to qualitative benchmarks, quantitative measures of success for relevant milestones (such as the proportion of compliance achieved) should be tracked, where feasible. (For more information, see WRI's Climate Policy Implementation Tracking Framework [Barua et al. 2014].)

In addition to tracking policy implementation, it can be useful to track indicators related to the impacts of policies and actions, in order to ensure that actions are delivering the intended results. A simple approach is to track performance indicators related to desired outcomes, such as those listed in Table 4-4.

4.2 Accounting for Policies and Actions

Some Parties include mitigation contributions in their NDCs that are lists of actions (such as policies, projects, or strategies) that the country plans to implement to achieve greenhouse gas reductions and other sustainable development objectives. They are sometimes combined with sectoral (non-greenhouse gas) targets related to each action and/or estimated greenhouse gas reduction impacts expected from each action.

Parties accounting for their NDCs by tracking policies and actions (rather than national greenhouse gas emissions or non-greenhouse gas indicators) can track one or more

Table 4-3 | **Definitions of Implemented, Adopted, and Planned Policies and Actions**

STATUS OF POLICY OR ACTION	DEFINITION
Planned	Policy or action options that are under discussion and have a realistic chance of being adopted and implemented in the future but that have not yet been adopted
Adopted	Policies and actions for which an official government decision has been made and there is a clear commitment to proceed with implementation but that have not yet begun to be implemented (e.g., a law has been passed but regulations to implement the law have not yet been established or are not being enforced)
Implemented	Policies and actions that are currently in effect, as evidenced by one or more of the following: relevant legislation or regulation is in force, one or more voluntary agreements have been established and are in force, financial resources have been allocated, or human resources have been mobilized.

Source: WRI 2014b, based on UNFCCC 2000.

Table 4-4 | **Examples of Indicators Related to Impacts of Actions**

EXAMPLE OF POLICY OR ACTION	EXAMPLES OF RELEVANT INDICATORS
Renewable energy policy	Total electricity generation by source (wind, solar, coal, natural gas)
Public transit policies	Passenger-kilometers traveled by transportation mode (subway, bus, train, private car, taxi, bicycle)
Waste management regulation	Tonnes or percentage of waste sent to landfills, recycling facilities, and incineration facilities
Afforestation/ reforestation policies	Area of forest replanted, by type

In addition to tracking policy implementation and impact indicators, the most robust approach is to additionally estimate the greenhouse gas and sustainable development impacts of key policies and actions in the NDC relative to a baseline scenario, ex-ante (forward looking) and/or ex-post (backward looking). Doing so provides an estimate of whether a policy or action is having the desired effects in terms of quantified emission reductions and other sustainable development benefits. Tracking indicators alone does not attribute changes in indicators to specific policies or actions. Box 4-2 describes how to estimate the impact of policies and actions.

Box 4-2 | **Estimating the Impact of Policies and Actions**

Estimating policy impacts involves the following steps (WRI 2014b):

- Clearly define the action to be assessed.
- Map the causal chain of the action to identify all potential greenhouse gas effects, including intended and unintended effects, and define the greenhouse gas assessment boundary around significant effects.
- Define the baseline scenario (the events or conditions most likely to occur in the absence of the action being assessed) and estimate baseline emissions for all affected source/sink categories included in the assessment boundary.
- Define the policy scenario (the events or conditions most likely to occur in the presence of the action being assessed) and estimate policy scenario emissions for the same set of source/sink categories.
- Subtract baseline emissions from policy scenario emissions to estimate the net greenhouse gas effect of the action.

The Greenhouse Gas Protocol *Policy and Action Standard* (WRI 2014b) provides guidance on how to estimate the greenhouse gas effects of policies and actions. It addresses additional topics, such as evaluating positive and negative interactions with other policies.

The same general approach can also be used to estimate the impacts of a policy or action on any relevant category of sustainable development impact (social, economic, environmental), such as those included in the SDGs. Examples may include air quality improvement, public health improvement, poverty reduction, job creation, increased household income, cost savings, and protection of ecosystem services, among others. For guidance on assessing sustainable development impacts of policies and actions, see the *Sustainable Development Guidance* developed under the Initiative for Climate Action Transparency (WRI and UNEP DTU Partnership 2018).

RECOMMENDATIONS ON POLICIES AND ACTIONS

Recommendations for accounting guidance

Parties should:

- monitor relevant indicators at regular intervals (e.g., annually), including indicators related to policy implementation, sectoral outcomes, and greenhouse gas emissions, as relevant

Recommendations for communicating accounting-related information in information provided to facilitate clarity, transparency, and understanding of NDCs

Parties should:

- clarify whether the policies and actions included in the NDC will be accounted for (as opposed to being provided for informational purposes)

Recommendations for reporting under Article 13, paragraph 7(b)

Parties should report the following information:

- if tracking implementation only, the implementation status of policies and actions included in the NDC
- if tracking indicators related to impacts, the performance of relevant sectoral indicators in relation to both historical values and the target values included in the NDC
- if quantifying impacts of actions, ex-post estimates of the impact of policies/actions on selected sectoral indicators, greenhouse gas emissions, and sustainable development indicators, as relevant, relative to a baseline scenario and compared with the desired impacts included in the NDC.

5. CONCLUSION

Robust accounting guidance is central to the integrity of the Paris Agreement and the NDCs Parties have put forward. Accounting is necessary to help determine “what counts” and lay out a clear framework for assessing progress and achievement. Without clear and strong accounting guidance, it will not be possible for Parties to uphold the principles of the Paris Agreement. Parties will require capacity building to transition toward more robust accounting systems.

Accounting need not be complex, especially for Parties with simpler NDCs and Parties that do not use ITMOs or treat the land sector differently from other sectors. For Parties that use ITMOs and apply unique accounting for the land sector that differs from inventory approaches, accounting will be more challenging.

Many decisions regarding the accounting guidance have yet to be made. Given the amount of detail that still needs to be resolved, it is critical that the accounting negotiations advance. This paper, with its recommendations for accounting, the reporting of accounting-related information, and the use of a balance sheet, can serve as a resource to Parties as they develop the NDC accounting guidance under the Paris Agreement.

APPENDIX A: SAMPLE BALANCE SHEET FOR MULTIYEAR TARGETS

Table A-1 | **Sample Balance Sheet for Accounting for a Nationally Determined Contribution with a Multiyear Target**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7	8	
	TARGET PERIOD							CUMULATIVE ^c	
	2020	2021	2022	...	2028	2029	2030	= (1) + (2) + (3) ... + (5) + (6) + (7)	
I. CALCULATE THE TARGET LEVEL OF EMISSIONS									
A	<p>Target level of emissions in the target year (MtCO₂e)</p> <p>Parties with annual or average multiyear targets should use the following equations to calculate the target level of emissions for each year of the target period. For Parties with cumulative multiyear targets, the target level of emissions is the maximum quantity of cumulative emissions to be emitted over the target period, as specified by the target.</p> <p><i>For base year emissions targets: base year emissions – [base year emissions x percent reduction]</i></p> <p><i>For fixed-level targets and trajectory targets: absolute quantity of emissions specified by target level (MtCO₂e)</i></p> <p><i>For baseline scenario targets: projected baseline scenario emissions in target year – [projected baseline scenario emissions in target year x percent reduction]</i></p>								
B	<p>Target level of emissions intensity in the target year (MtCO₂e/level of output)</p> <p>Parties with annual or average multiyear base year intensity targets should calculate the target level of emissions intensity for each year of the target period.</p> <p><i>For base year intensity targets: Base year emissions intensity – [base year emissions intensity x percent reduction]</i></p>								
II. CALCULATE ACCOUNTED EMISSIONS									
Emissions and removals (MtCO₂e)									
C	Total net emissions in the national greenhouse gas inventory ^a								
D	Total emissions in target boundary, if different from the national inventory ^b								

Table A-1 | **Sample Balance Sheet for Accounting for a Nationally Determined Contribution with a Multiyear Target (Ct'd)**

ACCOUNTING LINE ITEMS		1	2	3	4	5	6	7	8
		TARGET PERIOD							CUMULATIVE ^c
		2020	2021	2022	...	2028	2029	2030	= (1) + (2) + (3) ... + (5) + (6) + (7)
Net land sector emissions/removals (MtCO₂e)^d									
E	Total emissions in target boundary, excluding the land sector								
F	Net land sector emissions/removals in target boundary								
G	Change in net land sector emissions/removals (MtCO ₂ e) (for Parties that calculate the change in land sector emissions and removals separately from other sectors)								
For intensity targets									
H	Level of GDP or other metric								
I	Calculation of emissions intensity = D / H <i>For Parties that calculate the change in land sector emissions and removals separately from other sectors = (E + G) / H</i>								
Internationally Transferred Mitigation Outcomes (ITMOs) (MtCO₂e)^e									
J	Total ITMOs used								
K	Total ITMOs transferred								
L	Net ITMOs used = J - K								
Accounted emissions									
M	Accounted emissions (MtCO ₂ e) Parties with average or cumulative multiyear targets should calculate accounted emissions for each year of the target period and then sum the results. <i>For targets that do not calculate the change in land sector emissions and removals separately and do not use ITMOs = D</i> <i>For targets that do not calculate the change in land sector emissions and removals separately and use ITMOs = D + L^e</i> <i>For targets that calculate the change in land sector emissions and removals separately and do not use ITMOs = E + G</i> <i>For targets that calculate the change in land sector emissions and removals separately and use ITMOs = E + G + L^e</i>								

Table A-1 | **Sample Balance Sheet for Accounting for a Nationally Determined Contribution with a Multiyear Target (Ct'd)**

ACCOUNTING LINE ITEMS	1	2	3	4	5	6	7	8
	IMPLEMENTATION PERIOD							CUMULATIVE
	2020	2021	2022	...	2028	2029	2030	= (1) + (2) + (3) ... + (5) + (6) + (7)

N Accounted emissions intensity =
M / H (for base year intensity targets only)

III. ACCOUNTING BALANCE: Calculate difference between the target level of emissions and accounted emissions to determine whether target was achieved (MtCO₂e)

O	<p>Difference between the target level of emissions and accounted emissions to determine whether target was achieved = A - M</p> <p>For annual multiyear targets, this calculation is made separately for each year in the target period. For cumulative multiyear targets, this calculation is made cumulatively over the target period. For average multiyear targets, the cumulative results are averaged over the number of years in the target period.</p>	<p><i>Positive figure means target was achieved; negative figure means target was not achieved.</i></p>
P	<p>Difference between the target level of emissions intensity and accounted emissions intensity to determine whether target was achieved = B - N</p> <p>For annual multiyear targets, this calculation is made separately for each year in the target period. For average multiyear targets, the results are averaged over the number of years in the target period.</p>	<p><i>Positive figure means target was achieved; negative figure means target was not achieved.</i></p>

Notes:

^a This quantity—total net emissions/removals in the national greenhouse gas inventory—represents an aggregated summary. National inventory reports will need to follow reporting requirements agreed upon under the Paris Agreement.

^b Other information related to the NDC (e.g., covered sectors and greenhouse gases, GWP values) could be reported in an accounting balance sheet (not shown here) or in other documents.

^c The reporting requirements related to accounting for land sector emissions and removals have yet to be determined but likely will be detailed and disaggregated, requiring information on gross and net land sector emissions/removals for each selected land-use category, activity, pool, and flux, as relevant, among other information.

^d The reporting requirements for ITMOs have yet to be determined but will likely include information on types and vintages, among other factors.

^e The rules for accounting of ITMOs have yet to be decided. It remains to be seen, for example, what accounting procedures will be put in place for single year targets, how corresponding adjustments will be made, and which vintages will be eligible. This is a simplified illustration.

Source: Adapted from WRI 2014a.

APPENDIX B: SUMMARY OF RECOMMENDATIONS ON ACCOUNTING GUIDANCE

B.1 Recommendations on Greenhouse Gas Targets

Reference Level

For base year or base year intensity targets

- For Parties that have base year or base year emissions intensity targets, calculate base year emissions or base year emissions intensity by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary.
- For Parties that calculate net land sector emissions/removals separately from other sectors (see p. 26) and account relative to base year/period emissions, calculate net base year/period emissions in the land sector separately from other sectors, as well as base year/period emissions excluding the land sector.

For baseline scenario targets

- Develop a baseline scenario that covers the same sectors and gases as in the target boundary.
- For Parties that calculate the change in net land sector emissions/removals separately from other sectors and choose the forward-looking baseline accounting method (see p. 28), calculate baseline scenario emissions for the land sector separately from other sectors.
- For Parties with dynamic baseline scenario targets, develop a policy for recalculating the baseline scenario at the start of the target implementation period, including a threshold for determining whether changes in emissions drivers are significant enough to trigger a recalculation of the dynamic baseline scenario (see p. 40 on recalculations for other types of updates, such as improvements or corrections to the national inventory).
- To reflect the most likely future emissions pathway under a baseline scenario, include the impacts of all policies and actions in the baseline scenario that (a) have a significant effect on greenhouse gas emissions (either increasing or decreasing them) and (b) are implemented or adopted (and planned if chosen) up to the time the baseline scenario is developed.

Land Sector

- Account for emissions and removals arising from land use and land-use change within all covered land-use categories or activities.
- Separately account for emissions, removals, and net emissions/removals.
- In line with the principles of Decision 1/CP.21, strive for comprehensive coverage of all anthropogenic emissions and removals within each selected land-use category or suite of activities and to include all land-use categories or suites of activities in accounting.
- Account for changes in all significant land-based carbon pools, gases, greenhouse gas fluxes, and subcategories/activities within selected land-use categories or suites of activities.
- Account for harvested wood products using one of the relevant IPCC methodologies and/or good-practice guidance, taking account of any relevant UNFCCC or other decisions. The accounting guidance should

specify a single accounting approach to harvested wood products, or relevant trading Parties should adopt agreements to use a common approach.

- For Parties that include the land sector in the target boundary, use an accounting method for calculating net land sector emissions/removals that is consistent with accounting for the target, depending on the chosen target type for all land categories or activities:
 - **Base year emissions target:** Account relative to base year/period emissions (also known as net-net accounting)
 - **Fixed-level target:** Account in the target year/period, without reference to base year/period or baseline scenario emissions (also known as gross-net accounting)
 - **Base year intensity target:** Account for emissions intensity relative to a base year/period (also known as net-net accounting)
 - **Baseline scenario target:** Use forward-looking baseline accounting method.
- Parties should also be encouraged to minimize the risks associated with choosing an accounting method for calculating net land sector emissions/removals that leads to targets that are too lenient or do not incentivize mitigation.
- To factor out natural disturbances, Parties should do the following:
 - Exclude any removals on lands affected by a natural disturbance from accounting until they have balanced the quantity of emissions caused by the natural disturbance.
 - If relevant, ensure consistency with the treatment of natural disturbances in the base year, base period, or baseline scenario, including by excluding removals associated with the previously disturbed land in the base year/period or baseline.
 - Do not exclude emissions associated with salvage logging or emissions from natural disturbances on lands that are subject to land-use change following the disturbance. Further guidance should be developed to assist Parties in doing so.

Internationally Transferred Mitigation Outcomes

Parties that use ITMOs should do the following:

- Adopt a system of accounting, underpinned by double-entry bookkeeping, that ensures that ITMOs are used only toward the achievement of one NDC and are not double counted.
- Use ITMOs that are real, additional, permanent, transparent, verified, owned unambiguously, and address leakage.
- Use allowances that come from emissions trading systems with rigorous monitoring and verification protocols, transparent tracking and reporting, and stringent caps.
- Ensure that ITMOs are consistent with the Paris Agreement's principles and are generated and used in a manner that is robust in relation to the target year/period.

Target Level of Emissions

- Calculate the target level of emissions in the target year(s).
- For Parties with base year intensity targets, calculate the target level of emissions intensity in the target year(s).

Greenhouse Gas Inventory

- Use the IPCC Guidelines for National Greenhouse Gas Inventories to develop a national greenhouse gas inventory that is the basis for NDC accounting. The guidance should specify that Parties with sufficient capacity use the most recent IPCC guidelines.
- Apply GWP values provided by the IPCC based on a 100-year time horizon. The guidance should specify that Parties use the most recent GWP values from the IPCC or at least a common GWP, in line with the principle of comparability.

Tracking of Progress toward Nationally Determined Contributions

- Use a balance sheet (such as the one in Table 3-2) during implementation.
- Calculate reporting year emissions by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary.
- For Parties with base year intensity targets, calculate reporting year emissions intensity.
- For Parties that calculate the change in net land sector emissions/removals separately from other sectors, calculate the change in net land sector emissions/removals in the reporting year from selected land-use categories, activities, pools, gases, and fluxes based on the chosen land-use accounting method.

Recalculation of Emissions and Other Values

- If significant changes are made to methods used and/or significant errors in original calculations are discovered, recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; and/or (c) reporting year emissions.
- For Parties with dynamic baseline scenario targets, recalculate baseline scenario emissions by replacing forecasted values with observed values for all significant emissions drivers.
- If base year or baseline scenario emissions are recalculated, recalculate the target level of emissions to ensure consistency.
- The following could constitute a change in the NDC (but is yet to be determined), requiring recalculation:
 - If significant revisions are made to the target boundary (e.g., changes in sectors, gases, or geographic area), explain how the change to the NDC increases ambition and recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; and (c) reporting year emissions.
 - If the target type or target level is changed or the target is changed from a single year target to a multiyear target, explain how the change to the NDC increases ambition and recalculate the target level of emissions or emissions intensity and reporting year emissions.
- If land sector accounting is revised, undertake all relevant land sector accounting and reporting steps again if Parties (a) change the land sector accounting approach during the target implementation period or (b) add a land category, subcategory, or activity to accounting or change the treatment of an existing land category, subcategory, or activity.
- If land sector accounting is revised, revise the target level to compensate for nonadditional emissions or emission reductions.

Tracking of Achievement of Nationally Determined Contributions

- Use a balance sheet (such as the one in Table 3-2) at the end of the target implementation period.
- Calculate target year/period emissions by aggregating emissions from the greenhouse gas inventory for all gases and sectors included in the target boundary.
- Do not double count, double sell, or double claim ITMOs.
- Correct relevant registries, accounts, and reported emissions in the event that double counting is observed.
- Calculate accounted emissions.
- For Parties that calculate the change in net land sector emissions/removals separately from other sectors, calculate the change in net land sector emissions/removals from selected land-use categories, activities, pools, gases, and fluxes based on the land-use accounting method chosen.
- For Parties that have chosen to cap the quantity of land sector emissions and removals that can be applied toward the target, apply the cap when calculating accounted emissions.
- For Parties with base year intensity targets, calculate accounted emissions intensity.
- If significant changes are made to methods used and/or significant errors in original calculations are discovered, recalculate (a) base year emissions, base year emissions intensity, or baseline scenario emissions; (b) the target level of emissions or emissions intensity; (c) reporting year emissions; and (d) target year(s) emissions.
- For Parties with dynamic baseline scenario targets, recalculate baseline scenario emissions by replacing forecasted values with observed values for all emissions drivers.
- If base year or baseline scenario emissions are recalculated, recalculate the target level of emissions to ensure consistency.
- Compare accounted emissions with the target level of emissions in the target year(s) to assess achievement at the end of the implementation period.
- For Parties with base year intensity targets, compare accounted emissions intensity with the target level of emissions intensity in the target year(s).

B.2 Recommendations on Sectoral Non-Greenhouse Gas Targets

- Monitor relevant sectoral indicators using consistent methods at regular intervals (e.g., annually).
- If headline mitigation contributions consist of both greenhouse gas emissions targets and non-greenhouse gas targets or multiple non-greenhouse gas targets, account for each target separately.

B.3 Recommendations on Policies and Actions

- Monitor relevant indicators at regular intervals (e.g., annually), including indicators related to policy implementation, sectoral outcomes, and greenhouse gas emissions, as relevant.

APPENDIX C SUMMARY OF RECOMMENDATIONS FOR COMMUNICATING ACCOUNTING-RELATED INFORMATION

This Appendix compiles recommendations for communicating accounting-related information. It is divided into two sections, based on where the information is most appropriate to be communicated: (C.1) information to facilitate clarity, transparency, and understanding and (C.2) reporting of tracking progress and achievement under Article 13, paragraph 7(b). If Parties did not previously provide information to facilitate clarity, transparency, and understanding when submitting their initial NDCs, they can provide it through an NDC update or in the report on tracking progress under the transparency framework.

C.1 Recommendations for Communicating Accounting-Related Information to Facilitate Clarity, Transparency, and Understanding of Nationally Determined Contributions

RECOMMENDATIONS ON GREENHOUSE GAS TARGETS

Target boundary (scope and coverage)

- whether the scope and coverage is different from the national greenhouse gas inventory
- the sectors and categories included in the target boundary, including definitions of covered sectors and categories if they are different from those in the inventory and any sectors excluded from the target boundary, with an explanation of why they are excluded (per Decision 1/CP.21, paragraph 31 [d])
- the greenhouse gases included in the target boundary and, if not all greenhouse gases in the national boundary are included, an explanation of why certain gases are excluded
- the percentage of national greenhouse gas inventory emissions included in the target boundary in the base year
- an explanation of how previously covered categories continue to be covered and justification for any exclusion of a previously covered sector

Target timeframe

- whether the target is a single year or a multiyear target
- for multiyear targets, whether the target is an average, annual, or cumulative target
- the target year (for single year targets) or target period (for multiyear targets); if coupled short-term and long-term targets are chosen (e.g., a trajectory target), the various target years or periods

Reference level

Parties with base year emissions targets and base year intensity targets should report the following information:

- the base year or base period
- the complete greenhouse gas inventory for the base year or base period and the calculation methods used
- base year emissions separately by gas (in tonnes) and in tonnes of carbon dioxide equivalent (CO₂e), as well as the sources of the data and the calculation methods used

Parties accounting for net land sector emissions/removals relative to a historical base year (see p. 28 for discussion of how the land sector can be treated in an NDC) should report the following information:

- emissions, removals, and net emissions/removals for all selected land use categories, activities, pools, gases, and fluxes in the base year
- net base year emissions/removals for the land sector
- all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, or other approaches that differ from inventory-based approaches
- net emissions/removals from each selected land use category or activity (for activity-based accounting)

Parties with base year intensity targets should also report information on:

- base year emissions intensity, the level of GDP or other metric in the base year, and the data sources used

Parties with baseline scenario targets should report information on:

- for baseline scenario targets, whether the baseline scenario is static or dynamic
- for dynamic baseline scenario targets, the baseline scenario recalculation policy at the start of the target implementation period, including which drivers will trigger a recalculation
- baseline scenario emissions in the target year/period
- for Parties including the land sector in the target boundary or as a sectoral target, net baseline scenario emissions for the sector in the target year/period
- for Parties that calculate the change in net land sector emissions/removals separately and apply a forward-looking baseline accounting method:
 - net baseline scenario land sector emissions in the target year(s)
 - all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and other approaches that differ from inventory-based approaches

- description of the model used to develop the target baseline scenario
- timeframe for the baseline scenario, including the start year/period
- emissions within the target boundary in the start year/period, the complete greenhouse gas inventory for the start year/period, and the data sources and calculation methods used
- key emissions drivers included in the baseline scenario and assumptions and data for key emissions drivers included in the baseline scenario
- justification of the choice of whether to develop new data and assumptions for the baseline scenario or use published data and assumptions
- cutoff year for the inclusion of policies (the year after which no new policies or actions are included in the baseline scenario) and justification for choosing it
- key policies and actions included in the baseline scenario and any significant policies excluded from the baseline scenario, with justification
- any additional methods and assumptions used to estimate the effects of key policies and actions included in the baseline on emissions
- quantitative estimate or qualitative description of the uncertainty of the baseline scenario results, as well as the range of results from sensitivity analysis for key parameters and assumptions

Land sector

- how emissions and removals from the land sector are treated in the target (included in the economy-wide target boundary, treated as a sectoral target, change in net land sector emissions/removals calculated separately, or not included in the greenhouse gas target); if it is not included in the greenhouse gas target, a justification should be provided
- whether land-based accounting or activity-based accounting is used
- any use of a managed land proxy that has been adopted, including the definition of “managed land” and the locations and geographic boundaries of managed and unmanaged lands
- land sector categories or activities included in land sector accounting, as well as carbon pools, gases, greenhouse gas fluxes, and categories/activities included within selected land sector categories or suites of activities
- percentage of total inventory emissions from the land sector included in the target boundary in the base year/period or baseline scenario, as relevant
- whether harvested wood products, including wood, paper products, and other biogenic materials such as wood pellets, are included in the accounting and the accounting approach
- reference level for net land sector emissions/removals and an explanation of how it was constructed
- how the change in net land sector emissions/removals will be calculated (relative to a base year/period, without reference to a base year/period or baseline, or relative to a forward-looking baseline), with a justification if it differs from other covered sectors
- potential risks associated with the chosen approach for calculating net land sector emissions/removals and how those risks are minimized
- if part or all of a land category or a land-use activity is excluded from the target boundary to minimize potential risks, the exclusion, the reason for the exclusion, and the reason for any alternative accounting approach chosen

- if a cap on removals is adopted, the level of the cap
- all lands subject to the natural disturbance mechanism, including their geo-referenced location, year, and types of disturbances
- how annual emissions resulting from disturbances and the subsequent removals in those areas are estimated
- demonstration that no land-use change has occurred on lands for which the mechanism is applied and explanation of the methods and criteria for identifying any future land-use changes on those land areas during the target implementation period
- demonstration that the occurrences were beyond the control of, and not materially influenced by, the Party during the target implementation period, by demonstrating practicable efforts to prevent, manage, or control the occurrences that led to the application of the mechanism
- demonstration of efforts taken to rehabilitate, where practicable, the land for which the mechanism applied
- demonstration that emissions associated with salvage logging on forestland subject to natural disturbance were not and will not be excluded from accounting

Internationally Transferred Mitigation Outcomes

- expected amount of ITMOs to be used to meet the target, if known
- the maximum, if defined, and expected amount of ITMOs to be used from time periods before the target (“banked” units) (flexibility to be determined by the Article 6 guidelines)
- expected issuance of ITMOs that will be valid for use by another Party, if known
- approach to the corresponding adjustments, if more than one is elaborated under the Article 6.2 guidance
- whether the ITMOs will be used only toward the Party’s NDCs and at which stage
- anticipated net transfers of allowance units between emissions trading systems, if known
- types of ITMOs eligible to be applied toward the target (flexibility to be determined by the Article 6 guidelines), including whether they are from sectors covered by the NDC/target boundaries
- the accounting method applicable to ensure that all reductions are accounted for in the NDC implementing period and that ITMOs used toward a single year target are robustly counted (approaches to be determined by the Article 6 guidelines)
- mechanisms in place to prevent double counting of ITMOs (if more than one approach is elaborated under the Article 6 guidelines; provisions to be determined by the Article 6 guidelines)

Target level of emissions

- the target level of emissions in the target year (for single year targets), in each year of the target period (for annual or average multiyear targets), or over the target period (for cumulative multiyear targets)
- for Parties with base year intensity targets, the estimated level of output in the target year(s) and data sources or method used to estimate it
- for Parties with base year intensity targets only, the target level of emissions intensity in the target year or each year of the target period

Greenhouse gas inventory

- whether the most recent IPCC Guidelines will be used for the national greenhouse gas inventory that is the basis of NDC accounting and if not an explanation of why the most up-to-date IPCC Guidelines were not used and capacity needs related to their use
- GWP values used

RECOMMENDATIONS ON SECTORAL NON-GHG TARGETS AND POLICIES AND ACTIONS

- clarify whether the non-greenhouse gas targets and/or policies and actions included in the NDC will be accounted for (as opposed to being provided for informational purposes)

C.2 Recommendations for Reporting under Article 13, Paragraph 7(b)

RECOMMENDATIONS ON GREENHOUSE GAS TARGETS

Tracking of progress toward Nationally Determined Contributions

- information such as that included in Table 3-2 during implementation
- complete national greenhouse gas inventory for the reporting year, per Article 13.7(a) and guidelines under development
- reporting year emissions by gas (in tonnes) and in tonnes of CO₂e
- for Parties that include the land sector in the target boundary or treat it as a sectoral target, land sector emissions and removals separately for each land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, and including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, the change in net land-use emissions in the reporting year, separately reported for each land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, and including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties with base year intensity targets, reporting year emissions intensity, the level of output in the reporting year, and data sources used to determine the level of output

Recalculation of emissions and other values

- any emissions recalculations, including recalculations of base year emissions, base year emissions intensity, baseline scenario emissions, and the target level of emissions or emissions intensity, as well as the recalculated values alongside the original values

- for Parties with dynamic baseline scenarios:
 - any recalculations made during the target implementation period, the significance threshold used, and recalculated emissions alongside the original values
 - any recalculations of the target level of emissions and the recalculated target level of emissions alongside the original values
- the following could constitute a change in the NDC (but is yet to be determined) that would require recalculations and changes that would warrant reporting:
 - any revisions to the target boundary and any changes to the target type, target level, or a change from a single year to a multiyear target, and any recalculations made, including recalculated and original values
 - any changes resulting from recalculations for Parties that
 - add a land category, subcategory, or activity to accounting, or change the treatment of an existing land category, subcategory, or activity
 - revise the target level to compensate for nonadditional emissions or emission reductions
- for Parties that change the land sector accounting approach during the target period, the reasons for changing approaches and the quantitative and qualitative effects on land sector accounting and overall target accounting, including:
 - any changes to included land sector categories, activities, pools, gases, or greenhouse gas fluxes that significantly affect net land sector emissions/removals
 - any changes to the treatment of the land sector or the target level (to compensate for nonadditional emissions or removals)

Tracking of achievement of Nationally Determined Contributions

- information such as that included in Table 3-2 at the end of the target implementation period
- target achievement at the end of the target year (for single year targets), at the end of each year of the target period (for annual and average multiyear targets) or at the end of the entire target period (for cumulative multiyear targets)
- complete greenhouse gas inventory for the target year (for single year targets), the relevant year of the target period (for annual multiyear and average multiyear targets), or over the target period (for cumulative multiyear targets)
- target year emissions (for single year targets), the relevant year of the target period (for annual and average multiyear targets), or over the target period (for cumulative multiyear targets) separately by gas (in tonnes) and in tonnes of CO₂e
- accounted emissions in the target year (for single year targets), the relevant year of the target period (for annual and average multiyear targets), or over the target period (for cumulative multiyear targets) separately by gas (in tonnes) and in tonnes of CO₂e
- for Parties that use ITMOs (in line with Article 6 guidelines):
 - type, vintage, country of origin, and quantity (in tonnes of CO₂e) of ITMOs used and transferred in the target year, relevant year of the target period, or over the target period
 - whether the ITMO is generated from a sector/greenhouse gas

- covered by a national mitigation target
 - additional information on program standards of a crediting mechanism or design of an emissions trading scheme used toward the NDC, the permanence of the ITMO, the contribution to promotion of sustainable development, and how “higher ambition” under Article 6.1 is achieved (generated within or outside the scope of the NDC) (La Hoz Theuer et al. 2017)
- for Parties that include the land sector in the target boundary or treat it as a sectoral target, emissions and removals separately for each selected land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties that calculate the change in net land sector emissions/removals separately from other sectors, the change in net land-use emissions in the target year(s), separately reported for each selected land-use category, activity, pool, gas, and flux, as relevant, including all calculation methods used, including any use of unique accounting approaches, such as those associated with natural disturbances, harvested wood products, and others that differ from national inventory approaches
- for Parties with base year intensity targets, accounted emissions intensity, level of output in the target year/period, and data sources used to determine the level of output
- any emissions recalculations, including recalculations of base year emissions, base year emissions intensity, baseline scenario emissions, and the target level of emissions or emissions intensity, as well as the recalculated values alongside the original values
- any dynamic baseline scenario recalculations made during the target implementation period and recalculated emissions, alongside the original values

- any recalculations of the target level of emissions and the recalculated target level of emissions, alongside the original values
- the difference between accounted emissions (or emissions intensity) and the target level of emissions (or emissions intensity)
- whether the target was achieved

RECOMMENDATIONS ON SECTORAL NON-GREENHOUSE GAS TARGETS

- the performance of relevant sectoral indicators, in relation to both historical values and the target values included in the NDC

RECOMMENDATIONS ON POLICIES AND ACTIONS

- if tracking implementation only, the implementation status of policies and actions included in the NDC
- if tracking indicators related to impacts, the performance of relevant sectoral indicators in relation to both historical values and the target values included in the NDC
- if quantifying impacts of actions, ex-post estimates of the impact of policies/actions on selected sectoral indicators, greenhouse gas emissions, and sustainable development indicators, as relevant, relative to a baseline scenario and compared with the desired impacts included in the NDC

APPENDIX D ISSUES TO CONSIDER IN DEVELOPING ACCOUNTING GUIDANCE FOR PARTIES' NATIONALLY DETERMINED CONTRIBUTIONS

Table D.1 | **Issues to Consider in Developing Accounting Guidance for Parties' Nationally Determined Contributions**

ACCOUNTING ISSUE	ASPECTS TO BE ADDRESSED BY GUIDANCE
General	<p>What constitutes a "second" or "subsequent" NDC, given that accounting guidance is voluntary for the first NDC</p> <p>Whether accounting guidance applies to the entire NDC implementation period (to inform the tracking of progress) rather than only after the NDC implementation period is complete (to determine achievement)</p> <p>When a Party communicates multiple mitigation components of the NDC and whether one or more components are the headline NDC for the purposes of accounting (and others do not need to be accounted for, as they are for informational or implementation purposes only)</p> <p>Whether conditional contributions within NDCs need to be accounted for separately and if so how</p>
Quantification	Whether Parties with greenhouse gas targets will be required to quantify their NDC and calculate emissions levels in the target year(s) consistent with target achievement (or emissions intensity in the target year, in the case of a base year intensity target)
Methodologies and metrics	<p>Which IPCC inventory guidelines are to be used for the national inventory, the basis for accounting</p> <p>Which GWP values are to be used for accounting</p>
Scope and coverage	Whether significant sources of emissions or removals can be excluded from accounting (these sources are currently nationally determined, but as countries increase the scope and coverage of their NDCs over time, guidance could specify further details on how they do so)
Target timeframe	<p>Whether single year targets will be accommodated or will have to be converted into multiyear targets and if so how</p> <p>How to account for single year targets if they are accommodated, especially with regard to the use of ITMOs</p>
Reference level: Base year target	<p>Whether the guidance recommends the choice of a base period of multiple consecutive years in order to smooth out fluctuations and track progress against a more representative emissions level</p> <p>Whether the guidance recommends avoiding the selection of a year or years with atypically high or low emissions</p> <p>Whether the guidance recommends that Parties choose a single base year or base period for all sectors and gases included in the target boundary</p>
Reference level: Intensity target	Whether there will be guidance for the choice of data source for the unit of output (e.g., GDP)
Reference level: Base-line scenario target	<p>Whether Parties with baseline scenario targets can use dynamic baseline scenarios</p> <p>If dynamic baseline scenarios can be used, whether Parties will need to establish in advance a policy for recalculating updates and whether there will be guidance for doing so</p> <p>Which policies and measures should be included in the baseline scenario, the cut-off year for inclusion, and the estimation method</p> <p>Whether there will be any guidance on projection methods, assumptions, and/or data sources for key drivers</p>

Table D.1 | **Issues to Consider in Developing Accounting Guidance for Parties' Nationally Determined Contributions (Ct'd)**

ACCOUNTING ISSUE	ASPECTS TO BE ADDRESSED BY GUIDANCE
Land sector accounting	<p>Whether Parties can account for the land sector using land-based or activity-based accounting</p> <p>Whether coverage of particular land-use categories, activities, carbon pools, gases, and/or fluxes will be mandatory or left to the discretion of the Party</p> <p>How reference levels are to be constructed and reviewed</p> <p>How the change in net land sector emissions/removals is to be calculated (e.g., net-net, gross-net, forward-looking baseline) and whether it will need to be calculated in a manner consistent with the target type</p> <p>Whether guidance will require or encourage Parties to minimize risks associated with accounting (e.g., by using a cap or conservative methods and data)</p> <p>How to account for legacy effects</p> <p>How to account for natural disturbances</p> <p>How to account for harvested wood products</p> <p>Which definitions to use</p> <p>How to define managed land</p>
ITMOs	<p>How to develop and use a system of accounting, underpinned by double-entry bookkeeping, that ensures that ITMOs are used only toward the achievement of one NDC and are not double counted</p> <p>How to ensure that ITMOs are used in a manner that is robust in relation to the target year/period</p> <p>The approach to the corresponding adjustments</p> <p>Types of ITMOs</p> <p>Mechanisms to avoid double counting</p>
Recalculation of emissions and other values	<p>Conditions under which recalculations can be made</p> <p>Which recalculations would constitute a new NDC versus a revised NDC</p> <p>Which recalculations need to be made when there is a revision to ensure consistency</p>
Sectoral (non-greenhouse gas) targets	<p>Whether Parties with headline mitigation contributions consisting of both greenhouse gas emissions targets and non-greenhouse gas targets or multiple non-greenhouse gas targets should account for each target separately</p> <p>How Parties with headline mitigation contributions consisting of non-greenhouse gas targets should account for them (e.g., by monitoring relevant sectoral indicators using consistent methods at regular intervals)</p>
Policies and actions	<p>How Parties with headline mitigation contributions consisting of policies and actions should account for those actions, including whether to account for policy implementation, sectoral outcomes, and/or greenhouse gas emissions outcomes</p>
Reporting of accounting-related information	<p>The vehicle for reporting aspects that are appropriate for guidance on facilitating clarity, transparency, and understanding; reporting under Article 13, paragraphs 7(a) and (b); or other reporting vehicles</p> <p>What will need to be reported and when</p> <p>Whether a balance sheet will be used to help account for progress toward and achievement of the NDC</p>

ENDNOTES

1. The Greenhouse Gas Protocol develops international greenhouse gas accounting standards and guidance for companies, national governments, and cities. This paper draws on two of those standards designed to help national governments design climate change mitigation targets, assess and report progress toward achieving them, and estimate the greenhouse gas effects of policies and actions: the *Mitigation Goal Standard* (WRI 2014a) and the *Policy and Action Standard* (WRI 2014b). More information is available at <https://ghgprotocol.org/>.
2. Further reference is made in Article 4.14, which requests Parties to take into account, as appropriate, existing methods and guidance under the Convention when recognizing and implementing mitigation actions with respect to anthropogenic emissions and removals.
3. COP Decision 1/CP.21, paragraph 31.
4. COP Decision 1/CP.21, paragraph 32.
5. In the IPCC 2006 guidelines, these principles are considered indicators of inventory quality.
6. For more details see SBSTA (2018).
7. COP Decision 1/CP.21, paragraph 92.
8. COP Decision 1/CP.21, paragraph 31.
9. Paris Agreement, Article 4, paragraph 14.
10. COP Decision 1/CP.21, paragraph 31.
11. This section draws heavily on the Greenhouse Gas Protocol *Mitigation Goal Standard* (WRI 2014a). The recommendations in this section are consistent with it.
12. The land sector includes forestland, cropland, grassland, wetlands, and settlements, as well as emissions and removals from land used in agricultural production and grazing lands/grasslands (IPCC 2006).
13. The land sector includes forestland, cropland, grassland, wetlands and settlements, as well as emissions and removals from land used in agricultural production and grazing lands/grasslands (IPCC 2006).
14. Net land sector emissions/removals (or the net greenhouse gas flux) is the sum of greenhouse gas emissions and removals in the land sector. It can be positive (net emission) or negative (net removal).
15. See, for example, Prag et al. (2013), who refer to an “accounting balance,” and Winkler and Marquard (2018), who discuss using balance sheets for multiyear targets.
16. Parties that have yet to determine the target timeframe should refer to the Greenhouse Gas Protocol *Mitigation Goal Standard* (WRI 2014a), which lays out the benefits of multiyear over single year targets.
17. A base period is an average of multiple years of historical data against which emissions are compared over time.
18. This section draws on progress made by the UNFCCC in reducing emissions from deforestation and forest degradation, including forest conservation, sustainable management of forest and the enhancement of forest carbon stocks in developing countries (REDD+), as well as under the Kyoto Protocol. It also draws on the Greenhouse Gas Protocol *Mitigation Goal Standard* (WRI 2014a). The IPCC (2003, 2006) provides detailed guidance on land sector accounting.
19. Land use, land-use change, and forestry are referred to as LULUCF in the 2003 IPCC *Good Practice Guidance for Land Use* and in the common reporting format used for reporting emissions to the UNFCCC—or simply as the land sector. As defined, the land sector does not include emissions of non-CO₂ gases (e.g., from enteric fermentation, waste disposal, fertilization, and rice production) that are reported to the UNFCCC separately under agriculture. It does not include energy-related emissions from agriculture, forestry equipment, or transportation.
20. Parties that have yet to determine how the land sector is included in the target boundary should refer to the Greenhouse Gas Protocol *Mitigation Goal Standard* (WRI 2014a), which lays out the pros and cons of each approach.
21. The land-based accounting approach determines the scope of accounting based on six land-use categories: forestland, cropland, grassland, wetland, settlement, and other land. The categories used for land-based accounting should correspond to the reporting categories in a jurisdiction’s greenhouse gas inventory. The activity-based accounting approach bases the accounting on a predetermined set of land-use practices. For example, a Party may decide that the lands, pools, and fluxes to be included in accounting for the activity “grazing land management” are those affected by livestock ranching, fire prevention, and activities related to savannah restoration.
22. IPCC Guidelines provide multiple approaches to report on harvested wood products: the production approach, the stock-change approach, the atmospheric-flow approach, and simple decay.
23. To exclude emissions from a natural disturbance event, the land area subject to the disturbance is first geo-referenced and the emissions excluded from the land-use accounting are quantified (consistent with national inventory methodologies). After the event, the land will begin the process of recovery, which will generally include rebuilding soil carbon and/or vegetation. These activities will likely result in net removals on the area of recovering land. Use of the provision also requires information on efforts to prevent, manage, and suppress natural disturbances; efforts to rehabilitate the land following the disturbance; and information on the “background” level of natural disturbances. It also requires monitoring to ensure that there is no subsequent land-use change or salvage logging. If either occurs, the emissions must be accounted for.

24. This quantity is sometimes referred to as an *emissions budget* or *carbon budget*.
25. Projections of output metrics should be gathered from official data sources in order to enhance the transparency and consistency of reporting. GDP projections should be based on data from national government bodies or international sources, such as the International Monetary Fund, the World Bank, or the OECD. Unlike other types of targets, expected emissions in the target year for base year intensity targets represent only an estimate, as they require forecasts of the level of output in the target year, which are likely to change and are unlikely to accurately represent the actual value in the target year.
26. In the case of accounting for the land sector in the target year/period without reference to net emissions in the base year/period or a baseline scenario, the change in net land sector emissions/removals does not represent a true change in emissions compared with accounting relative to base year/period emissions or forward-looking baseline accounting, because no reference case is used for accounting. However, for simplicity this standard uses the term “change in net land sector emissions/removals” in relation to all three accounting methods.
27. See <http://unstats.un.org/sdgs/>, which includes the Global Database (<http://unstats.un.org/sdgs/indicators/database/>) and the official list of SDG indicators (<http://unstats.un.org/sdgs/indicators/indicators-list/>).

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Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

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We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

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COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

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We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

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We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.



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