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GHG or not GHG: Accounting for Diverse Mitigation Contributions in the Post-2020 Climate Framework

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FOREWORD

This document was prepared by the OECD and IEA Secretariats in 2014 in response to a request from the Climate Change Expert Group (CCXG) on the United Nations Framework Convention on Climate Change (UNFCCC). The CCXG oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. Authors work with the CCXG to develop these papers in a collaborative effort. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudge the views of countries participating in the CCXG. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience.

Members of the CCXG are Annex I and OECD countries. The Annex I Parties or countries referred to in this document are those listed in Annex I of the UNFCCC (as amended by the Conference of the Parties in 1997 and 2010): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom of Great Britain and Northern Ireland, and the United States of America. As OECD member countries, Korea, Mexico, Chile, and Israel are also members of the CCXG. Where this document refers to “countries” or “governments”, it is also intended to include “regional economic organisations”, if appropriate.

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Executive summary

Parties to the UN Framework Convention on Climate Change (UNFCCC) are preparing their intended nationally determined mitigation contributions for the 2015 climate change agreement. By COP 20 in Lima, Parties are to agree what up-front information should be provided for clear, transparent and understandable contributions. The contributions themselves will be communicated by the first quarter of 2015 by those Parties ready to do so.

Information provision alone may not be sufficient to provide understanding of the intended mitigation contributions and their expected impact on greenhouse gas (GHG) emissions in the post-2020 period. For a particular level of national mitigation ambition, different accounting approaches can result in different headline numbers for emissions reductions. It could therefore be difficult for Parties to understand each other's intended mitigation contributions unless there is also progress on some elements of the post-2020 accounting framework.

Accounting for a diverse range of contribution types

Parties are likely to communicate a diverse range of intended national mitigation contributions. These could include different forms of GHG (e.g. relative to a base year, relative to a baseline, or fixed level goals) and non-GHG (e.g. renewable energy; energy efficiency) goals.

Estimating future GHG emission levels is needed in order to identify aggregate progress towards limiting temperature rise to below 2 degrees Celsius. Such estimations are easier for some types of mitigation contributions than others. For economy-wide mitigation contributions expressed in terms of annual GHG emissions relative to a base year, future emissions levels are explicitly specified. For contributions expressed as GHG emissions relative to a baseline, future emission levels can be estimated if assumptions underpinning the baseline are specified. For contributions focused on sectors, individual projects or non-GHG goals, clarification of the contribution may only provide information on the action concerned, and not an estimate of economy-wide emission reductions. Therefore, while use of more diverse contributions may facilitate broader participation in the 2015 agreement, it could be more challenging to make pre-2020 estimates of expected post-2020 global emissions.

The building blocks of accounting for mitigation contributions expressed in GHG terms have been extensively covered in the existing emissions accounting literature. For non-GHG contributions, accounting needs have received little attention to date. For non-GHG goals, it is important to distinguish between tracking progress in implementation of the non-GHG contribution, and understanding the GHG impact of the contribution. Understanding the full GHG impacts of non-GHG goals would require conversion of the contribution to GHG terms, as well as information from GHG inventories and on international transfers of units.

Some Parties may choose to put forward multiple types of contributions. The use of overlapping multiple contributions can make it more difficult to minimise double counting and to estimate future expected GHG emissions levels. Policy interactions mean that it may be simpler to make a single estimate of the aggregate impact on future GHG emissions of multiple contributions, rather than attempt to calculate and sum the individual impacts.

Managing double counting and single-year targets

There are a number of forms that double counting of mitigation can take. These include **double issuance** of more than one unit for the same emissions reduction (for example in two crediting or trading mechanisms covering the same economic sector), **double selling** or **retirement** of the same GHG unit by more than one Party to meet their mitigation contributions, **double claiming** of the same emissions reduction by more than one Party when accounting for their mitigation contributions, and **double coverage** of transferred emissions reductions under two different types of

targets in the two different countries (e.g. a GHG goal in one country and a non-GHG goal in the other).

Double counting could occur whether transfers occur via market mechanisms or non-market approaches. The potential for double counting is wider than just the case of GHG credits being claimed toward both host and purchasing countries' contributions. It could also occur between GHG and non-GHG contributions (e.g. renewable energy targets), or between production-based crediting schemes and consumption-based mitigation contributions.

Several options exist for managing double counting of mitigation. **Post-2020 reconciliation** of achievement of mitigation contributions is possible without double counting if all Parties report actual transfers of units and/or mitigation outcomes. If Parties also wish to limit or prevent double counting in **pre-2020 estimates** of expected aggregate emissions reductions from mitigation contributions in the post-2020 period, three options could be considered:

- Option 1 (Transparency only): Before 2020, Parties make estimates of expected post-2020 transfers. After 2020, Parties report actual flows (issuance, retirement, transfers, banking) of GHG units and/or transferred emissions reductions. This option does not prevent double claiming, however enough information is collected to enable an accurate count of total emissions reductions ex post. Before 2020, this option only provides a “best guess” of likely future double claiming.
- Option 2 (Enhanced clarity and limiting double claiming): In addition to transparency requirements, a quantitative limit is agreed on use of transferred emissions reductions. This limit would apply when transferred reductions originate in Parties with GHG contributions that do not take unit flows into account. This option again does not prevent double claiming, but limits its maximum extent. As such, it provides better pre-2020 estimates of emissions outcomes.
- Option 3 (Preventing double claiming): All parties opting to participate in international transfers via market mechanisms/non-market approaches agree that their GHG-based mitigation contributions will take into account unit flows from sources or sinks covered by the national GHG inventory, and have continuous multi-year goals rather than snapshot single-year goals. All transferred units are accounted for by both buyer and seller, so there is no double claiming.

With each of these options, further technical elements would be needed to prevent double issuance or double selling of transferred emissions reductions. These could include agreed registry/tracking standards, and sound governance of the systems issuing units.

Options also exist for managing single-year (rather than continuous multi-year targets). In Option 3 above, Parties with single-year targets would not be able to use transferred emissions reductions. An alternative which could fit with Option 2 would be to allow only use of units associated with multi-year processes (e.g. a national emissions trading system).

Options for land use accounting

For Parties with a significant share of emissions coming from the land sector, understanding the land sector accounting approach to be used can be crucial for understanding mitigation contributions put forward. Up-front information alone may not be sufficient; greater clarity on the accounting approach for the post-2020 period would be helpful.

Two general approaches could be taken to land sector accounting in the 2015 agreement: developing common accounting (with a full sets of accounting rules), or agreement on accounting principles only. The first approach would enable comparability among the contributions from Parties. Possible options for common approaches are extending KP-type accounting to a wider range of countries and activities, moving to inventory-based accounting which would cover all managed lands, or moving to a new approach where nationally appropriate reference levels would be established for land sector

activities. Parties could also be given flexibility to choose from a menu of agreed accounting options.

In the second approach, agreement on accounting principles, the principles could include the general elements necessary to construct a reference baseline - in this case, there may be little difference between this and a common approach of developing nationally appropriate reference levels. Alternatively, the principles could be more general, for example the use of IPCC and UNFCCC guidance for estimating and reporting land sector emissions and removals; and the use of national GHG inventories as the basis for land sector accounting. This could be part of a “bounded flexibility” approach for the land sector, i.e. allowing countries to choose their land sector accounting approach in line with national circumstances and capabilities, provided they are applying agreed methodologies and guidance.

While there is not yet agreement on how to account for the land sector in the 2015 agreement, there are already many agreed sources of guidance, standards, and decisions on transparent reporting, review, and accounting that can be built on. In other words, as for general GHG accounting, post-2020 land sector accounting does not need to start from scratch.

Key decisions and timing issues

To be in a position to put forward contributions by early 2015 that are clear, transparent and understandable, Parties will need to make progress on some aspects of the accounting framework at COP 20, while other issues could be agreed at COP 21 or later:

- **By the first quarter of 2015:** Progress would be helpful on rules or guidance for the up-front information to be provided alongside each contribution type; what types of nationally-determined mitigation contributions are of interest to Parties; whether for land sector accounting Parties will work towards a single approach, a menu of approaches, or a set of principles; and whether Parties will provide estimates of expected use of market and non-market mechanisms. Decision on whether use of transferred units from market and non-market mechanisms in the post-2020 period should be limited, and if so in what way, would also aid clarity.
- **Between 2015 and 2020:** It would be helpful to develop guidelines for baseline-setting and review; and for estimating the expected impact of non-GHG goals on future GHG emissions levels. If Parties decide to work towards a single land sector approach or menu of approaches, further work on the details could continue after COP 21 with a view to adopting rules or guidance before the new agreement comes into effect from 2020. Agreement on the approach to be used for tracking and reporting GHG unit transfers (and potentially also transfers of mitigation outcomes via non-market approaches) in the post-2020 period will also be needed.
- Without some clarity on the approach for the use of GHG units and land use sector accounting before the first quarter of 2015, it will be challenging to understand the intended national mitigation contributions put forward and estimate what their expected impacts on global GHG emissions levels are likely to be. In the absence of up-front clarity on these issues, it is also likely that contributions will be subsequently updated to reflect the emerging accounting framework. This in turn would increase the level of uncertainty associated with estimates of expected future global GHG emissions levels, which play an important role in assessments of progress being made towards the below 2 °C long-term global goal.

1. Introduction

The 195 Parties to the United Nations Framework Convention on Climate Change (UNFCCC) are developing a “protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties” (UNFCCC, 2011a). With the aim of delivering this new climate agreement at the twenty-first Conference of the Parties (COP 21) in Paris in December 2015, a first step agreed at COP 19 in Warsaw is to:

“...invite all Parties to initiate or intensify domestic preparations for their intended nationally determined contributions [...] and to communicate them well in advance of the twenty-first session of the Conference of the Parties (by the first quarter of 2015 by those Parties ready to do so) in a manner that facilitates the clarity, transparency and understanding of the intended contributions, without prejudice to the legal nature of the contributions...” (UNFCCC, 2013a); and

“...identify, by the twentieth session of the Conference of the Parties, the information that Parties will provide when putting forward their contributions, without prejudice to the legal nature of the contributions...” (UNFCCC, 2013a)

A diverse range of nationally-determined mitigation contributions could be communicated by Parties. An effective post-2020 accounting framework to understand and track implementation of these mitigation contributions will therefore need to accommodate a range of contribution types and varying national capacities. With Parties now undertaking domestic preparations for developing intended mitigation contributions for the 2015 agreement, three major questions arise:

- What up-front information should be provided alongside intended mitigation contributions to facilitate understanding of the intended contributions and their expected impacts on greenhouse gas (GHG) emissions levels?
- What accounting rules or guidance for post-2020 mitigation contributions (if any) would it be helpful to agree or develop before 2020, to facilitate understanding of intended contributions and their expected impacts on GHG emissions levels?
- What could be the timing of key decisions on accounting issues, taking into account the agreed timetable for communication of intended mitigation contributions?

This paper explores these questions in greater detail and highlights issues that Parties may wish to consider when preparing and communicating their mitigation contributions. Providing Parties with some structure for the framing of intended mitigation contributions could help simplify domestic preparations for these intended contributions, in particular for those Parties with lower institutional capacity.

Earlier CCXG work looked at the diverse range of mitigation contributions that Parties may choose to put forward, options for “bounded flexibility” for some technical aspects of these contributions (Briner and Prag, 2013), and options for GHG unit accounting (Prag, Hood and Barata, 2013). This paper will build on previous work to consider in more detail the accounting options for different contribution types. It will focus in particular on four key areas: (i) understanding and accounting for non-GHG and multiple contributions; (ii) minimising double counting; (iii) accounting for GHG impacts of actions taken in the land sector;¹ and (iv) the timing of decisions on accounting issues, taking into account the timetable for communicating intended mitigation contributions.

This paper will not consider how measurement, reporting and verification (MRV) processes (notably the new biennial report and biennial update report processes) could or should evolve under the new

¹ In this document the term “land sector” is used for both developed and developing countries. The term “LULUCF” is used when referring specifically to the Kyoto Protocol rules for land use, land use change and forestry for Annex I Parties.

agreement. A separate discussion of the timing and nature of post-2020 MRV processes will be needed as part of the negotiation of the new agreement.

This paper is structured as follows: Section 2 describes the possible objectives and building blocks of accounting for post-2020 mitigation contributions; Section 3 considers the implications of different mitigation contribution types for accounting; Section 4 addresses double counting of mitigation outcomes for various contribution types; Section 5 considers options for land sector accounting; and Section 6 explores the timing of accounting decisions and next steps.

2. Why accounting matters: the objectives and role of the accounting framework in the 2015 agreement

The 2015 agreement to be adopted at COP 21 in Paris is expected to combine nationally-determined (i.e. “bottom up”) mitigation contributions with internationally-agreed (i.e. “top down”) elements (Bodansky, 2012; EDF, 2013; Haites, Yamin and Höhne, 2013). Internationally-agreed accounting provisions will be needed to enhance understanding of the mitigation contributions and their expected impact on GHG emissions levels before 2020, and track progress toward achieving these diverse contributions after 2020. The key objectives and role of a UNFCCC accounting framework for post-2020 mitigation contributions at both the national and global scale are shown in Figure 1.

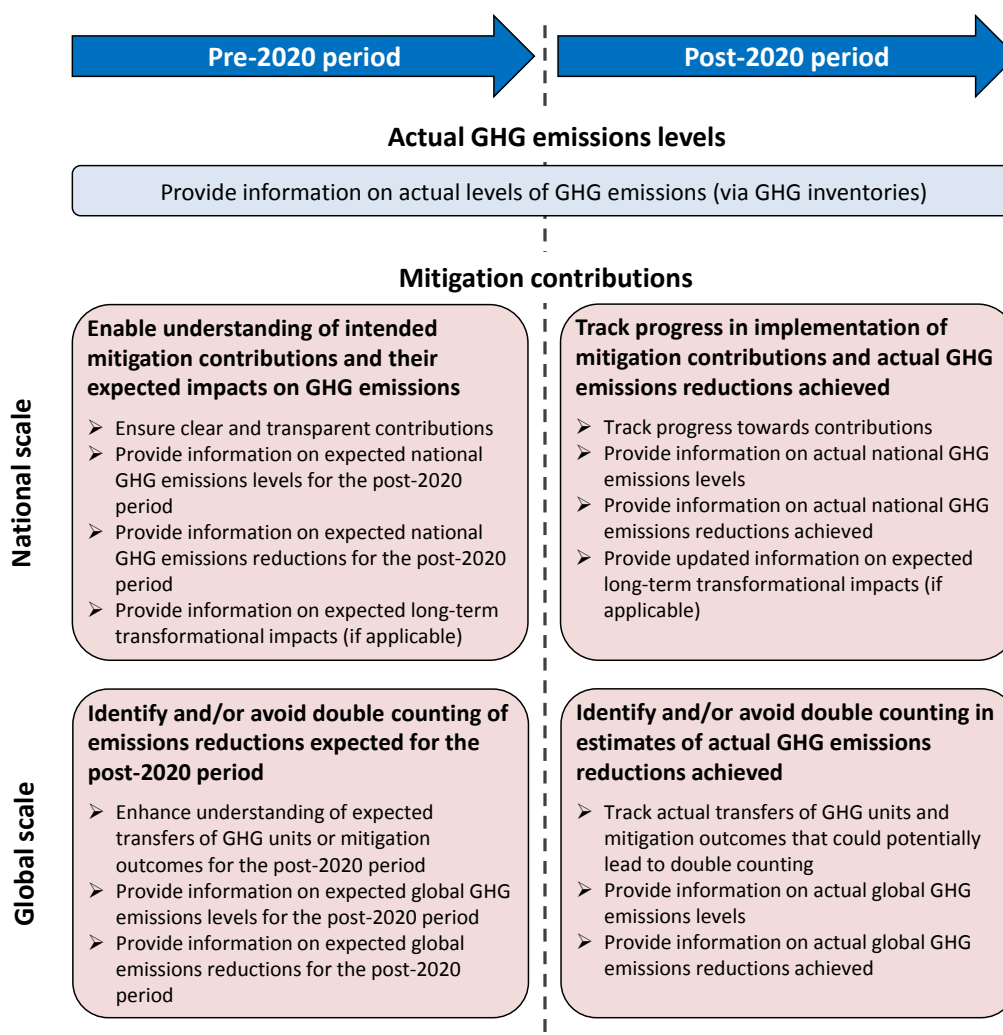
GHG inventories based on IPCC methodologies are and will remain the foundation of emissions accounting in the context of the UNFCCC. They are currently reported annually by Annex I Parties and included in the national communications, biennial reports and biennial update reports of all Parties. However, some Parties may choose not to express their post-2020 mitigation contributions solely in terms of domestic GHG inventory emissions. In these cases, GHG inventories may need to be supplemented by further information (e.g. on GHG unit transfers and actions taken in the land sector) in order to track progress towards mitigation goals (Prag, Hood and Barata, 2013).

Building on national GHG inventories, the accounting framework should provide sufficient information so that intended mitigation contributions can be understood before they begin (i.e. before 2020) and progress in implementation can be tracked after 2020. Understanding of intended mitigation contributions (whether framed in GHG or non-GHG terms) and their expected GHG impacts is important to build mutual trust and increase confidence that the contributions proposed by Parties are meaningful and equitable. In addition, information on any expected long-term transformation impacts can help Parties to achieve recognition for these actions, the effects of which may not manifest themselves in short-term GHG emissions inventories. Tracking implementation of mitigation contributions in the post-2020 period helps to show that Parties are following through on their intentions and enhances understanding of actual GHG emissions levels and actual emissions reductions achieved at national and global scales.

Information on future expected GHG levels nationally and globally is also important to underpin calculations of likely future atmospheric GHG concentrations. This in turn allows scientists to estimate the probable temperature rise and impacts associated with the mitigation contributions that have been communicated. Parties can use this information to assess the total level of ambition in light of the below 2 degree goal (UNFCCC, 2011a).

Some transfers of GHG units (i.e. those that cross the boundaries of mitigation contributions, either between or within Parties) could potentially lead to double counting of emission reductions. To understand the aggregate emissions reductions expected to occur in the post-2020 period, it would therefore be helpful for Parties to share in advance (i.e. before 2020) their expected transfers of such units, as well as to track actual transfers of these units in the post-2020 period. Relevant transfers could occur through market approaches (e.g. linked emissions trading or crediting mechanisms) or potentially also non-market approaches (e.g. non-market transfers of mitigation outcomes).

Figure 1. Objectives of an accounting framework for post-2020 mitigation contributions



Estimating future GHG levels is easier for some types of contributions than others (Levin and Finnegan, 2013). For economy-wide mitigation contributions expressed in terms of annual GHG emissions relative to a base year, future emissions levels are directly specified and do not need to be estimated. For mitigation contributions expressed in terms of GHG emissions relative to a baseline, clarification of the assumptions underpinning the baseline would enable an estimate of future emissions levels.

For contributions relating to sectors, projects, or expressed in non-GHG terms, clarification of the contribution may only provide estimates of emissions reductions for the action or policy concerned, and not necessarily sector-wide or economy-wide emissions. This highlights a trade-off in having a diverse range of contribution types: while this may improve participation (and hence total mitigation), there will be inherent uncertainty around estimated future emission levels. Given the inherent uncertainty of up-front estimates of expected GHG emissions levels for certain types of contributions, tracking and regular reporting in the post-2020 period will be important to understand progress.

While some internationally-agreed accounting elements would help build understanding of mitigation contributions and facilitate tracking, a careful balance is needed between the ability to accurately track GHG emissions levels and maintaining sufficient flexibility to encourage widespread participation. An accounting framework that is designed too rigidly could undermine participation if it is seen by some Parties as not accommodating their national circumstances, or being too intrusive into domestic processes (Prag, Hood and Barata, 2013). Conversely, an

accounting framework that is too flexible could undermine environmental integrity by providing a high level of uncertainty regarding the environmental outcome expected to result from the intended mitigation contributions put forward.

Accounting for mitigation contributions is one component of the broader transparency framework under the UNFCCC, which also includes provisions for measurement, reporting and verification (MRV) of information relating to mitigation, adaptation, finance, technology and capacity building (see Box 1). Co-ordination will be needed between the design of the post-2020 accounting framework and the design of the post-2020 MRV system, to ensure that the right information is provided by the right Parties at the right time.

Box 1: The difference between accounting and MRV

Measurement, reporting and verification (MRV) and accounting are distinct but overlapping issues in the UNFCCC negotiations. The accounting framework sets out how progress towards mitigation objectives under the UNFCCC is assessed, and may include rules or guidance regarding which actions taken by countries can count towards the achievement of those objectives. The way in which progress is assessed depends on the mitigation type in question, i.e. whether it is expressed in absolute GHG emissions, GHG emissions intensity, GHG emissions reductions relative to a BAU baseline, carbon neutrality, in non-GHG terms, etc. Recognised actions may include decreases of emissions or increases of sinks in various sectors (including the land sector) within the borders of the Party concerned, as well as sales or purchases of units (via a market mechanism) representing decreases in emissions or increases of sinks that occurred outside the borders of the Party concerned.

MRV refers to the provisions in place for gathering, sharing, and reviewing information between Parties and other stakeholders on emissions levels, progress being made towards mitigation goals, adaptation, finance, technology, capacity building and other topics. There are already a variety of MRV provisions under the UNFCCC, covering all Parties in various ways. These include reporting of GHG inventories and updates on mitigation actions and goals via biennial reports, biennial update reports and national communications, as well as verification of this information via in-depth reviews, international assessment and review (IAR) and international consultations and analysis (ICA) processes (Ellis and Moarif, 2009; Ellis et al., 2011). The role of verification is to increase trust and confidence in the information provided. The MRV system can enhance transparency but does not by itself strengthen or weaken environmental ambition.

3. Accounting implications of different types of contributions

Under the Kyoto Protocol's accounting framework, the various accounting functions described in Section 2 are delivered in an integrated manner for those Annex I Parties with commitments. Emissions inventories underpin commitments, commitments are framed in a common format to enable clarity and understanding, the use of GHG targets relative to a base year avoids any issues of conversion to GHG impacts, and the format of commitments and rules for unit transfers avoid any double counting.

However, the Kyoto Protocol framework is not designed to account for mitigation contributions expressed relative to a baseline, non-GHG contributions, or actions with long-term but not short-term impacts on GHG emissions. This section briefly explores accounting building blocks for contributions of different types, building on Briner and Prag (2013).

3.1 Different types of mitigation contributions

A diverse range of nationally-determined mitigation contributions could be communicated by Parties. These could include GHG or non-GHG goals, expressed in different forms (e.g. relative to a

base year, relative to a baseline, or as a fixed level). Some could result in short-term emissions reductions, while others could contribute to longer-term decarbonisation.

Prag, Kimmel and Hood (2013) divided mitigation goals into three types: Type I (GHG goals), Type II (non-GHG goals or actions with short-term impacts on GHG emissions) and Type III (actions that promote long-term transformations to low-carbon economies). This range of types of mitigation contributions reflects varying national circumstances and national capacities, but also a growing recognition that there are multiple dimensions to the long-term challenge of transforming economies and societies to become low carbon, and short-term GHG targets alone may not always be the best driver of ambitious long-term mitigation action. To help with clarity and domestic political acceptability, countries might also choose to communicate multiple complementary contributions (e.g. a target for annual GHG emissions as well as an energy efficiency target).

Whatever type of contribution or contributions countries decide to put forward, it will be important to provide sufficient information so that (i) the contributions can be understood; and (ii) their expected impacts on GHG emissions are clear. What is important to know from an accounting perspective are absolute (for contributions expressed relative to a base year) or estimated future emissions for all major emitters, so that aggregate progress towards the below 2 degree goal can be assessed. Communication of measurable contributions is therefore important, whether expressed in GHG or non-GHG terms (Levin and Finnegan, 2013).

3.2 Accounting for GHG goals (Type I contributions)

Perhaps the most common type of mitigation contribution to date has been a goal for annual GHG emissions, relative to a base year or a baseline, or as a fixed target level. This is the commitment type used for mitigation objectives for Annex I Parties under the Kyoto Protocol. It is also being used by many developed and developing countries to describe their mitigation pledges for 2020.² Contributions expressed in GHG terms will be a critical element in understanding whether short- to medium-term emissions levels are on track globally. Quantitative GHG-based contributions should therefore be encouraged where possible to facilitate accounting and tracking progress.

There is considerable experience to date with accounting using GHG-related goals and so related accounting issues and the information needed to understand GHG goals have been covered elsewhere (Briner and Prag, 2013; WRI 2013a).³ In order to understand a mitigation contribution expressed in terms of GHG emissions, information is needed on:

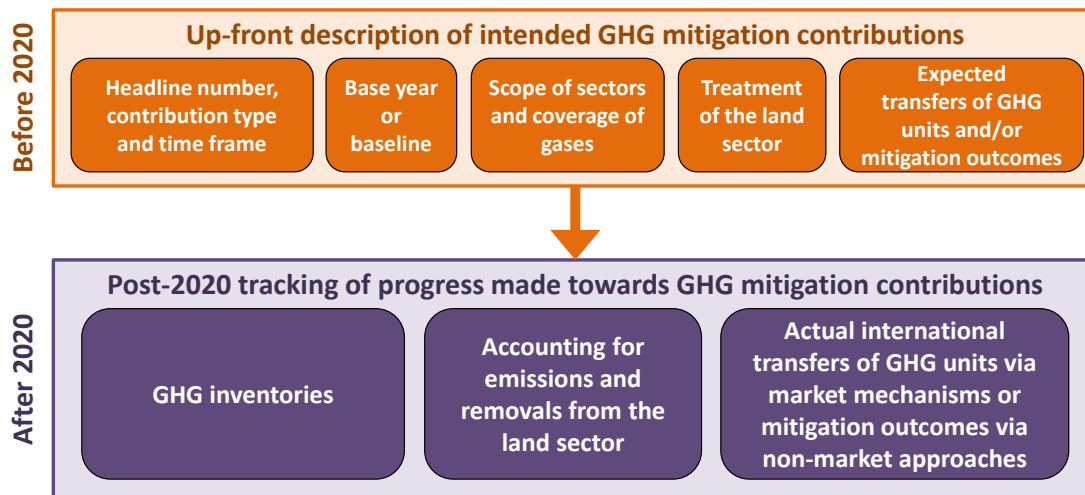
- time frame (i.e. single or multi-year, annual or cumulative emissions)
- base year
- coverage in terms of gases and sectors
- GWPs or other equivalence metrics used
- treatment of emissions from the land use sector
- use of units (if any) from market mechanisms
- baseline and assumptions used (for contributions relative to baselines)

² All Annex I Parties (except Turkey) as well as Antigua and Barbuda, Marshall Islands and Moldova have outlined a mitigation pledge for 2020 in terms of annual GHG emissions relative to a base year. Bhutan, Costa Rica, the Maldives and Papua New Guinea have expressed carbon neutrality pledges. Further, China and India have expressed 2020 pledges in terms of GHG emissions per unit GDP, and Brazil, Chile, Indonesia, Israel, Mexico, Papua New Guinea, Korea, Singapore and South Africa have outlined pledges in terms of reductions of annual GHG emissions relative to a baseline.

³ The WRI Mitigation Goals Accounting and Reporting Standard (WRI, 2013a) provides detailed guidance on accounting for four Type I contributions: annual GHG emissions relative to a base year, annual GHG emissions relative to a baseline, GHG emissions per unit GDP relative to a base year, and fixed level targets, including carbon neutrality.

In addition to ex ante information to describe the contribution, Prag, Hood and Barata (2013) highlighted the importance of accounting for land sector emissions and removals, and treatment of market or non-market transfers of mitigation outcomes. Figure 2 illustrates this set of information and rules, separating those that define the scope, content and extent of the contribution ex-ante from ex-post accounting rules. Briner and Prag (2013) built on this analysis to show how understanding could be enhanced by agreeing bounded flexibility for some technical dimensions of contributions (e.g. by agreeing to use IPCC metrics for global warming potentials, or the same time frame for contributions).

Figure 2. Building blocks of accounting for GHG-framed mitigation contributions



Source: Adapted from Prag, Hood, and Barata (2013)

Radiative forcing is linked to cumulative emissions, not annual emissions. Therefore from the perspective of facilitating assessment of progress towards the global below 2 degrees goal, countries expressing contributions in terms of GHG emissions could be encouraged to do so in terms of cumulative emissions over multiple years rather than annual emissions in a single year. Countries could also combine long-term GHG contributions (e.g. to achieve net zero emissions by the second half of the 21st century) with short- to medium-term single or multi-year contributions.

GHG intensity goals and contributions expressed relative to baselines can in some cases make contributions more durable, since they can automatically adjust to changes in conditions (e.g. GHG emissions per unit GDP can adjust for future changes in GDP). However, more information is needed upfront in order to understand them. Specifically, projections of the denominator can enhance understanding of GHG intensity goals (i.e. GDP projections in the case of GHG emissions per unit GDP) and the baseline and the assumptions behind it can enhance understanding of baseline goals. Further, intensity goals and contributions expressed relative to baselines can increase the uncertainty associated with estimates of future emissions levels, and therefore make it more challenging to assess progress towards the below 2 degrees goal (Levin and Finnegan, 2013).

3.3 Accounting for non-GHG goals (Type II contributions)

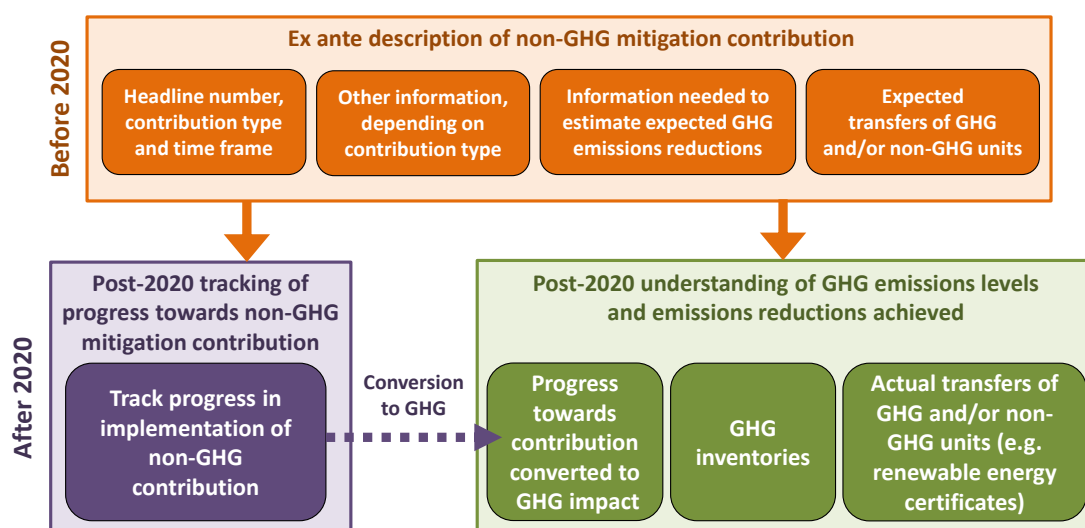
Most of the existing literature on accounting in the context of the UNFCCC focuses on Type I GHG contributions (Briner and Prag, 2013; WRI 2013a). However, many countries may choose to communicate non-GHG mitigation contributions (e.g. energy efficiency, renewable energy, forest cover targets or policy actions), either as standalone contributions or in addition to GHG contributions. Use of these non-GHG goals could help increase mitigation ambition by enabling Parties to take actions that have significant co-benefits, for example energy efficiency interventions that improve productivity and growth, renewable energy targets that create a local industry, or clean air mandates (World Bank, 2012). While experience with this type of contribution is low within the

UNFCCC, there is significant experience in policy tracking outside the UNFCCC process (Fransen and Cronin, 2013), and guidance has been developed on translating individual policies and measures into GHG impacts (WRI, 2013b).⁴

For non-GHG contributions, the building blocks of accounting would be different than for GHG contributions (Figure 3). In this case, there is still a set of information needed to define the scope, content and extent of the contribution before 2020. However for non-GHG contributions there is a distinction between accounting for the non-GHG mitigation contribution itself, and understanding the GHG impact of the contribution.⁵ Progress on the contribution itself could be assessed in non-GHG terms (e.g. area of forest cover, gigawatt-hours of new renewable energy production, successful implementation of a policy commitment), with the GHG calculation serving to enhance understanding of the climate impact of the contribution. Understanding the full GHG impact would generally require conversion of the contribution to GHG terms, inventory information, and information on market or non-market transfers of mitigation outcomes.

There is uncertainty associated with all estimates of future GHG emissions. However, the use of non-GHG goals increases the uncertainty associated with estimates of future emissions at the national and international level. Therefore, while use of non-GHG goals may facilitate broader participation in the 2015 agreement, it could also make it more challenging to make up-front estimates of expected emissions, and to assess aggregate progress ex post towards the below 2 degree goal.

Figure 3. Building blocks of accounting for non-GHG contributions



There are also many ways in which a non-GHG contribution can be expressed in detail, for example an energy efficiency contribution could be a commitment to introduce building codes, a percentage improvement in energy intensity, a final energy consumption goal, or a target to reduce energy use by a fixed quantity. These details will affect how easy it is to quantify, track, and translate contributions into GHG reductions, and to estimate future emissions. It may therefore be desirable to develop guidelines for common formats to express each type of contribution, a form of “bounded flexibility” (Briner and Prag, 2013). Table 1 outlines the information needed to understand selected Type II mitigation contributions.

⁴ The WRI Policy and Action Accounting and Reporting Standard (2013b) provides guidance on accounting for GHG impact of policies and actions such as regulations, subsidies, taxes and emissions trading systems, a step towards a framework to account for non-GHG mitigation contributions.

⁵ A renewable energy (or other non-GHG) target could also be framed and measured in terms of its GHG reductions: this would be a particular example of a GHG target referenced to a baseline, so would be covered by the description of GHG-framed contributions.

3.4 Accounting for non-GHG goals with long-term transformational impacts (Type III contributions)

Type III contributions are actions that set the conditions for long-term transformations to low-carbon economies and societies. While these actions aim to reduce GHG emissions in the long-term, they do not necessarily result in significant GHG emissions reductions in the short to medium term.

To date, commitments to reduce greenhouse gases under the UNFCCC have been structured around goals framed within the next decade, such as the commitment periods of the Kyoto Protocol and the 2020 targets put forward at COP 17 in Cancun. The set of mitigation actions that will deliver these goals at least-cost is not necessarily the same as those that are needed for longer-term deep decarbonisation.

Today's investment decisions in long-lived infrastructure may have a limited impact on short to medium term emissions, but a large impact in locking-in emissions over the long term. A narrow time window remains to set infrastructure development onto a clean path before major infrastructure investments are locked in – particularly in rapidly growing economies. Therefore Type III actions are important for these countries (World Bank, 2012), as an important supplement to Type I and II goals. Parties' actions in the short term to encourage research, demonstration and deployment of technologies that will be critical for deep decarbonisation could also be seen as Type III contributions.

If Type III contributions are to be recognised under the 2015 agreement, the accounting framework will need to be flexible enough to encompass them. While the impact of Type III actions on GHG emissions could be significant in the long term, it would be challenging to project expected future outcomes and expected quantities of emission reductions for these actions. Therefore Type III contributions should be viewed as a complement and not a substitute for Type I or Type II contributions. As the emissions reductions associated with this type of contribution would arise mostly after completion of the contribution itself, long-term emissions impacts could be estimated but not measured. It would be possible to report these estimates (if capacity allows) to highlight the importance of the action, and build understanding of likely global emissions trends over the longer-term.

One approach to formulating Type III contributions would be to focus on key actions that will keep infrastructure or technology development on track with low emissions development strategies (LEDS)⁶, thereby avoiding lock-in of high emissions infrastructure (World Bank, 2012). For example a country could state, as a Type III mitigation contribution, that the average emissions intensity of new power plants installed during the contribution period would be below a target level consistent with the LEDS roadmap. Achievement of the contribution would be measured in terms of the non-GHG goal (in this example, the emissions intensity of new power generation installed).

Examples of Type III contributions which could be consistent with LEDS include: rates of investment in R&D, demonstration and deployment of advanced technologies; emissions intensity for new infrastructure (power plants, buildings, industrial plant); implementation of low-carbon urban planning guidelines; numbers of green patents; quantity of low-carbon technology exports, or changes to low-carbon investment patterns. There has been little policy work to date to develop key indicators for tracking technology development. The IEA tracks development and deployment of key technologies at a global level compared to its 2DS pathway (IEA, 2013); this could be built on to provide Parties with options to track their Type III contributions toward global technology development needs.

⁶ Also low carbon development strategies (LCDS), low carbon climate resilient strategies (LCCRS)

Table 1. Information needed to understand and estimate GHG impacts for selected Type II mitigation contributions

Goal type	Information to understand contribution	Information to estimate GHG impact
Energy demand / energy efficiency <ul style="list-style-type: none"> • Total primary energy supply (PJ, Mtoe) • Final energy consumption (PJ, Mtoe) • Energy intensity (TWh per USD) • Energy intensity corrected for changes in economic structure (World Bank, 2013) • Energy consumption per unit of production in key energy-intensive sectors • Technology-specific goals (e.g. vehicle fuel economy or appliance standards, number of energy efficient light bulbs distributed) 	<ul style="list-style-type: none"> • Primary energy supply or final energy consumption • Coverage in terms of sectors or technologies • Whether imports and exports of energy are included or excluded, if applicable • Definition of the baseline and how/when this will be revised • Treatment of international trading or banking of energy efficiency certificates or white certificates, if applicable • Definition and estimated technology penetration for technology-specific goals (e.g. fuel economy standard, expected uptake) 	<ul style="list-style-type: none"> • Future anticipated energy supply/consumption • Emissions factors • Flows of GHG units (e.g. from Clean Development Mechanism projects) associated with energy efficiency reductions counted under the contribution (discussed further in Section 4) • For sectoral energy intensity goals: production levels, sectoral energy use.
Renewable energy <ul style="list-style-type: none"> • Annual production (PJ, Mtoe, kWh) • Share of renewable energy in total energy supply (%) • Share of renewable energy in total energy demand (%) • Cumulative installed renewable electricity capacity (MW) • Share of renewable electricity in total generation (%) • Share of new build of renewable energy in energy investment (%) • Funding of research, development and deployment (USD or other) • Biofuel production volume (litres) • Biofuel consumption volume (litres) • Share of biofuel production/consumption (%) 	<ul style="list-style-type: none"> • Coverage (e.g. electricity generation, heat, both) • Definition of “renewable” energy • How losses from the transmission and distribution networks are treated, if applicable • Exports of electricity, if applicable • Treatment of international trading of renewable energy certificates or green certificates, if applicable • Definition of biofuels • Feedstock and country of origin of the biofuels • Sustainability criteria of the biofuels, if applicable 	<ul style="list-style-type: none"> • Future anticipated electricity generation mix • Definition of the baseline and how/when it may be revised, if applicable • Emissions factors (country-specific or default) • Associated flows of GHG units, if applicable • Future anticipated levels of biofuel production/consumption • Treatment of indirect land use change, if applicable
Forest <ul style="list-style-type: none"> • Forest cover (km², hectares) • Forest stock volume (km³) • Share of forest cover in total land area (%) 	<ul style="list-style-type: none"> • Definition of forests used • New forest areas and restocked forest areas • Treatment of relevant natural events (e.g. forest fires) 	<ul style="list-style-type: none"> • Future anticipated levels of forest cover • Associated flows of GHG units, if applicable
Carbon capture and storage (CCS) <ul style="list-style-type: none"> • Annual volume of CO₂ captured/stored (m³) • Capacity/generation of CCS or CCS-ready plant (MW/MWh) • Share of CCS in total installed capacity or generation (%) • Funding of research, development and deployment (USD or other) 	<ul style="list-style-type: none"> • Definition of “CCS-ready”, if applicable • Net or gross reporting (i.e. treatment of energy needed for separation and transport of CO₂) 	<ul style="list-style-type: none"> • Future anticipated electricity generation mix • Emissions factors
Phase out of fossil fuel subsidies <ul style="list-style-type: none"> • Absolute magnitude of fossil fuel subsidies (USD or other) • Share of fossil fuel subsidies in total energy subsidies (%) 	<ul style="list-style-type: none"> • Definition of fossil fuel subsidies • Inclusion of producer or consumer support (or both) 	<ul style="list-style-type: none"> • Future anticipated energy mix • Emissions factors

As was the case with Type II goals, it would be helpful in understanding global aggregate action toward long-term decarbonisation if there were some bounded flexibility in the framing of Type III goals (for example expressing R&D funding according to common statistical definitions, and common definitions for low-carbon investment). These could take the form of rules or best-practice guidance, developed either within or outside the UNFCCC process.

3.5 Multiple contributions

It is likely that some countries will put forward multiple contributions of different types. Some of these could overlap, particularly if a combination of Type I and II goals are used (e.g. goals for annual GHG emissions plus goals for renewable energy, energy efficiency and/or forestry). The set of contributions could be structured as a primary GHG goal with Type II goals indicating how the primary GHG goal is to be met; or they could be multiple parallel contributions with equal weighting.

In theory, a GHG goal should drive energy efficiency and other cost-effective Type II contributions, since Type II actions are likely to be implemented to deliver the GHG goal. In practice, however, there are often multiple objectives of Type II actions besides reducing GHG emissions (e.g. energy security or air quality and health concerns), and there may be barriers to implementing energy efficiency or renewable energy actions that GHG emissions goals alone cannot address. Further, multiple contributions can provide a form of “safety net” for climate action. This is because if one goal is subsequently repealed or not met, the other goals can compensate (Ricardo-AEA, 2013). There is some evidence that in packages of multiple contributions, the combined effect of Type II elements can indirectly lead to more GHG reductions than explicitly described by the Type I GHG target (Sterk et al., 2013), reinforcing the potential value of the seemingly redundant multiple elements in bolstering ambition. For example, The European Union’s renewable efficiency and energy efficiency goals (combined with the impact of the economic crisis) are expected to lead to domestic emissions reductions of 25% compared to 1990, compared to the target of 20% (European Commission, 2011).

The use of overlapping multiple contributions poses accounting challenges, first to ensure that emissions reductions are not double counted, and second, how to estimate future emissions levels before 2020. For countries with multiple Type II contributions but no Type I contribution, policy interactions mean that it is more meaningful to make a single estimate of the aggregate impact of the various actions on future inventory emissions, rather than add the individual savings (Hood 2013; WRI 2013b). Information could also be provided on the assumptions used in making this calculation. For Parties with both Type I and Type II contributions, a useful role for the analysis of contributions would be to assess the consistency of the Type I and Type II goals. If the Type I target is found to be less ambitious than the expected effect of the Type II contributions, the Party could be encouraged to strengthen its Type I contribution.

A final issue for accounting is the potential overlap between contributions addressing sub-national action (for example in cities), and those at the national level. Given that engagement with the UNFCCC is at the national government level, sub-national mitigation contributions would be in addition to national-level contributions, rather than instead of them. As with Type II and III contributions, tailored information would need to be submitted to understand sub-national mitigation contributions and their direct impact on GHG levels. However their impact on future inventory emissions at the national and international level could be difficult to estimate, due to overlap with national-level calculations. As such, while it would be useful to report GHG estimates to highlight the value of the actions, the national-level contributions would be used for accounting.

3.6 Accounting for single-year versus multi-year contributions

Another dimension of the accounting challenge is that contributions could be for a snapshot in a single target year (e.g. for the year 2030), or could cover multiple years across a continuous period (e.g. for the period 2020-2030). Single-year contributions add to the uncertainty in estimating total cumulative emissions, because only emissions in the target year and not intermediate years are covered. In addition, Party-to-Party transfer of emissions units (or non-market mitigation outcomes) could be problematic in the case of single-year contributions if units of vintages outside the target year are used. Any use of double-counted units would further exacerbate uncertainties over total emissions (Prag, Hood and Barata, 2013). Options for dealing with these issues will be explored further in Section 4.

Multi-year mitigation contributions decrease uncertainty regarding the environmental outcome of the contribution (e.g. its actual impact on atmospheric GHG concentrations). They also simplify accounting for transfers of units. However, environmental effectiveness still depends on the ambition of the contribution. If targets are weak and overachievement can be carried forward to future periods,⁷ there is potential for locking-in low levels of mitigation action over the long term (Sterk et al., 2013).

The legal form of mitigation contributions, although not the focus of the paper, will influence whether the contribution is seen as something that needs to be reconciled to each tonne (similar to Kyoto targets) or as a more general goal that drives policy action. Under a legal form that requires precise reconciliation of the emissions targets, Parties may tend toward use of multiyear (rather than single-year) contributions, as these facilitate the use of market or non-market transfers that would make precise reconciliation easier.

If contributions are seen only as goals, there will be much less ex ante certainty on the final or total emissions level likely to be achieved: emissions could be above the target level if policies are delayed or unsuccessful, or below the target level (overachieving the goal) if the target is set too conservatively or mitigation policies are more successful than anticipated. Whether Parties adopt single-year or multi-year contributions, this type of legal form would only strengthen the need for clear accounting to enable ex post tracking of actual developments, and the best up front estimate feasible.

4. Addressing double counting of emissions reductions

GHG emissions units are relevant for UNFCCC accounting only when units that originated outside the boundary of a Party's contribution are counted directly towards the achievement of that contribution (Prag, Hood and Barata, 2013). This can occur from international transfers of units, from the use of domestic units that originated in sectors not covered by the contribution (e.g. agriculture or soil carbon) or from the use of units generated in a different time period. Units transferred between linked domestic trading systems, or offsets purchased by entities covered by those systems, are not relevant for UNFCCC accounting unless one Party chooses to count those units directly towards meeting a national mitigation contribution. Similarly, transfers of mitigation outcomes via non-market approaches could also be relevant to UNFCCC accounting, if the emissions reductions achieved in one country are counted towards the mitigation contribution of another country.

At COP 18 in Doha, a work programme was launched to elaborate a framework for various approaches (FVA) that Parties may develop individually or jointly, using markets or non-market approaches. It was agreed that "all such approaches must meet standards that deliver real, permanent, additional and verified mitigation outcomes, avoid double counting of effort and achieve a net decrease and/or avoidance of greenhouse gas emissions" (UNFCCC, 2012a). Among other issues, the FVA is therefore expected to include:

⁷ If emissions are below the target level an option would be to allow these to be "banked" and credited against emissions reductions required under future targets.

- i. A set of criteria and/or governance mechanisms to ensure environmental integrity of units or non-market transfers of mitigation outcomes.
- ii. Provisions to enable accurate recording and tracking of transferred mitigation outcomes (for example through registry systems meeting certain standards).

Transferable units arising from such approaches raise important accounting issues, including the potential for double counting of mitigation action. There are a number of forms that double counting of mitigation could take:

- **Double issuance** of units for a single emissions reducing activity, for example in two crediting or trading mechanisms covering the same economic sector. Schneider, Kollmuss and Lazarus (2014) highlight the importance of strong governance of market mechanisms to prevent issuance of units corresponding to activities that have already been credited.
- **Double selling or retirement** of units to meet multiple obligations. Robust registry systems (for example with mutually recognised serial numbers) are important to avoid the same unit being sold to more than one buyer, or retired in more than one registry (Prag et al, 2011).
- **Double claiming** of the emissions reductions associated with the transferred units by both the host country and the country receiving the units.
- **Double coverage** of transferred emissions reductions by a GHG target in one country and a non-GHG target in the other.

Options for registries and governance are considered in detail in Prag et al (2011) and Prag, Hood and Barata (2013), so questions of double issuance and double selling or retirement will not be dealt with in this paper. Rather, this section deals with the final two issues. These relate to situations where Parties have mitigation contributions of different types, and there is transfer of emissions reductions that is counted toward achievement of one of the contributions. Double counting could occur whether the transfers occur by market or non-market mechanisms. This section also considers the implications of single-year versus multi-year mitigation goals.

There are two points at which double counting of mitigation outcomes is particularly important: (i) when the expected collective global GHG impact of mitigation contributions is estimated up-front before 2020; and (ii) when the actual impact is calculated after 2020. For each mitigation contribution, it should be possible to individually understand and track delivery of the contribution, and understand (or estimate) and track its associated GHG emission reductions. However, to understand aggregate global GHG emission reductions, it is necessary to also have information on the quantity of transfers between the Parties that are counted toward their contributions. An ex ante understanding of likely use of transferred units or mitigation outcomes would enable an ex ante understanding of how future inventory emissions, target emissions levels, and transfers could add up.

4.1 Double claiming of GHG mitigation outcomes

There could be double claiming of mitigation when two Parties have quantified GHG (Type I) contributions, and one Party accounts for transferred mitigation while the other expresses its contribution only in terms of inventory emissions.⁸ Discussions to date of double claiming have focused primarily the potential for units from crediting mechanisms to be counted toward both the host and purchasing countries' targets; however transfers between linked ETSs could similarly give rise to double claiming (Prag, Hood and Barata, 2013).

⁸ In addition, there will only be double claiming if the emissions reductions in question appear in the national GHG inventory. Some project-level emissions reductions may not be captured by inventory systems that use average parameters, even if they occur in sectors covered by the national inventory.

A form of double claiming could also occur within a single Party's contribution, if mitigation outcomes are transferred from a different time period that used different accounting (for example if banked units in an emissions trading system are used in a later period under different rules).

There are several approaches that could be taken to address double claiming of mitigation outcomes. The appropriate choice will depend on whether Parties only wish to prevent double counting from disrupting the final aggregate ex-post reconciliation of total emission reductions, or whether they also wish to understand and/or prevent double counting when future GHG reductions are estimated before 2020. The result of this negotiation could be an agreed set of accounting rules for those countries opting to participate in market or non-market transfers of mitigation outcomes.

If **preventing double counting during final ex post reconciliation** is desired, information on actual net flows (issuance, retirement, transfers, banking⁹) of units or non-market mitigation transfers is needed. This information would be needed from all Parties involved, whether they are the host or buyer/recipient of the mitigation transfer, and irrespective of their type of mitigation contribution (Type I or Type II). Reporting information on flows does not necessarily mean that these would be tallied against the individual contributions; rather this information would be used to understand the aggregate emissions reductions resulting from the contributions.¹⁰ That is, there could still be double claiming of mitigation between individual countries' contributions, but enough information would be available to ensure that the aggregate global reductions could still be accurately calculated ex post. As there are no restrictions on double claiming, the degree to which this occurs would not be known until the end of the reporting period. As such, there could be significant uncertainty ex ante on the total emissions reductions expected.

If **greater certainty is desired on ex ante estimates** of the aggregate GHG impact of contributions, there are essentially three options (Prag, Hood and Barata, 2013).¹¹ These would be in addition to the requirement to report actual transfers ex post:

- i. **Estimation:** All Parties intending to participate in unit or non-market transfers (irrespective of the type of their contribution) would be required to provide a best estimate ex ante of expected unit or non-market flows. An ex ante understanding of potential flows would enable some understanding of how future inventory emissions, target emissions levels, and transfers are expected to add up. However actual flows could turn out to be quite different from those anticipated.
- ii. **Quantity limit:** A maximum use of transferred emissions reductions could be agreed for units that are issued by jurisdictions that do not account for transfers. Specifying a maximum level would limit the degree of potential double claiming, allowing some greater understanding of aggregate emissions reductions ex ante, but not eliminating double claiming.
- iii. **Agree accounting rules to be used when using market mechanisms or non-market approaches for international transfers:** Parties could agree that transferred mitigation can only be used to meet goals when both Parties account for the transfer.

⁹ Prag, Hood and Barata (2013) explores this in more detail, and offers three alternative equivalent sets of information that could be provided. Parties should also report which of these units/transfers arise from within the boundary of the mitigation contribution, and which are outside.

¹⁰ That is, the total global emissions reductions that the mitigation contributions have delivered. It is important to track this in addition to actual emissions levels (which would be understood via national inventories), to understand what impact the contributions have had.

¹¹ Levin et. al (2010) also consider the option of restricting issuance of units to sectors, locations or entities not covered by a national mitigation contribution. This might be possible for project crediting, however sectoral crediting or emissions trading would likely be in sectors covered by a mitigation contribution.

This option would provide better ex ante clarity over emissions levels, as it essentially prevents double claiming between GHG (Type I) contributions.

As these options are considered, it should be remembered that many Parties are already participating in market mechanisms through the Clean Development Mechanism (CDM). Therefore, any criteria to “opt-in” to use of markets or non-market transfers should be realistic for these countries while also providing as much ex ante understanding of contributions as is feasible, and giving an incentive to progress to more comprehensive emissions contributions over time.

4.2 Double coverage of transferred emissions reductions by GHG and non-GHG goals

As discussed in Section 3.3, non-GHG (Type II) contributions such as renewable energy targets may be put forward primarily for non-climate reasons, and achievement would naturally be measured in terms of their own metric (e.g. gigawatt hours of renewable energy generated). Translation to greenhouse gas reductions is still important to provide information on estimated emissions reductions associated with the contribution, to enable estimation of collective ambition pre-2020, and an accurate count of aggregate results ex-post.

Countries with a non-GHG (Type II) goal could participate in transfers of greenhouse gas emissions reductions through crediting, trading, or non-market mechanisms. For example, some current hosts of CDM projects do not have GHG targets, but may have non-GHG (Type II) sectoral goals. If the transferred mitigation is generated in sectors covered by Type II goal, there is the potential for double counting of the resulting emissions reductions when they are estimated pre-2020, or counted ex-post, because the reductions are covered by two different types of targets. Examples of potential double counting of this type are shown in Table 2.

In Section 4.1 it was argued that at a minimum, all Parties participating in transfers of mitigation should be required to report actual net flows (issuance, retirement, transfers, banking) for market or non-market transfers. As long as this reporting is done by all Parties including those with only Type II goals or contributions of policies and measures, then enough information would be available to disentangle any double counting, and accurately assess aggregate global reductions ex post. Options to reduce ex ante uncertainty about this form of double counting are more limited: asking countries for a pre-2020 estimate of expected unit flows would provide some information.

Table 2. Selected examples of how double counting of mitigation could arise with non-GHG (Type II) contributions

Party A contribution type	Party B contribution type	Example of how double counting could arise due to double coverage of target types
GHG goal (taking into account unit transfers)	Renewable energy target (based only on installed capacity)	The renewable energy target in Party B is delivered in part by renewable energy projects that have been financed by the CDM. The associated CERs have been sold by Party B to Party A, which uses them for compliance. Double counting would arise if the total emissions reductions achieved are estimated by summing the total mitigation claimed by Party A and the emissions reductions associated with the renewable energy target of Party B.
Renewable energy target (based only on installed capacity)	Renewable energy target (taking into account transferred renewable energy credits)	Some renewable energy policies are implemented through tradable green certificate schemes. Green certificates can be purchased and cancelled, or potentially used in other jurisdictions if there is linking. If Party A reports renewable energy based on installed capacity while Party B includes transferred certificates, there could be double counting of the resulting total greenhouse gas emissions reductions reported.
GHG goal (taking into account unit transfers)	Forest cover target (not expressed in GHG terms)	If forest clearing in Party B is slowed through REDD and credits are sold to (and claimed by) Party A, then the total GHG reductions is not the simple sum of the reductions associated with the two mitigation contributions.
GHG goal (taking into account non-market transfer of mitigation outcomes)	Policies and measures	The policies and measures in Party B are delivered in part by a non-market mechanism supported by Party A, and associated emissions reductions are shared. Party A claims its share towards a GHG target. Party B (which does not have a GHG target) simply reports on delivery of the policies and measures and the GHG reductions from them. There could be double counting of greenhouse gas emissions reductions.

4.3 Avoiding double counting in the case of single-year targets

If a contribution is for a single target year only, then the inclusion of transfers (including offsets, units from trading systems, or non-market transfers) can be problematic (Prag, Hood and Barata, 2013). If units with multiple vintages are accrued over a number of years then retired in the target year, this would give a misleading picture of the total emissions, as what the atmosphere “sees” are cumulative emissions across all years, not just the emissions level in the target year. Unconstrained use of units against single-year targets could also significantly exacerbate ex ante uncertainty over likely cumulative emissions.

In Prag, Hood and Barata (2013), options proposed to reconcile unit use and single-year targets included to report unit use (which would enable ex post reconciliation, but leave poor ex ante understanding), limit unit use to target-year vintage units only (addressing the issue of matching timeframes, but still not helping with ex ante understanding); put quantitative limits on unit use toward single-year targets (improving ex ante understanding); or prohibit unit use toward single-year targets and only allowing them in continuous multi-year contributions (providing best ex ante clarity).

Building on this analysis, an additional distinction can be drawn between units/transfers counted in the target year that are representative of a long term domestic policy commitment, and those that are a one-off action in the target year. In principle, if units/transfers counted in the target year are representative of what is also occurring in intervening years, then allowing their inclusion should be less problematic. For example, if companies operating within a domestic emissions trading system import and retire credit units for compliance with a continuous, binding ETS obligation at the domestic level, then these could be counted as part of a national single-year contribution. Similarly, if a government had in place a multi-year programme of acquiring emissions reductions via non-market transfers, counting these in a

target year would not be problematic as long as they are representative of action occurring on an annual basis, not a one-off attempt to square the books only in the target year.

4.4 Options for opt-in provisions for use of transferred emissions reductions

For Parties wishing to participate in transfer of emissions reductions (via market and/or non-market approaches), a set of accounting rules and eligibility criteria could be agreed, to address issues of double claiming, double counting of Type II contribution emission reductions, and single-year targets. Parties would “opt in” if they wish to participate in transfer of emissions reductions and in doing so agree to meet the associated eligibility requirements and accounting rules. While the rest of the accounting framework would be applicable to all Parties, this set of accounting rules would only apply to Parties opting to use market mechanisms and/or non-market approaches to transfer GHG units or mitigation outcomes from one Party to another.

This section focuses on possible accounting rules for transferred emissions reductions. Other key aspects of eligibility that are not covered here would include maintaining adequate registry and unit tracking arrangements, as well as following agreed processes to ensure environmental quality of transferred emissions reductions (Prag et al, 2011).

There are three purposes of accounting rules for use of transferred emissions reductions. First, they would facilitate reconciliation after 2020 of actual GHG emission levels and achievement of mitigation contributions for each national contribution. Second, they would enable an accurate aggregation of total global emissions reductions resulting from these national mitigation contributions. Third, they could reduce uncertainties in pre-2020 estimates of expected post-2020 emissions levels.

To achieve the first and second purposes (accurate ex-post reconciliation at the national and global level) all Parties involved would need to report information on actual GHG unit flows, including international transfers and units carried over from (or banked to) different time periods. With regard to the third purpose (reducing uncertainty in pre-2020 estimates of outcomes), different packages of information requirements and accounting rules could be agreed, with each providing a different level of pre-2020 understanding of the expected aggregate emissions reductions from mitigation contributions. If there is significant uncertainty pre-2020 about the potential for double counting, this could make it difficult to assess the level of collective mitigation ambition proposed by the national contributions. Table 3 presents three broad options for packages of accounting rules for Parties opting to use market mechanisms or non-market approaches to meet part of their mitigation contributions.

Table 3. Options for packages of accounting rules for Parties opting to participate in transfer of emissions reductions via market or non-market approaches

	Elements of information provision and accounting rules	Outcomes
Option 1: Minimum transparency	<p>1. Irrespective of their contribution type, all participating Parties agree to:</p> <ul style="list-style-type: none"> • report actual issuances, transfers, retirements, banking of GHG units and transferred emissions reductions • provide pre-2020 estimates of expected flows of GHG units and transferred emissions reductions. 	<p>Achievement of national mitigation contributions can be reconciled with GHG emissions levels post-2020, based on reported unit flows.</p> <p>While there may be double claiming of reductions by more than one Party, information provided on unit flows enables an accurate count of aggregate global emissions reductions ex-post.</p> <p>Pre-2020 estimates of unit flows provide some estimate of potential double claiming.</p>
Option 2: Enhanced clarity and limits on double claiming	<p>1. Irrespective of their contribution type, all participating Parties agree to:</p> <ul style="list-style-type: none"> • report actual issuances, transfers, retirements, banking of GHG units and transferred emissions reductions • provide pre-2020 estimates of expected flows of GHG units and transferred emissions reductions. <p>2. Quantitative limit on use of units from Parties that do not take into account transferred units in their mitigation contributions.</p> <p>3. Use of transferred units and emissions reductions in single-year targets must be reflective of continuous policy action not a one-off reconciliation.</p>	<p>Achievement of national mitigation contributions can be reconciled with GHG emissions levels post-2020, based on reported unit flows.</p> <p>While there may be double claiming of reductions by more than one Party, information provided on unit flows enables an accurate count of aggregate global emissions reductions ex-post.</p> <p>Quantitative limits on unit use define the maximum possible level of double claiming, allowing better pre-2020 estimation of expected emissions reductions after 2020.</p> <p>Avoids problems caused by one-off reconciliation with units in single target year.</p> <p>If Parties put forward GHG contributions that do not take into account unit flows, purchase of their units by other Parties would be limited.</p>
Option 3: Avoidance of double claiming	<p>1. Irrespective of their contribution type, all participating Parties agree to:</p> <ul style="list-style-type: none"> • report actual issuances, transfers, retirements, banking of GHG units and transferred emissions reductions • provide pre-2020 estimates of expected flows of GHG units and transferred emissions reductions. <p>2. All participating Parties agree that if they have GHG-based mitigation contributions, these will take into account flows (issuance, transfers, retirement, banking) of units, and that GHG contributions will have continuous multi-year rather than discontinuous single-year targets.</p>	<p>Achievement of national mitigation contributions can be reconciled with GHG emissions levels post-2020, based on reported unit flows.</p> <p>Avoids double claiming between GHG contributions. This simplifies calculation of aggregate emissions reductions ex-post, and enables best pre-2020 estimates of expected emissions reductions.</p> <p>For developing countries already involved in markets through the CDM, this option could create a disincentive to take on GHG-based mitigation contributions due to the extra complexity, as in this option GHG contributions must take unit flows into account and be continuous rather than single-year. Some Parties may, in that case, prefer non-GHG contributions.</p> <p>Could create a disincentive to development and linking of domestic carbon markets in regions without the required form of national contribution.</p>

Finally, for all these contribution types, there needs to be clarity on how upstream (production) and downstream (consumption) targets could overlap, and how accounting can overcome this problem. For example, there could be double counting if there is transfer of goods embodying an emissions reduction (for example clean electricity or biofuels) between contributions framed as production-based and consumption-based goals (Schneider, Kollmuss and Lazarus, 2014). Similarly, if electricity is exported from one Party (whose contribution is to generate a certain quantity of clean electricity) to another (whose contribution is based on

GHGs), the emissions reductions associated with low-carbon electricity generation could be counted in both mitigation contributions.

Potential solutions could involve bounded flexibility to require contributions to be in a common basis, or procedures to reconcile flows across borders if countries use a different accounting basis. There will also need to be agreement on how emissions reductions carried forward from previous periods will be accounted for.

5. Options for land sector accounting

Accounting for land sector mitigation contributions can diverge from land sector inventory accounting. This is because contributions generally target direct human-induced activities while emissions inventories capture all emissions and removals both natural and human-induced. For the same level of mitigation ambition, different accounting approaches can result in very different headline numbers for emissions reductions. For Parties with a significant share of emissions from the land sector, it could therefore be difficult to communicate quantified contributions unless there is some understanding of the accounting approach that will be applied (Prag, Hood and Barata, 2013). There is significant existing experience in the UNFCCC on which to build future land sector accounting arrangements (Annex A).

5.1 Options for bounded flexibility for post-2020 land sector accounting

If one of the aims of the 2015 agreement is to move to a more comprehensive land sector accounting framework that is applicable to all Parties and allows for comparability with some degree of flexibility, then key questions for Parties to consider are:

- i. What approach will create positive incentives to broaden participation of Parties and increase the inclusion of lands or activities?
- ii. How will different national circumstances and capabilities affect the effectiveness of the approach chosen?

Table 4 summarises some of the potential approaches that could be used in the post-2020 climate regime to include developed and developing countries, and bring in more land area and/or more activities. It will be necessary to take into account different national circumstances and capabilities (e.g. institutional arrangements, data, financial and human resource availability for MRV systems; policies and enforcement mechanisms). However, focus must also be kept on the ultimate goal of creating a more comprehensive land sector accounting framework applicable to all Parties, so that a greater share of emissions and removals from the land sector will be reported and accounted for.

The options explored in Table 4 assume that neither exempting the land sector from the agreement (a “no accounting” option) nor complete freedom of choice of accounting (a “free for all” option) would be politically realistic. There are therefore two main options: “International agreement on a common approach to land sector accounting” or “Agreement on principles for land sector accounting”.

The first option, “International agreement on a common approach to land sector accounting”, has the advantage that it would potentially create the necessary conditions for more comparability among the contributions from Parties. The “Reference levels for all” approach combines comparability and flexibility by establishing nationally-appropriate baselines against which land sector activities are measured. The next section will explore that approach in more detail.

Under the “KP approach”, applying the current KP approach post-2020 would probably only bring new afforestation, reforestation and deforestation (ARD) activities (mostly from developing countries) into the accounting framework. The extent to which forest management

(FM) could be included by developing countries would depend on their experience and success with REDD+ activities, and associated forest reference emission levels and/or forest reference levels. Developed countries that did not participate in the KP may also find it difficult to apply an activity-based approach due to the additional reporting requirements.

Applying the "UNFCCC-based" approach would create its own set of challenges, in particular for developing countries, due to the uncertainties and technical difficulties of estimating emissions and removals from specific UNFCCC land categories. In this approach, full GHG accounting is expected on all managed lands, and countries with low capabilities may not be confident of being able to cover all required elements across all land categories. To avoid this situation, Parties may apply a gradual approach, where they can start by accounting emissions and removals on a sub-set of land areas and move to a more comprehensive coverage when they develop more capabilities. Applying this approach also raises the debate about how to separate human-induced emissions and removals from natural ones. An activity-based approach will in theory capture only the human-induced emissions and removals resulting from each activity. If instead land categories are used as a basis for the accounting framework, it may potentially also include emissions and removals that are not human-induced occurring on that land area. To avoid such a situation, the natural disturbance provisions developed for the second commitment period of the KP¹² could be adapted to be used in this case.

¹² When accounting for forest management, afforestation and reforestation activities under Article 3, paragraph 4, KP Parties may exclude from the accounting, either annually or at the end of the second commitment period, emissions from natural disturbances that in any single year exceed the forest management background level (in the case of forest management) or the afforestation and reforestation background level (in the case of afforestation and reforestation). Any subsequent removals during the commitment period on the lands affected shall also be excluded from the accounting (UNFCCC, 2012b).

Potential approaches for more comprehensive accounting in the land sector for all Parties¹³

Approach/Activity	Afforestation, reforestation & deforestation (ARD)	Forest Management (FM)	Other Activities (including REDD+, where applicable)	Pros/Cons – not a complete list	Potential implications for measuring progress toward contributions	
<i>International agreement on common approach to land sector accounting</i>	<i>“KP Approach”</i> Activity-based approach, building on KP rules	Mandatory to all Parties	Mandatory if already accounting for this, otherwise depends on national capacity	Voluntary to all Parties	Builds on KP experience ARD will be accounted in all countries The election of additional activities will be voluntary	Focus would need to be on ARD and FM (in developed countries and developing countries that elected the activity)
	<i>“UNFCCC-based”</i> Land-based approach, building on UNFCCC reporting	Instead of selection of activities, this approach would follow the land categories that Parties use to report emission and removals under the Convention		All anthropogenic emissions and removals from “managed” land would be accounted ¹⁴ Parties may still have concerns in relation to uncertainties and technical difficulties of estimating emissions and removals; in particular isolating anthropogenic effects (“factoring out” ¹⁵ and effects of natural disturbances)	Focus would need to be on the land managed classification	

¹³ The approaches listed are the result of merging and modifying options of Table 6 from Prag, Hood and Barata (2013) and Table 3 from Briner and Prag (2013).

¹⁴ The IPCC Guidelines have adopted the use of estimates of GHG emissions and removals on managed land as a proxy for the estimation of anthropogenic emissions and removals. "Managed land is land where human interventions and practices have been applied to perform production, ecological or social functions" (2006 IPCC Guidelines).

¹⁵ Since the objective of the accounting is to cover only anthropogenic emissions and removals; Decision 16/CMP.1 (paragraph 1(h)) stipulated that in the accounting of removals from LULUCF activities Parties need to "exclude removals resulting from: (i) elevated carbon dioxide concentrations above their pre-industrial level; (ii) indirect nitrogen deposition; and (iii) the dynamic effects of age structure resulting from activities and practices before the reference year". This has been called "factoring out".

	<p><i>“Reference levels for all”</i> Expanded use of reference levels</p>	Mandatory to all Parties	Mandatory if already accounting for this, otherwise depends on national capacity	Depends on national capacity	<p>"Bounded flexibility" is given to Parties through use of national reference levels More activities will be included There are methodological and institutional challenges (in particular in developing countries and some developed countries) to determine the reference levels. These difficulties may go beyond transparency on assumptions and strengthening of capacity. Additional rules may be needed to guide the use of reference levels</p>	<p>Since all activities will have an associated RL the focus would be on the process of determining the RL (including technical assessment).</p>
<p><i>Agreement on principles for land sector accounting</i></p>	<p>Selection and accounting of activities will be made based on agreed principles (e.g. mandatory versus voluntary; net-net versus gross-net; natural disturbance; carbon pools including harvested wood products; etc.) or Alternatively, the principles could be more general (e.g. the use of IPCC and UNFCCC guidance for estimating and reporting land sector emissions and removals; the use of National GHG Inventories as the basis for land sector accounting) and aim to guide all Parties in choosing between different accounting approaches.</p>	<p>More flexibility to Parties Negotiation of the principles may take as long as negotiation of a single approach Principles could be applied to reflect national circumstances and capabilities; giving to Parties a 'bounded flexibility' approach for the land sector - i.e. allowing countries to choose their land sector accounting approach, provided they are applying agreed methodologies and guidance. Avoid creating an overly prescriptive approach. Application of principles may be subject to Parties interpretation, and could create difficulties during reviews.</p>	<p>Focus would need to be on the application/interpretation of the principles</p>			

The second option “Agreement on principles for land sector accounting” would potentially allow more flexibility. The major issue in this option is what type of principles would be agreed. The principles could be the general elements necessary to construct a reference baseline (e.g. mandatory versus voluntary; net-net versus gross-net accounting; managing natural disturbances; carbon pools including harvested products, etc.). In this case, there may be little difference between this approach and that of “Reference levels for all” in terms of accounting. Alternatively, rather than providing the elements of baseline construction, the principles could be more general and aim to guide Parties in choosing between different accounting approaches. In this case, the principles would relate to national circumstances and capabilities in order to facilitate and explain the choice of accounting framework made by a Party. For example some countries with dynamic land sectors might find a reference level approach more useful, while other countries may only want to include stable land sector emissions within an economy-wide pledge so might prefer an UNFCCC-based approach. An agreed set of principles could help guide and explain these choices.

Several approaches could give the flexibility and confidence that Parties need to take on land sector contributions. None of these approaches will necessarily make Parties account for more emissions or removals (i.e. 100% cover of the anthropogenic emissions and removals), rather this will depend on whether the detailed modalities and procedures (to be developed) create positive incentives to broaden participation and inclusion of more lands and/or activities in the accounting framework. Since the application of the accounting framework will only happen after 2020, Parties would have sufficient time to develop the institutional and technical arrangements necessary (assuming necessary means of implementation).

In implementing any new approach, it should be remembered that the IPCC has produced guidelines that can continue to be used to underpin land sector accounting (e.g. IPCC, 2003b). Any further accounting framework can use this material, and if necessary Parties can invite IPCC to develop further guidance.

5.2 Information needed to understand land sector contributions in a reference level approach

In a reference level approach, the reference level (RL) is a value of annual net emissions and removals from a land sector activity. Accounting for progress on the land sector contribution would require tracking net emissions and removals for that activity compared to the RL. Based on the experience that Parties had in constructing forest management reference levels (FMRL) under the KP, there are several possibilities for constructing reference levels:

- (a) Projections using country-specific methodologies
- (b) Projections using an internationally-agreed approach
- (c) Historical RL based on a single year
- (d) Average emissions and removals during a historical time series
- (e) Linear extrapolation of historical emissions data of the land category remaining in the same category used for reporting under the Convention
- (f) Zero value, equivalent to gross-net accounting¹⁶ using a narrow approach.¹⁷

¹⁶ Gross-net accounting considers the emissions and removals during the commitment period only, without comparison to the emissions and removals of a previous period of time. In the first KP commitment period, the gross-net accounting was only used for forest management. Other activities used a net-net accounting; i.e. identifies the emissions and removals that occurred in the base year or period and in the CP due to the activity, and considers the difference between the two.

¹⁷ A “narrow approach” refers to the effect of individual practices such as reduced tillage or irrigation water management on an area of land. By contrast, a “broad approach” is when the net effect of all practices applied to an area is considered.

To guide the construction of reference levels, a list of potential elements could be agreed by Parties. Table 5 explores, based on the elements used for the FMRL, if such elements could be applicable to other land sector activities. The complete list of elements and how they apply to other land sector activities would be subject to negotiation among Parties.

In addition to information on how the elements were taken into consideration in the construction of the respective RLs; Parties would need to explain how carbon pools (including harvested wood products) and natural disturbances¹⁸ were considered. An initial technical assessment (similar to the one done for the FMRL) could evaluate if the construction of the RLs was consistent with the information and descriptions of the elements provided by the Parties.

Table 5: Indicative list of elements needed for the construction of reference levels

Element/ selected land sector activity	Forest management	Revegetation	Cropland management	Grazing land management	Wetland drainage, rewetting
Historical data from GHG inventory submissions (e.g. area, emission factors, etc.)	Applicable to all activities				
Age-class structure	Applicable		NA	NA	NA
Factoring out	Applicable to all activities				
Activities already undertaken					
Projected activities under a 'business as usual' scenario					
Continuity with the activity in the previous CP	Only applicable to 2 nd CP KP Parties	If elected in the 2 nd commitment period of the KP			

For some Parties (in particular developing countries) it could be difficult to present and justify all the information above for all activities at once. Parties could agree on certain incentives (e.g. tech transfer; finance through the Green Climate Fund; capacity building, etc.) and/or a step-by-step process that would allow for incremental inclusion of land/activities. Developing countries (and some developed countries) will need technical and financial support for creating and implementing the human and institutional capacity and the infrastructure to undertake land sector accounting. One particular area of need may be in regard to global and/or regional models¹⁹ for projection of land use. Those can be used for constructing RLs; but based on the current situation developing countries probably will have difficulties in developing and/or applying such models. Partnership with developed countries could help overcome such deficiencies.

6. Timing of key decisions and possible ways forward

The diverse range of post-2020 mitigation contributions that is likely to be communicated by Parties raises challenges in developing a broad and flexible accounting framework for the post-2020 period. There will be trade-offs for Parties as they negotiate the post-2020 accounting arrangements between precise clarity of expected future emissions levels, and the degree of flexibility afforded to Parties. Allowing a diverse range of contribution types,

¹⁸ Assuming a similar definition to Decision 2/CPM.7: "those that cause significant emissions in land use categories and are beyond the control of, and not materially influenced by, a Party. These may include wildfires, insect and disease infestations, extreme weather events and/or geological disturbances, beyond the control of, and not materially influenced by, a Party."

¹⁹ For example the Global Forest Model (G4M):

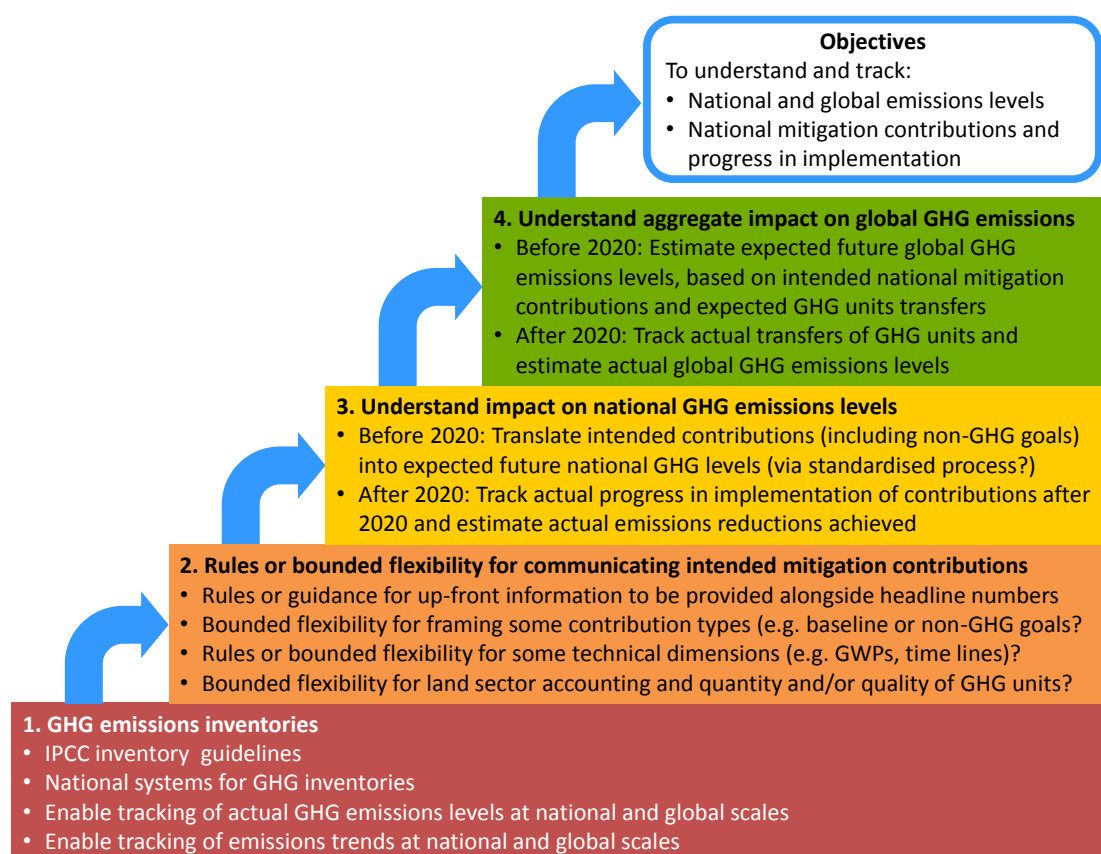
<http://www.iiasa.ac.at/web/home/research/modelsData/G4M.en.html>

GLOBIOM: <http://www.iiasa.ac.at/web/home/research/modelsData/GLOBIOM/GLOBIOM.en.html>

including GHG contributions relative to baselines and non-GHG framed contributions, may improve participation (and hence total mitigation), but it also introduces uncertainty around expected future emissions levels.

The accounting framework for post-2020 mitigation contributions can be viewed as a set of building blocks (Figure 4):

1. GHG inventories are the foundation of accounting, and form the basis on which the other blocks build.
2. While mitigation contributions will be nationally determined, there could be internationally-agreed rules or guidance for what information should be supplied with different types of contributions. There could also be bounded flexibility agreed on the framing of each type of contribution (e.g. expressing non-GHG contributions in metrics that are more easily translated into estimated GHG reductions). This could help to increase understanding of what the intended contributions are and how progress towards them will be measured in the post-2020 period. This would be the case whether contributions are expressed in GHG or non-GHG terms.
3. The third block is to estimate the impact of intended mitigation contributions on expected future national GHG emissions levels in the post-2020 period. This is trivial for contributions expressed in terms of annual GHG emissions relative to a base year or fixed level. For other contribution types, the ease of making this estimation depends on the precise framing of the contribution (e.g. whether a renewable energy target is framed as a fixed quantity GHG reduction, or as percentage of total electricity supply). Bounded flexibility on framing contributions could help to simplify this translation exercise. After 2020, actual progress in implementation of contributions and actual emissions reductions achieved are tracked.
4. The final block is to aggregate the impact of individual national contributions in order to estimate expected future global GHG emissions levels for the post-2020 period. To do so, information is needed on expected GHG unit transfers via market mechanisms that could potentially lead to double counting (transfers of mitigation outcomes via non-market mechanisms would also be relevant). Before 2020, this information would enable Parties to disentangle expected future global GHG emissions from the national headline numbers put forward. Double counting could be minimised by placing limits on use of market or non-market mechanisms, or agreeing that only Parties with specific contribution types are eligible to use the mechanisms. After 2020, actual global GHG emissions levels can be tracked by aggregating national GHG inventories, which will continue to be reported by all Parties.

Figure 4. Four building blocks needed to deliver the full range of accounting objectives

Regarding the timing of key decisions, agreement will not realistically be reached on all aspects of the accounting framework for post-2020 mitigation contributions before intended mitigation contributions are communicated in the first quarter of 2015. It is more feasible that agreement on the different building blocks of the accounting framework will be reached in a phased or iterative approach. An important question is therefore which elements are most important to be agreed by the first quarter of 2015, and which elements can be left for agreement at COP 21 in 2015, or later.

Before the first quarter of 2015

For Parties to be in a position to put forward intended mitigation contributions that are clear, transparent and understandable, progress would be helpful on the following issues before the first quarter of 2015 (i.e. at COP 20):

- **Up-front information.** This would consist of rules or guidance for the up-front information to be provided alongside each contribution type. For mitigation contributions expressed in terms of GHG emissions relative to a baseline, this could include information on the baseline and its underlying assumptions. For contributions expressed in non-GHG terms, this could include an estimation of their expected impacts on future national or sector-level GHG emission levels. Having early clarity regarding up-front information requirements could be helpful for countries with lower institutional capacity.
- **Technical dimensions of each contribution type.** For each type of nationally-determined mitigation contribution that is of interest to Parties (or might be expected for some groups of Parties), there could be agreement on (or agreement to develop) rules or bounded flexibility of technical dimensions that are used to define the contributions. For example, for intended contributions expressed in GHG terms,

there could be agreement of rules or bounded flexibility for GWPs, end dates, and whether they cover single-year or multi-year time frames. For intended contributions expressed in terms of GHG emissions relative to a baseline, there could be agreement to develop internationally-agreed guidance for baseline-setting and review. For intended contributions expressed in non-GHG terms, there could be agreement to develop a methodology for translating these into GHG terms (Haïtes, Yamin and Höhne, 2013).

- **Land sector accounting.** Agreement would be helpful on whether Parties will work towards a single (but flexible) approach for land sector accounting that is applicable to all Parties, such as setting national reference levels. Alternatively, agreement could be sought to work toward a menu of multiple approaches that provides increased flexibility for Parties, or a set of principles for land sector accounting (this option would provide the greatest flexibility). The agreement of basic elements or principles for land sector accounting by the first quarter of 2015 would help to provide a common basis for communicating intended mitigation contributions. In the absence of clarity regarding the treatment of the land sector in the 2015 agreement, agreement could be sought that land use accounting assumptions are specified when Parties communicate their mitigation contributions. In this case, some Parties might choose to put forward several headline numbers representing the same intended contribution under different land sector accounting scenarios.
- **GHG unit transfers.** It would be useful for Parties to agree that they will provide estimates of expected use of market or non-market mechanisms as part of the up-front information alongside their intended mitigation contributions. It would also be helpful if Parties decide whether the use of market and non-market mechanisms in the post-2020 period should be limited, and if so, how and to what extent. It would be helpful to know this information by the first quarter of 2015 so that Parties can factor this into the contributions they propose, and also so the uncertainty of estimates made before COP 21 of expected future global GHG emissions levels based on the intended contributions communicated is minimised.

Between 2015 and 2020

To enhance understanding of the intended contributions on the table after the first quarter of 2015, progress would be needed on the following accounting issues at COP 21 and beyond:

- **Contribution types.** Guidance for baseline-setting and review could be developed and adopted (if agreement is found on this topic). Similarly, guidance for estimating the expected impact of non-GHG goals on future national or sector-level GHG emissions levels could be developed and adopted. If there is no agreement on bounded flexibility for intended contributions before the first quarter of 2015, it is possible that mitigation contributions could be updated or “translated” at COP 21 to take any subsequent agreement into account (e.g. if there is agreement at COP 21 to use multi-year time frames in order to facilitate the use of markets in the post-2020 period, then intended contributions initially expressed as single-year goals could be translated into multi-year goals).²⁰
- **Land sector accounting.** If Parties decide to work towards a single land sector approach that is applicable to all, further work on the details of this approach could continue after COP 21 with a view to adopting rules or guidance before the new

²⁰ This would be a restatement of the contribution in a different format, not an opportunity to reduce ambition. This is analogous to the translation of 2020 targets into second commitment period commitments under the Kyoto Protocol. For example Australia’s 2020 target of 5% below 2000 levels was translated to a Kyoto Protocol commitment of 0.5% average below 1990 levels. This reflects the same ambition, translated to a different accounting basis.

agreement comes into effect from 2020. Similarly, if Parties decide to adopt a menu of possible approaches to land sector accounting, then details of the possible approaches could be finalised after COP 21. Parties that put forward several headline numbers representing different land sector accounting scenarios could be encouraged to clarify their mitigation contributions as soon as possible following decisions on the accounting framework.

- **GHG unit transfers.** Agreement could be reached on the system to be used for tracking and reporting GHG unit transfers (and potentially also transfers of mitigation outcomes via non-market approaches) in the post-2020 period.

For some Parties, headline numbers for intended contributions may depend strongly on the accounting approach chosen for the land sector. Transparency and clarity over accounting assumptions made in land sector mitigation contributions would be a first step. This could help Parties to narrow down options for accounting and/or develop the principles for land sector accounting. In this situation Parties should explain in details the accounting assumptions they are using for establishing the land sector contributions (or even a range of headline values based on different assumptions). Following the communication of intended mitigation contributions in early 2015 (possibly including proposed reference levels and/or several headline numbers for some Parties, reflecting different land sector accounting scenarios) there could be a technical consultations process and the contributions could be updated if necessary at COP 21 (for further discussion of consultations and updating of mitigation contributions, see Briner, Kato and Hattori, 2014).

Without some clarity on the approach for the use of GHG units and land use sector accounting before the first quarter of 2015, it will be challenging to understand the intended contributions put forward and estimate what their expected impacts on global GHG emissions levels are likely to be. In the absence of up-front clarity on these issues, it is also likely that intended contributions put forward in the first quarter of 2015 will be subsequently updated to reflect the emerging accounting framework. This in turn would increase the level of uncertainty associated with estimates of expected future global GHG emissions levels, which play an important role in assessments of progress being made towards the below 2 °C long-term global goal. Alternatively, Parties may delay ratification or decide to withdraw from the 2015 agreement if subsequent decisions on accounting do not go as anticipated.

As Parties map out the process for communication and clarification of intended mitigation contributions it is therefore important to consider not only provision of up-front information to enhance transparency, but also bounded flexibility for expressing each contribution type, and early agreement on some accounting issues relating to the land sector and GHG unit transfers. Together, these could form the foundations of an accounting framework that can accommodate each type of mitigation contribution and is therefore applicable to all Parties.

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Glossary

ADP	Ad hoc Working Group on the Durban Platform for Enhanced Action
BAU	Business As Usual
BR	Biennial report (developed countries)
BUR	Biennial update report (developing countries)
COP	Conference of the Parties to the UNFCCC
EU ETS	European Union Emissions Trading System
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GWP	Global Warming Potential
IAR	International Assessment and Review (developed countries)
ICA	International Consultations and Analysis (developing countries)
KP	Kyoto Protocol
LDC	Least Developed Country
LULUCF	Land Use, Land-use Change and Forestry
MRV	Measurable, Reportable and Verifiable
SBSTA	Subsidiary Body for Scientific and Technological Advice
UNFCCC	United Nations Framework Convention on Climate Change

Annex I: Existing experience with LULUCF reporting and accounting

There is significant experience on which to build future LULUCF accounting arrangements. A “land-based” approach is used for UNFCCC inventory reporting, in which emissions are reported for six broad categories of land use (forest land, cropland, grassland, wetlands, settlements, and other land). An “activity-based” approach is used to account for LULUCF under the Kyoto Protocol (KP) first (2008-2012) and second (2013-2020) commitment periods, in which emissions are reported by categories of activities rather than by land type. One of the main characteristics of the KP approach is that Parties are able to select (at least partly) the LULUCF activities that they will account for against their commitments. In the first commitment period only afforestation, reforestation and deforestation were mandatory (Article 3.3 of the KP); while revegetation, forest management, cropland management and grazing land management were optional (Article 3.4). For the second commitment period, forest management became mandatory and wetland drainage and rewetting was introduced as additional elective activities under Article 3.4.

Another shift in accounting rules for the second KP commitment period was the introduction of reference levels for forest management activities. The Forest Management Reference Level (FMRL) is a value of annual net emissions and removals from forest management; against which the actual net emissions and removals reported for forest management will be compared for accounting purposes. Guidance on how to construct the FMRL was provided, and the FMRLs proposed by each Party underwent technical assessment. This could be seen as an example of "bounded flexibility" (Briner and Prag, 2013) since Parties established their own FMRL, following guidance negotiated among Parties; and Parties had the chance to assess and agree with the proposed FMRLs. The application of the FMRL approach will be reviewed after the submission of the first National Inventory Report for the KP 2nd commitment period,²¹ so the success of this approach cannot be fully evaluated yet.

In a related area of negotiations; the recent development of REDD+, in particular the "Warsaw REDD+ Framework" (UNFCCC, 2013b) is intended to not only improve monitoring, reporting and verification of emission and removals in developing countries, but also the development and implementation of REDD+ policies. This framework also uses a kind of reference level approach: forest reference emission levels and/or forest reference levels expressed in tonnes of CO₂ equivalent per year are the benchmarks for assessing each country's performance in implementing REDD+ activities, and will be subject to technical assessment (UNFCCC, 2011b).

²¹ By 15th April 2015.

www.oecd.org/env/cc/ccxg.htm

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