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Enhancing transparency of climate change mitigation under the Paris Agreement: lessons from experience

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FOREWORD

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

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ABSTRACT

Enhancing transparency of climate change mitigation under the Paris Agreement: lessons from experience

An enhanced transparency framework will be a central component of the post-2020 international climate policy regime under the Paris Agreement, underpinning the dynamic process of updating nationally determined contributions (NDCs) and providing input to the global stocktakes of progress towards the long-term goals of the Paris Agreement. The enhanced transparency framework will apply to all Parties, with flexibility in light of capacities. This paper highlights lessons learned from the existing transparency framework for mitigation that can help inform the development of modalities, procedures and guidelines for the enhanced transparency framework under the Paris Agreement. It outlines how clearer and more detailed reporting guidelines could be developed for communication of the mitigation components of NDCs and reporting on progress in their implementation and achievement, based on NDC type. It also describes how the current review and analysis processes applied to greenhouse gas inventories, national communications, biennial reports and biennial update reports have generally had a positive impact on the quality of reporting to the UNFCCC, and discusses how regular cycles of technical review and multilateral consideration of progress could help facilitate continuous improvements in measurement and reporting for all Parties.

JEL Classification: F53, Q54, Q56, Q58
Keywords: climate change, mitigation, UNFCCC, transparency

RÉSUMÉ

Renforcer la transparence en matière d'atténuation du changement climatique dans le cadre de l'Accord de Paris : enseignements tirés de l'expérience

Un élément central du régime climatique international après 2020 défini par l'Accord de Paris sera le cadre de transparence renforcé qui soutiendra le processus dynamique de l'actualisation des contributions déterminées au niveau national (CDN) et contribuera à dresser le bilan des progrès accomplis dans la réalisation des objectifs de l'Accord de Paris. Ce cadre de transparence renforcé s'appliquera à toutes les Parties, et leur accordera une certaine flexibilité qui tiendra compte de leurs capacités. Cette étude dégage les enseignements tirés du cadre de transparence existant en matière d'atténuation, dans l'optique de contribuer à éclairer l'élaboration des modalités, procédures et lignes directrices relatives au cadre de transparence renforcé de l'Accord de Paris. Elle expose comment des lignes directrices plus claires et plus détaillées pourraient être élaborées pour communiquer les éléments des CDN relatifs à l'atténuation et rendre compte des progrès accomplis dans leur mise en œuvre et leur réalisation, en fonction du type de contribution. Le document décrit aussi en quoi les processus actuels d'examen et d'analyse appliqués aux rapports d'inventaire des gaz à effet de serre, communications nationales, rapports biennaux et rapports biennaux actualisés ont eu généralement un impact positif sur la qualité des notifications au titre de la CCNUCC. Enfin, il étudie la façon dont des cycles réguliers d'examen technique par des experts et d'examen multilatéral des progrès accomplis pourraient contribuer à faciliter pour toutes les Parties l'amélioration constante du système de mesure et de notification.

Classification JEL : F53, Q54, Q56, Q58
Mots-clés : changement climatique, atténuation, CCNUCC, transparence

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An enhanced transparency framework will be a central component of the post-2020 international climate policy regime under the Paris Agreement, underpinning the dynamic process of updating nationally determined contributions (NDCs) and providing input to the global stocktakes on successive five-year cycles. The enhanced transparency framework will apply to all Parties, with flexibility in light of capacities. This paper highlights lessons learned from the existing transparency framework for mitigation that can help inform the development of modalities, procedures and guidelines for the enhanced transparency framework under the Paris Agreement.[1] It covers communication of the mitigation components of NDCs,[2] reporting on progress in their implementation and achievement, technical review, and multilateral consideration of progress.

The processes for reporting, review and multilateral consideration of progress under the Paris Agreement will be critical for building international trust and the domestic processes and capabilities needed to facilitate the transition to low-emission, climate-resilient development pathways. Further, the enhanced transparency framework could facilitate implementation of mitigation actions, particularly in developing countries where it can help identify areas requiring support.

A large number of Parties have communicated intended nationally determined contributions (INDCs): 162 INDCs representing 189 countries as of July 2016. Some INDCs include multiple mitigation-related goals. These often include a main mitigation goal as well as information on supporting domestic mitigation measures that will be undertaken to achieve the main goal. The modalities, procedures and guidelines for communicating and tracking progress of NDCs will need to account for the fact that Parties may change their NDC type over time. Further, Article 4 of the Paris Agreement states that each successive NDC will "represent a progression" beyond the previous NDC; this could be challenging to demonstrate, particularly if a Party communicates different types of successive NDCs.

Clearer and more detailed reporting guidelines based on NDC type could therefore be helpful. Absolute emission targets generally provide high up-front clarity and low uncertainty associated with future levels of greenhouse gas (GHG) emissions if the target is met. The emission level in a base year is a clear and objective reference point for tracking progress (though it can change due to GHG inventory recalculations). To facilitate understanding of emission goals relative to business-as-usual (BAU) levels (which have been put forward by many Parties), the information needed includes a description of the model used to develop the BAU baseline, and the assumptions used for key input parameters such as future levels of gross domestic product (GDP) and population. While some Parties with an emissions goal relative to a BAU baseline have provided this information (e.g. South Africa, Republic of Korea), most have not. Further, most countries have not clarified whether their BAU baseline is fixed or may be revised in light of unexpected developments.

China and Singapore have included goals to peak GHG emission levels by a given year in their INDC submissions. It remains unclear how progress towards such goals can be tracked ex ante. Before the peak, a general trend of decelerating emission rates may indicate that the Party concerned is moving towards peaking. It could take several years to be reasonably certain that a peaking has occurred.

Several Parties have included goals in their INDCs for GHG emissions per unit of GDP (e.g. Chile, China, India, Singapore). For this NDC type, transparency can be enhanced by providing GDP projections, since this enables expected future GHG emission levels to be estimated. However, no

[1] This paper is accompanied by a note outlining the possible structure of mitigation-related modalities, procedures and guidelines for the enhanced transparency framework (Briner and Moarif, 2016a).

[2] It remains unclear whether guidance for communicating NDCs under Article 4 will be part of the package of modalities, procedures and guidelines for the enhanced transparency framework, or developed separately.

Party has done this to date. Likewise, Israel and Zimbabwe have communicated goals for GHG emissions per capita, but neither Party included population projections in their INDC submission.

Many Parties have included goals using non-GHG indicators in their INDC submissions, either as main mitigation goals or as supporting measures. These goals include renewable energy targets, forestry targets and various goals in other sectors. Given the wide variety of indicators available, it is unlikely that detailed reporting guidance would be provided at an international level for this NDC type, though preferred ways of expressing goals for some sectors could be agreed. Further, there is growing experience with reporting information on estimated outcomes of domestic mitigation measures and expected emission reductions. For example, this information had been fully or partly reported in all but one of the 13 biennial update reports from developing countries that had undergone technical analysis as of February 2016.

Parties have taken different approaches to time frames and periods of implementation for their mitigation INDCs. Most have expressed their INDCs as single-year targets, though some (e.g. Norway, Armenia) have expressed them as emission budgets.[3] Previous CCXG work has highlighted that single-year targets can complicate accounting and tracking progress towards mitigation goals, particularly for countries wishing to use units from market-based mechanisms to meet part of their goals. Many INDCs contain limited information regarding how Parties intend to account for emissions and removals from the land sector; further guidance on accounting could be useful for this sector.

Regular cycles of reporting, review and multilateral consideration of progress can help facilitate continuous improvements in measurement and reporting for all Parties. For Parties with less reporting experience and with capacity constraints, the immediate priorities are often setting up or improving national systems and institutional arrangements for preparing GHG inventories. The transparency and completeness of national GHG inventories is improving over time. For example, the number of Annex I Parties submitting their GHG inventory using Common Reporting Format (CRF) tables increased from 23 (out of 39) in 2000 to 42 (out of 44) in 2015. Many Parties are also expanding the coverage of sources and gases in their GHG inventories, and using higher, more accurate, IPCC tiers. For example, a number of developing countries (e.g. Argentina, Chile, Colombia, India, Indonesia, Namibia, Singapore, South Africa, Thailand and Viet Nam) used Tier 2 methods for some categories of emissions and sinks in their latest GHG inventories.

The current review and analysis processes applied to GHG inventories, national communications, and more recently to biennial reports and biennial update reports, have generally had a positive impact on the quality of reporting to the UNFCCC.[4] The review and analysis processes have successfully led to greater political visibility for climate policy within the country concerned. This can result in resources for certain activities which may otherwise be difficult to secure, such as developing GHG inventories or preparing GHG projections. The frequency of inventory reviews and the experience of in-country reviews are factors that have helped ensure government departments retain their capacity to maintain and improve the quality of GHG inventories and reporting to the UNFCCC.

Technical reviews and analyses have also substantively helped improve understanding of the information reported by Parties, and helped those in charge of reporting understand how to provide information that is clearer and more complete. This happens in part through the exchange of questions and answers between the review or technical expert team and the Party, particularly during in-country reviews.

[3] Most Parties use the Global Warming Potentials over a 100-year time horizon provided by the IPCC for aggregating GHG emission totals in their INDC submissions, though some (such as Brazil) use alternative metrics.

[4] Though it remains too soon to assess the impact of international consultations and analysis on the quality of information reported in biennial update reports.

Knowledge that helps improve future reporting is also acquired through participation in reviews. Members of expert review teams (for Annex I Party reports) and technical teams of experts (for biennial update reports) are drawn from the UNFCCC roster of experts and are in large part also government officials. Participating in reviews helps them understand how to improve reporting within their own countries, based on their experience reviewing the reports of others. In-country reviews can therefore be highly valuable, even though they are very resource-intensive. The current roster of experts system is stretched thin and may need to expand, but should maintain the participation of government officials as a means of knowledge sharing.

Technical reviews and analyses have been adaptable to different country capacities and circumstances. Reviews of Annex I Parties' reports seek to provide recommendations that will improve the transparency and completeness of reporting, and these recommendations will vary with different countries' starting points and reporting capacities. Since reviewers examine past reports, and whether past recommendations have been acted upon, they can assess whether reporting has improved. The review and analysis processes themselves have also evolved and become more consistent. For example, since 2014, all reviewers must undergo training related to the specific sections of the report they will be reviewing or analysing, and reviewers must prepare questions for the Party being reviewed or analysed well ahead of the review week.

The resources involved in undertaking reviews and analyses have been a perennial challenge, as these involve significant demands on the time of staff from various government organisations and the UNFCCC Secretariat. Further, the scope of reviews and analysis are framed by reporting guidelines, which can limit the scope, depth and rigour of the outputs. Where it is clear what information is to be reported, information is easier to assess, and experts can ask more questions and seek more clarification. If reporting modalities are vague, broad or mostly optional, this constrains the ability of the experts to seek clarification and analyse the information reported, which in turn may limit the specificity and therefore usefulness of the review or analysis. It can also sometimes be challenging to reconcile reporting provisions in the guidelines for biennial (update) reports and national communications.

Experience to date with "multilateral consideration"-type processes has been more limited, but has nevertheless yielded several positive lessons. First, these processes have helped increase the political visibility of climate issues within government. Second, they enabled Parties to ask very specific, technical questions of each other, allowing for useful knowledge sharing. Third, the multilateral assessment process can be a useful space for Parties to ask more "political" questions, where objective assessments are challenging. The multilateral processes have also improved transparency and accountability, facilitated sharing of good practices and helped to identify capacity building needs for developing country Parties. One challenge is that active participation in these processes has been limited thus far, which reduces the usefulness of peer-to-peer exchange. As countries tend to ask questions on topics that are of particular interest to them, the more countries that participate, the richer the ensuing exchange.

The enhanced transparency framework is to provide flexibility to developing country Parties that need it in the light of their capacities, in order to facilitate the participation of all Parties. There are various ways in which flexibility could be introduced into the enhanced transparency framework. For example, flexibility could be provided for (i) certain groups of developing country Parties (e.g. LDCs and SIDS, which could have flexibility in terms of timing of GHG inventories and other reports); (ii) developing country Parties with least capacity (e.g. emission projections may not be expected from Parties with insufficient capacity); (iii) Parties with particular national circumstances (e.g. less frequent in-country reviews or multilateral considerations for small emitters); and (iv) Parties who wish to receive more feedback from the technical expert review process (e.g. deeper, in-country technical reviews could be granted to Parties that request them). An approach to flexibility is needed that can incentivise effective universal participation of all Parties in the Paris Agreement.

1. Introduction

The enhanced transparency framework in the Paris Agreement includes reporting of information on mitigation, adaptation, finance, technology and capacity building by Parties, as well as technical review of some information and a process for "multilateral consideration of progress". The framework applies to all Parties, with flexibility in light of capacities. The enhanced transparency framework shall "build on and eventually supersede" the existing measurement, reporting and verification (MRV) system established under the Cancun Agreements (UNFCCC, 2015a).

The enhanced transparency framework under the Paris Agreement will be critical for building international trust and domestic processes and capabilities to facilitate the transition to low-emission, climate-resilient development pathways. At the domestic level, it can help to raise the profile of climate change as a policy issue and integrate it into mainstream policy planning processes, while the information collected and reported can provide a basis for planning and implementing domestic mitigation measures. The feedback received from technical review and multilateral consideration of progress can help Parties to accelerate improvement of their MRV systems and identify priority areas for capacity building.

At the international level, the enhanced transparency framework can help to build trust by providing reassurance that Parties are implementing the provisions of the Paris Agreement and making progress on planning and implementing domestic climate policies. Further, the information reported under the enhanced transparency framework could be one input to the global stocktake of collective progress towards the long-term goal to keep the rise in global average temperature to well below 2°C.

It will be important to build on experience when developing modalities, procedures and guidelines for the enhanced transparency framework. A significant amount of experience has already been gained from the MRV systems under the Convention and the Kyoto Protocol. A system is needed that can improve over time, taking into account the fact that Parties have different starting points, capacities, and areas in need of improvement.

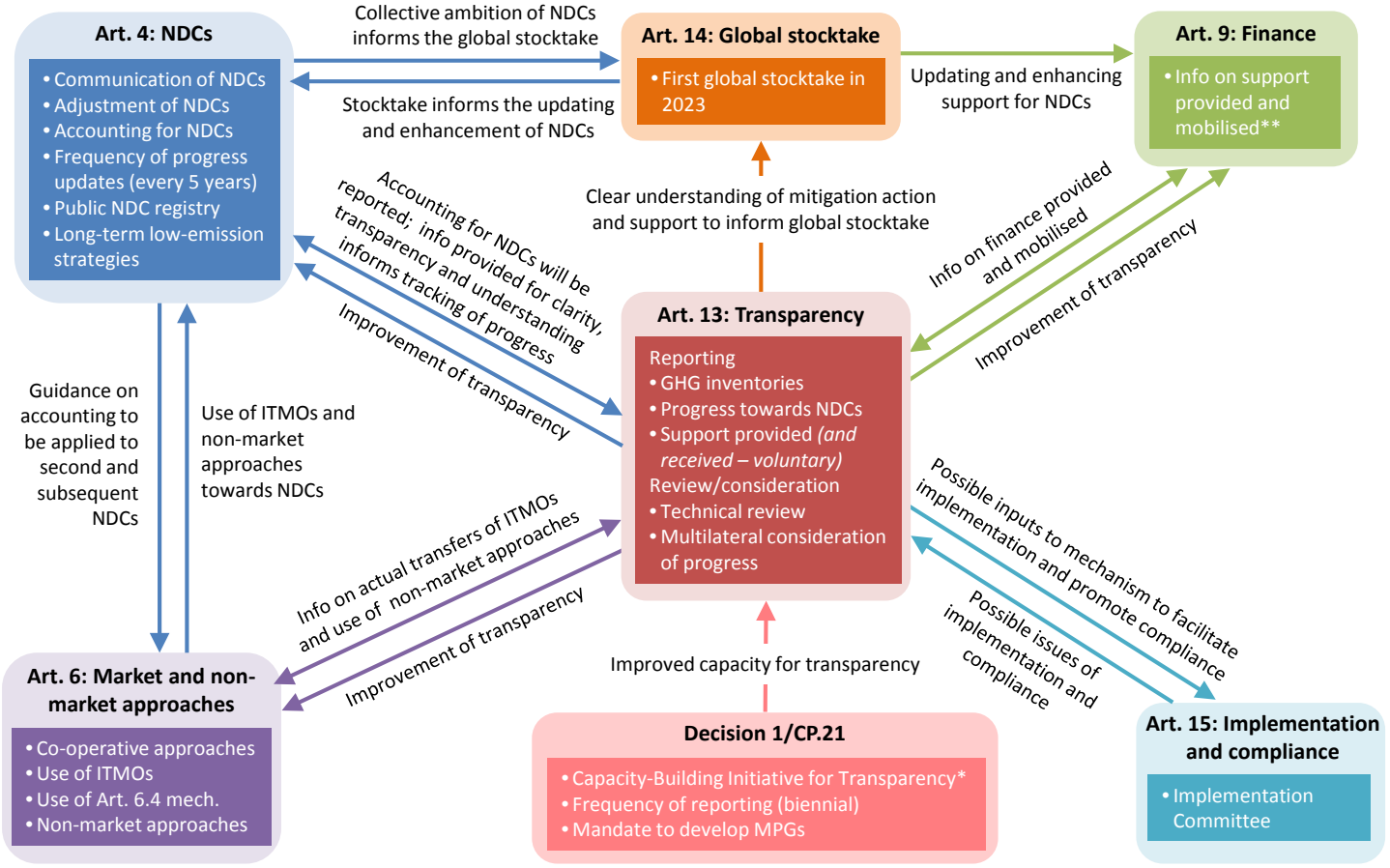
Previous CCXG work in this area highlighted gaps in the current transparency system and outlined the information required to track progress towards different types of nationally determined contributions (NDCs) (Ellis and Moarif, 2015; Briner and Moarif, 2016b). This paper builds on previous CCXG work by highlighting lessons learned from the existing transparency framework for mitigation[5] that can help inform the development of modalities, procedures and guidelines for the enhanced transparency framework under Article 13 of the Paris Agreement, as well as communication of information necessary for clarity, transparency and understanding of NDCs under Article 4.8.[6] When designing the enhanced transparency framework, Parties will need to bear in mind the links that exist between Article 13 and Article 4, as well as the various links between these articles and the other articles of the Paris Agreement (Figure 1).

Section 2 discusses lessons learned from existing measurement, reporting and verification (MRV) systems under the Convention and the Kyoto Protocol that are relevant to the communication of NDCs and tracking progress in their implementation and achievement. Section 3 outlines relevant experiences from existing processes relevant to technical review and multilateral consideration of progress under the Paris Agreement. Section 4 presents conclusions.

[5] A separate CCXG paper (Ellis and Moarif, 2016) discusses transparency of finance.

[6] This paper is accompanied by a note outlining the possible structure of mitigation-related modalities, procedures and guidelines for the enhanced transparency framework (Briner and Moarif, 2016a).

Figure 1. Mitigation-related links between Article 13 and other parts of the Paris Agreement and Decision 1/CP.21



* The Capacity-Building Initiative for Transparency aims to strengthen national institutions and provide tools, training and assistance for developing country Parties to meet the provisions of Article 13. It could therefore help to improve reporting on mitigation, adaptation, and support received.

** Article 9 also stipulates that developed country Parties shall biennially communicate indicative information including, as available, projected levels of public financial resources to be provided to developing country Parties, and other Parties providing support are encouraged to communicate such information. It is unclear whether this information is part of the enhanced transparency framework under Article 13.

2. Reporting: Communication of NDCs and tracking progress in their implementation and achievement

Many Parties to the UNFCCC now have experience with communicating mitigation targets or actions, such as absolute emission targets under the Kyoto Protocol (for Annex I KP Parties) and Cancun Agreements (for developed countries), nationally appropriate mitigation actions under the Cancun Agreements (for developing countries), and INDCs for the post-2020 period (all Parties). In the case of INDCs and mitigation targets and actions submitted under the Cancun Agreements, limited guidance has been provided to date regarding the information needed to provide clarity, transparency and understanding of these mitigation targets and actions, and to track progress being made towards them.

A large number of Parties have communicated INDCs for the post-2020 period.[7] Some INDCs include multiple mitigation-related goals. These often include a main quantitative mitigation goal or goals, as well as information on supporting domestic mitigation actions and measures that will be undertaken to achieve the main goal(s).[8] Briner and Moarif (2016b) identified several categories of NDCs from the INDCs submitted to date. These were:

A. economy-wide emission targets and carbon neutrality targets

B. sectoral emission targets

C. goals to peak emissions in a given year

D. economy-wide emission goals relative to a business-as-usual (BAU) baseline

E. sectoral emission goals relative to a BAU baseline

F. goals for GHG emissions per unit of gross domestic product (GDP) or per capita

G. goals using non-GHG indicators

H. qualitative mitigation actions.

The communication of NDCs under Article 4 and the modalities, procedures and guidelines for tracking progress of NDCs under Article 13[9] will need to take into account the fact that Parties may change their NDC type over time. Further, Article 4 of the Paris Agreement states that each successive NDC will "represent a progression" beyond the previous NDC. This could be challenging to demonstrate, particularly if a Party communicates different types of successive NDCs. Table 1 provides some examples of Parties that have submitted different types of mitigation goals and actions for 2020 under the Cancun Agreements and INDCs for the post-2020 period.

[7] A total of 162 INDCs representing 189 countries had been submitted as of July 2016.

[8] Though in some cases it can be difficult to distinguish between the main quantitative goal(s) of an INDC and information on supporting domestic mitigation measures, particularly when many quantitative domestic mitigation measures are listed.

[9] It remains unclear whether the guidelines for communicating NDCs under Article 4 will be part of the package of modalities, procedures and guidelines for the enhanced transparency framework under Article 13, or developed separately.

Table 1. Examples of Parties with different types of mitigation goals and actions under the Cancun Agreements and the Paris Agreement

Party	Mitigation goals/actions	Absolute emission reduction goal	Goal to peak emissions	Emission intensity goal	Goal for emission per capita	Goal relative to a BAU level	Quantitative non-GHG goals	Qualitative mitigation actions
Brazil	Goals/actions for the Cancun Agreements					✓		✓
	INDCs under the Paris Agreement	✓					✓	✓
Chile	Goals/actions for the Cancun Agreements					✓		
	INDCs under the Paris Agreement			✓			✓	✓
China	Goals/actions for the Cancun Agreements			✓			✓	
	INDCs under the Paris Agreement		✓	✓			✓	
Ethiopia	Goals/actions for the Cancun Agreements						✓	
	INDCs under the Paris Agreement	✓				✓		✓
Ghana	Goals/actions for the Cancun Agreements						✓	✓
	INDCs under the Paris Agreement					✓	✓	✓
Israel	Goals/actions for the Cancun Agreements					✓	✓	
	INDCs under the Paris Agreement				✓		✓	✓
Singapore	Goals/actions for the Cancun Agreements					✓		
	INDCs under the Paris Agreement		✓	✓				
Turkey	Goals/actions for the Cancun Agreements							
	INDCs under the Paris Agreement					✓	✓	✓

Note: All Annex I Parties except Turkey have taken on absolute emission targets under the Cancun Agreements and the Paris Agreement.

Some guidance is provided in the Paris Agreement and its accompanying Decision 1/CP.21 regarding the up-front information to be provided relating to NDCs. Decision 1/CP.21, paragraph 27, states that "the information to be provided by Parties communicating their nationally determined contributions … may include, as appropriate, inter alia, quantifiable information on the reference point (including, as appropriate, a base year), time frames and/or periods for implementation, scope and coverage, planning processes, assumptions and methodological approaches including those for estimating and accounting for anthropogenic greenhouse gas emissions and, as appropriate, removals, and how the Party considers that its intended nationally determined contribution is fair and ambitious, in light of its national circumstances, and how it contributes towards achieving the objective of the Convention as set out in its Article 2" (UNFCCC, 2015a). Decision 1.CP.21 requests the Ad hoc Working Group on the Paris Agreement (APA) to develop further guidance for the up-front information to be provided relating to NDCs. The up-front information required would depend on the NDC type concerned, as outlined below in Section 2.1.

No guidance is provided in the Paris Agreement and Decision 1/CP.21 regarding the mandatory information to be provided by Parties on tracking progress made in implementing and achieving their mitigation-related NDCs. Previous work by the CCXG and others (Briner and Moarif, 2016b; Briner and Prag, 2013; Levin et al., 2014) sets out the information needed to track progress towards different types of NDCs. For example, for absolute emission targets the information needed to track progress includes a GHG inventory, information on actual use of international co-operative approaches under Article 6 including participation in transfers of internationally transferred mitigation outcomes (if any), emissions projections (if available), and any changes made to the up-front information reported when communicating the NDC.

In order to ensure that countries fulfil international reporting requirements, it is important to make the UNFCCC reporting process domestically relevant and useful. If reports are prepared only to fulfil the

reporting obligations of the UNFCCC and are not read by anyone except the expert review team, the effectiveness of the reporting process will be limited. The report preparation process can help to raise awareness of climate policy issues domestically (Kato and Ellis, 2016). The collection of statistics, communication of results and recognition of contributing institutions can also facilitate procedural continuity and help to show data providers (such as statistical agencies) the value of the information they collect.

2.1 Specific reporting issues depending on NDC type

2.1.1 Absolute emission targets

Absolute emission targets (i.e. relative to a base year or a fixed emission level) generally provide a high level of up-front clarity and a low level of uncertainty associated with future levels of GHG emissions if the target is met. The emission level in a base year is a clear and objective reference point for tracking progress (though it can change due to GHG inventory recalculations). In addition to all developed country Parties, some developing country Parties (e.g. Botswana, Brazil, Ethiopia, the Marshall Islands) have submitted INDCs in the form of absolute emission targets.

To understand emission targets relative to a base year, it is necessary to know the emission level in the base year as well as the coverage of the target in terms of sectors and gases. This is often available in a Party's GHG inventory, so long as the base year is part of the time series covered by the GHG inventory. In cases where it is not covered in the GHG inventory, transparency can be increased by including the emission level and associated methodologies and data for the base year within the NDC submission. For example, Botswana's INDC is to reduce GHG emissions by 15% by 2030 relative to 2010 levels. However, the GHG inventory reported by Botswana in its second national communication only covered the years 1994 and 2000. Botswana's INDC submission therefore includes the emission level for the 2010 base year (8 307 GgCO2-eq).

2.1.2 Emission goals relative to business-as-usual levels

Emission goals relative to BAU levels are the most common type of NDC communicated under the Paris Agreement. The information needed to facilitate understanding of BAU baselines includes a description of the model used to develop the BAU baseline, and the assumptions used for key input parameters such as future levels of GDP and population. It is also helpful to know whether the BAU baseline is fixed for the duration of the emission goal, or whether and in what circumstances it can be revised in light of unexpected developments (for example, if GDP growth is significantly higher or lower than expected).

Some Parties with mitigation goals relative to BAU baselines under the Cancun Agreement and the Paris Agreement have reported up-front information on the model used to calculate the baseline and the assumptions made for key variables (e.g. trends in GDP, population, energy prices and technology developments). For example, South Africa communicated that the assumptions behind its long-term mitigation scenarios include between 3% and 6% annual GDP growth, population projections that take into account demographic trends, technological efficiencies, costs and learning rates, and discount rates of 3%, 10% and 15% (Government of South Africa, 2011). Further technical documentation regarding South Africa's long-term mitigation scenarios is publically available (e.g. Government of South Africa, 2007), though it has not been submitted formally to the UNFCCC Secretariat. The Republic of Korea's assumptions behind its BAU baseline include a GDP growth rate of between 4.2% and 3.6%, a peaking of population in 2018, an oil price outlook based on the 2008 US Energy Information Administration projections, extrapolation of current trends of technology advancements and energy efficiency improvements, and implementation of mitigation policies and measures approved as of 2008 (Government of Korea, 2011).

When communicating their mitigation goals under the Cancun Agreements and the Paris Agreement, most countries have not clarified whether their BAU baseline is fixed or may be revised. An exception

is Indonesia, which plans to include a revised BAU baseline for its 2020 mitigation goal in its second biennial update report and third national communication (Government of Indonesia, 2015). Mexico revised the BAU baseline for its 2020 mitigation goal under the Cancun Agreement (Fransen et al., 2015). The revision of emission baselines can help ensure that they reflect changing economic and other circumstances as accurately as possible. However, such dynamic baselines also pose challenges for tracking progress towards mitigation goals. While the approach and assumptions used for emission baselines will be nationally determined, Parties might consider developing guidance for what types of retroactive changes may be made to baselines used for the purpose of tracking progress towards NDCs.

Some Parties have provided very little or no quantitative information on the emission baseline to be used to measure progress towards their mitigation goal, making it challenging to understand and track progress towards their goals. Herold, Siemons and Herrmann (2016 forthcoming) found that of the 79 Parties that have submitted goals relative to BAU levels in their INDCs, 13 did not provide any quantitative information about the BAU scenario at all and 12 provided only a figure depicting the BAU baseline – thus around a third of INDCs of this type submitted to date do not include clear numbers for the reference point against which progress is to be measured. In cases where quantitative information on the BAU baseline has been reported, many of these baselines correspond to a significant increase in GHG emissions over the implementation period. For 11 INDCs, GHG emissions in the BAU scenario increase by over 200% between the base year and 2030 (Herold, Siemons and Herrmann, 2016 forthcoming).

Previous work by the CCXG and others has identified good practices and key elements for preparing emission baselines (e.g. Clapp and Prag, 2012; DEA, OECD and UNEP Risø Centre, 2013; WRI, 2014). Further, a Compendium on GHG Baselines and Monitoring is currently being developed by the NAMA Partnership.[10] The forthcoming Compendium will provide an overview of methodologies, methods and tools for establishing baselines and monitoring emissions reductions from mitigation actions in different sectors (NAMA News, 2016). In future this work could help to promote increased consistency in the approaches used by countries to develop BAU baselines.

2.1.3 Goals to peak GHG emissions

China and Singapore have included goals to peak GHG emission levels by a given year in their INDC submissions.[11] China's goal is to achieve the peaking of CO2 emissions by around 2030 and to make best efforts to peak early. Singapore's goal is to stabilise its GHG emissions by reducing emissions intensity with the aim of peaking its emissions around 2030. China does not provide information in its INDC submission on the level at which emission are expected to peak or what "around 2030" means.[12] Reporting information on the expected peaking level would enhance understanding of future expected GHG emission levels, both nationally and globally.

It remains unclear how progress towards goals to peak emissions by a given year can be tracked ex ante. Before the peak, decelerating emission rates may indicate that the Party concerned is moving towards peaking. After the peak, the Party needs to demonstrate that emission levels will not again exceed the peak level. It could take several years to be reasonably certain that a peaking has occurred. The detection of emission peaks would be particularly challenging for Parties for which the land-use,

[10] The members of the NAMA Partnership include the UNFCCC Secretariat, the World Bank, World Resource Institute, Food and Agriculture Organization, United Nations Development Programme, International Renewable Energy Agency, GIZ, Fundación Torcuato Di Tella, and the Swedish Energy Agency.

[11] This type of goal can be combined with other goals – for example, China's NDC also includes an emission intensity target as well as targets for clean energy and forestry.

[12] Singapore provides an estimate of the level at which emissions are expected to stabilise in a footnote in its NDC submission.

land-use change and forestry (LULUCF) sector accounts for a significant share of the national GHG inventory, due to the often high annual variability of emissions and removals from this sector.

South Africa's INDC is expressed as a peak, plateau and decline emissions trajectory. This can be viewed as a variation on a peaking goal that provides additional information regarding the expected post-peak emissions pathway. In its INDC, South Africa specifies that its emissions by 2025 and 2030 will be in a range between 398 and 614 Mt CO2e. South Africa also clarifies in its INDC submission that further details regarding the peak, plateau and decline trajectory are provided in South Africa's National Climate Change Response Policy (Government of South Africa, 2011b). Providing links to publically-available documents containing further details is a practical way to enhance understanding of this type of NDC.

2.1.4 Goals for GHG emission per unit of GDP or per capita

Several Parties have included goals in their INDCs for GHG emissions per unit of GDP (e.g. Chile, China, India, Singapore). To understand and track progress towards goals of this type it is necessary to know the value of the indicator in the base year and the target year. Chile and Singapore clearly report both of these values in their INDC submissions. China and India do not report the level of emissions per unit of GDP in the base year or target year in their INDC submissions. Reporting data relating to GDP should not constitute a significant additional reporting burden, since related statistics are already reported to international organisations such as the UN and the World Bank on a regular basis via domestic institutions (e.g. the treasury, census agencies).

There are different ways of measuring GDP (e.g. nominal GDP at current prices or real GDP at constant prices, market exchange rates or Purchasing Power Parity exchange rates).[13] Transparency can therefore be enhanced by clarifying which form of GDP will be used for the purpose of calculating emission intensity, and what source of statistics will be used. Chile reports in its INDC submission that GDP in constant 2011 prices as reported in the National Accounts of the Central Bank of Chile will be used. Singapore specifies that GDP in constant 2010 prices will be used. China and India do not provide this information.

For Parties with goals for GHG emission per unit of GDP, transparency could be further enhanced by including GDP projections in NDC submissions. This would enable expected future GHG emission levels to be estimated. However, no Parties have done this to date. It is unclear what happens to these goals if GDP growth is significantly higher or lower than expected. For example, Chile's emission intensity goal was communicated "considering a future economic growth which allows … adequate measures to reach this commitment" (Government of Chile, 2015). However, the submission does not specify what happens if this level of future economic growth is not achieved, or what minimum rate of GDP growth is considered the threshold for implementation of the NDC. If this information is not reported, uncertainty is added to the likelihood of the Party concerned meeting its national commitments and (for large emitters) global emission levels consistent with a pathway to well below 2°C.

Israel and Zimbabwe have communicated goals for GHG emissions per capita. Israel's target is to reduce its GHG emissions per capita from 10.4 tCO2e per capita in 2005 to 7.7 tCO2e per capita in 2030 (with an interim target of 8.8 tCO2e per capita in 2025). Zimbabwe's target is to reduce GHG emissions per capita in the energy sector by 33% relative to the BAU level by 2030. Zimbabwe's INDC includes projections of GHG emissions per capita from the energy sector between 2000 and 2030 under a BAU scenario and a "with mitigation" scenario. Neither Party included population projections in their INDC submission.

[13] The different ways of measuring GDP can have a significant impact on the value reported. For example, OECD estimates of China's GDP in 2014 range from USD 8.2 trillion to USD 19.2 trillion, depending on the measurement approach and base year chosen (OECD, 2016).

2.1.5 Goals expressed using non-GHG indicators

Many Parties have included various types of quantitative goals in their INDC submissions using non-GHG indicators, such as renewable energy targets, forestry targets and goals in other sectors. In some cases, these goals are the main quantitative mitigation goal of the INDC and progress towards them would therefore be tracked and reported internationally. In other cases, goals for non-GHG indicators are included as part of the information on supporting domestic mitigation measures implemented or planned to achieve the main goal of the INDC (though in practice it can often be difficult to distinguish between the two). The most common approach is to use a base year as a reference point (e.g. to reduce emissions intensity by X% relative to 2005 levels, to increase forest cover by Y% relative to 2010 levels) or to set a fixed level target (e.g. to increase the share of renewable energy to Y GW of installed capacity or Z% of total energy supply).

Many Parties have communicated renewable energy goals as part of their INDCs. There are different ways of expressing renewable energy targets. The most common indicators used in INDC submissions are the share of renewable energy in the total energy mix and the share of renewable energy in the electricity generation mix. Some Parties have also expressed targets in terms of share of installed electricity generation capacity, absolute installed capacity of renewable energy, share of renewable energy during peak electricity demand and absolute electricity generation from renewable energy technologies. China's target is expressed in terms of the share of "non-fossil fuels" (i.e. including nuclear energy) in primary energy consumption.

Several Parties have communicated goals relating to the forestry sector. These include quantitative goals for forest cover (e.g. Cambodia, Costa Rica, Honduras, Kenya, Nepal), forest stock volume (e.g. China), afforestation and reforestation (e.g. Ecuador, Ghana), deforestation rate (e.g. Mexico) and protected forest area (e.g. Brunei, Colombia), in addition to qualitative goals in areas such as sustainable forest management. Mitigation goals and policies in the forestry sector are often linked to efforts to increase resilience and promote climate smart agriculture (WWF, 2015; Rainforest Alliance, 2015).

Reporting the level of the non-GHG indicator concerned in the base year (i.e. the starting point) can help increase understanding of the INDC. For example, India's INDC explains that the installed capacity of solar power has increased from 3.7 MW in 2005 to about 4 060 MW in 2015, and the target is to increase this to 100 GW by 2022. In its INDC submission, Brazil outlines its domestic target to achieve a 45% share of renewable energy in the energy mix by 2030 from a starting point of 40%. In many cases, however, information on the starting point is missing from INDC submissions. The transparency of renewable energy goals can also be enhanced by explicitly communicating what energy sources are included in the definition of "renewable", "clean" or "non-fossil" energy.

2.1.6 Domestic mitigation measures

The Paris Agreement states that Parties "shall pursue domestic mitigation measures" in order to achieve their NDCs. Many countries have included information on supporting domestic mitigation measures as part of their INDC submissions. This can include quantitative information on the intended outcomes of domestic mitigation measures (such as targets for renewable energy and forestry, as discussed above) as well as qualitative information on measures implemented or planned (such as carbon pricing mechanisms, laws and regulations or information-related instruments). Providing an understanding of what domestic mitigation measures are in place and progress in implementing them is an important part of the transparency framework. However, these reporting provisions should avoid locking Parties into specific policy choices. Reporting this information could be encouraged for SIDS and LDCs that have submitted qualitative policies and measures as NDCs.

Developed countries have considerable experience with reporting qualitative information on policies and measures in their national communications and biennial reports, though more limited experience with reporting quantitative estimates of expected emission reductions for individual measures or

groups of measures. Expected emission reductions for groups of measures are often reported because it is difficult to isolate the impact of individual policies within a sector, particularly when multiple policies can affect the same emission source or sink. The United States has submitted a special report on methods for estimating the GHG impact of policies and measures alongside its first biennial report, which increases the transparency of these estimates and could be a helpful point of reference for other countries (US Government, 2015). Other methodologies for estimating the GHG impact of mitigation policies exist under the Clean Development Mechanism (UNFCCC, 2011c) and have been published by other organisations (e.g. JICA, 2011; EVO, n.d.; IFC, n.d.; GEF, 2008; 2010; Climate Action Reserve, n.d.; N2O Network, n.d.; ADB, 2009; VROM, 2004; AEA, 2009; DECC, 2011).

In their biennial update reports, developing countries have generally reported qualitative information on domestic mitigation measures (i.e. recent progress made in implementing policies and measures). The reporting guidelines for biennial update reports state that for each mitigation action or groups of actions, developing country Parties shall provide information on, amongst other things, "the results achieved, such as estimated outcomes … and estimated emission reductions, to the extent possible" (UNFCCC, 2011a). Of the 13 biennial update reports that had undergone technical analysis as of February 2016, estimated outcomes had been fully reported by seven Parties and partly reported by five Parties. Some Parties provided quantitative information using non-GHG indicators (e.g. Brazil, which used indicators such as number of professionals trained, hectares of land under conservation, litres of liquid fuel saved, etc.), some provided estimated emission reductions expected (e.g. Chile, Ghana, Singapore, former Yugoslav Republic of Macedonia, Tunisia) and at least one provided estimated emission reductions achieved (Namibia[14]).

2.2 General issues relating to tracking progress towards NDCs

2.2.1 Greenhouse gas inventories

Parties are at different stages of the learning curve regarding their GHG inventories. Annex I Parties have been preparing annual GHG inventories for two decades and having them reviewed, and therefore have considerable experience in this area (Ellis and Moarif, 2015). For non-Annex I Parties the inventory preparation process is typically less frequent and in many cases there remain constraints in terms of capacity, resources and data availability. A growing number of countries have made progress on putting in place institutional arrangements for data collection and preparation of GHG inventories (see Box 1).

The transparency and completeness of national GHG inventories has improved over time. In 2000, only 23 out of 39 Annex I Parties submitted their inventory using the Common Reporting Format (CRF) tables and only eight submitted a national inventory report. Only five Parties provided a complete time series for the period 1990-1998 (Australia, Japan, New Zealand, UK, US) (UNFCCC, 2001). By contrast, in 2015, 42 out of 44 Annex I Parties submitted CRF tables and national inventory reports (Figure 2) and all of these submissions contained a complete time series.

[14] In the mitigation actions section of its BUR, Namibia provides a mixture of GHG emission reductions expected and achieved.

Box 1. Improvements to institutional arrangements for preparing GHG inventories

Institutional arrangements play an important role in improving the quality of GHG inventories. Effective domestic institutional arrangements can facilitate data collection and analysis as well as development of country specific emission factors and other related scientific and technical work. Many Parties have made significant progress in improving their institutional arrangements over time. Further, some Parties specifically highlighted inventory-related institutional capacity needs in their INDC submissions (e.g. Ghana, Malaysia, Morocco).

The passing of climate-related laws and the creation of new institutions can accelerate improvement of the national inventory. For example:

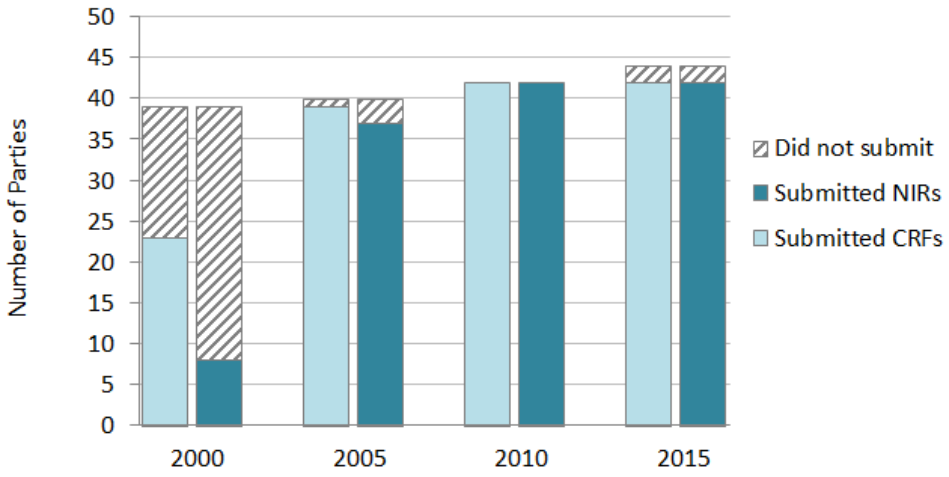
- **Australia** implemented a National Carbon Accounting System which improved methods for estimating emissions and removals from the LULUCF sector in Australia. The outputs included a soil properties map, land use and management information, and the state of knowledge of forest soils (UNFCCC, 2001b).

- In **Korea**, the Greenhouse Gas Inventory and Research Centre (GIR) was established under the Framework Act on Low Carbon and Green Growth enacted in 2010. The key functions of the GIR are to establish and publish a National GHG Inventory Management Plan, to provide MRV guidelines for the national GHG inventory; to verify and decide country-specific emission factors and removal factors; and to manage and operate a National GHG Management System (Government of Korea, 2014).

- **Mexico's** General Law on Climate Change establishes an Inter-ministerial Commission on Climate Change and provides a mandate for monitoring climate change actions at national level, as well as a system for co-ordinating measurement and reporting among the three levels of government (Government of Mexico, 2015).

- The **Philippines** passed Executive Order no. 174 in 2014 that established a Greenhouse Gas Inventory Management and Reporting System (Government of the Philippines, 2014). The executive order establishes the Climate Change Commission as the lead agency for implementation of the GHG inventory management and reporting system, and clarifies the responsibilities of relevant government ministries. Similar laws have been adopted in Ghana, Indonesia, Peru, South Africa and Viet Nam.

Figure 2. Submissions of CRFs and NIRs by Annex I Parties



Source: Authors, based on national inventory submissions on the UNFCCC website

Many developed countries and several developing countries have increased the coverage of their GHG inventories over time to include more GHG sources and sinks. For example, since their initial inventories many developed countries have improved their reporting of HFCs, SF_6, PFCs, and indirect GHGs such as non-methane volatile organic compounds (NMVOCs), SO_x, NO_x, and CO. The coverage of gases in GHG inventories was also expanded for Parties with commitments under the second commitment period of the Kyoto Protocol to include NF_3. Table 2 compares the coverage of gases and years in the first national communications and first biennial update reports of selected developing countries, several of which increased the gases covered and/or the completeness of the time series provided over time.

Many Parties have shifted over time to higher level IPCC tiers for estimating GHG emissions and removals in their inventories. Higher IPCC tiers represent higher levels of methodological complexity and are considered to be more accurate.[15] The use of country-specific emission factors rather than IPCC default values is also increasing and this is improving the accuracy of GHG inventories. For example, Ireland used Tier 1 methods for estimating CO2 emissions from road transportation in its 1998 inventory, but Tier 2 and Tier 3 methods for this category in its 2013 inventory. Viet Nam was commended by the technical team of experts analysing its first biennial update report for its use of Tier 2 methods for fugitive emissions from coal production, manure management and solid waste disposal, among other key sources (UNFCCC, 2015b). Argentina, Chile, Colombia, India, Indonesia, Namibia, Singapore, South Africa, Thailand also used Tier 2 methods for some categories of emissions and sinks in their latest GHG inventories, and Tier 3 methods were used in a small number of specific cases (e.g. emissions from mineral production in Tunisia).

[15] Tier 1 is the basic method, Tier 2 intermediate and Tier 3 most demanding in terms of complexity and data requirements (IPCC, 2006).

Table 2. Coverage of gases and years in GHG inventories and IPCC guidelines used for selected developing countries

✓ Covered/used (✓) Partly covered/used

Party	Report (year submitted)	Years covered	Greenhouse gases or climate forcers covered										IPCC guidelines used			
			CO_2	CH_4	N_2O	HFCs	PFCs	SF_6	NMVOCs	NO_x	SO_x	CO	Black carbon	1994 / Revised 1996	GPG-2000	GPG-2003	2006
Brazil	NC1 (2004)	1990-1994	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	(✓)[1]		
	BUR1 (2014)	1994, 2000, 2010 [2]	✓	✓	✓	✓[3]	✓	✓	✓	✓		✓		✓	✓	✓	(✓)
Chile	NC1 (2000)	1994	✓	✓	✓				✓	✓	✓	✓		✓			
	BUR1 (2014)	1990-2010	✓	✓	✓	✓	✓										✓
Costa Rica	NC1 (2000)	1990, 1996	✓	✓	✓	(✓)[4]			✓	✓	(✓)[4]	✓		✓			
	BUR1 (2015)	2012	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		(✓)[5]			✓
Republic of Korea	NC1 (1998)	1990 [6]	✓	✓	✓				✓	✓		✓		✓[7]			
	BUR1 (2014)	1990-2012	✓	✓	✓	✓	✓	✓						✓			(✓)[8]
Mexico	NC1 (1997)	1990	✓	✓	✓				✓	✓		✓		✓			
	BUR1 (2015)	1990-2012	✓	✓	✓	✓	✓	✓					✓	✓	✓		
India	NC1 (2004)	1994	✓	✓	✓									✓			
	BUR1 (2016)	2000-2010	✓	✓	✓	✓	✓	✓						✓	✓	(✓)	(✓)
Israel	NC1 (2000)	1996	✓	✓	✓				✓	✓	✓	✓		✓			
	BUR1 (2016)	2000, 2007-2013	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓			
Namibia	NC1 (2002)	1994	✓	✓	✓									✓			
	BUR1 (2014)	1994, 2000, 2010 [9]	✓	✓	✓				✓	✓	✓	✓					✓
Singapore	NC1 (2000)	1994	✓	✓	✓									✓			
	BUR1 (2014)	1994, 2000, 2010 [10]	✓	✓	✓	✓	✓	✓						✓	✓		(✓)[11]
South Africa	NC1 (2003)	1990, 1994	✓	✓	✓									✓			
	BUR1 (2014)	2000-2010	✓	✓	✓	✓	✓										✓

[1] Brazil's NC1 (2004) was mainly prepared using the 1994 IPCC Guidelines. Wherever possible, the Revised 1996 Guidelines were used, and some of the estimates take into account the IPCC GPG-2000.

[2] Brazil's BUR1 (2014) provides summary tables for years 1994, 2000 and 2010 but states that the data provided in the BUR should be considered provisional and the most recent data will be in the NC3, which was underway during the release of the BUR. Brazil's NC3 (2016) covered years 1990-2010.

[3] Brazil accounts for two HFCs (HFC-23and HFC-134a) in its NC1 (2004) and six HFCs (HFC-23, HFC-32, HFC-125, HFC-134a, HFC-143a, HFC-152a) in its BUR1 (2014).

[4] Costa Rica's NC1 (2000) reported on 1990 and 1996. Two extra gases (SO_x and HFCs) were accounted for in the 1996 Inventory.

[5] Costa Rica's BUR1 (2015) used the 2006 IPCC Guidelines but the Revised 1996 IPCC Guidelines were used for calculating emissions of precursors.

[6] Korea's NC1 (1998) inventory contains an estimate of all six GHGs covered for 1990, and a time series for CO_2 emissions from fossil fuel combustion for 1990-1995.

[7] Korea's NC1 (1998) inventory is based on the 1994 IPCC Guidelines for National Greenhouse Gas Inventories. A non-IPCC methodology was used to calculate methane emissions from rice fields and livestock in the agriculture sector.

[8] Korea's BUR1 (2014) is mainly based on the Revised 1996 IPCC Guidelines. The 2006 IPCC Guidelines used to calculate GHG emissions from rice cultivation in agriculture and other waste.

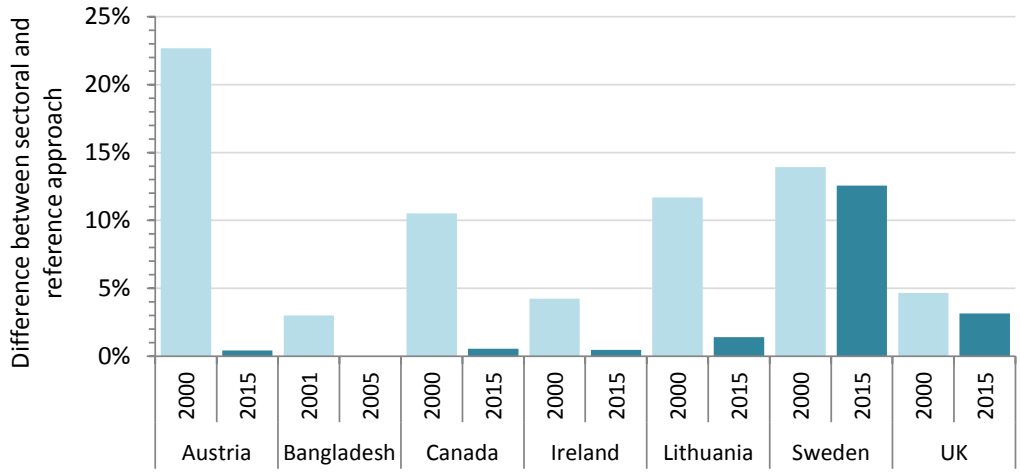
[9] Namibia's BUR1 (2014) provides detailed information for 2010 and summary tables for 2000 and 1994

[10] Singapore's BUR1 (2014) provides detailed information for 2010 and summary tables for 2000 and 1994

[11] Singapore's BUR1 (2014) mentions that emissions from waste incineration and HFCs, PFCs and SF_6 from integrated circuit and semiconductor production were estimated using the 2006 IPCC Guidelines since there are no 1996 IPCC factors.

GHG inventories are also becoming more accurate over time. The difference between the sectoral and reference approach[16] for calculating CO_2 emission estimates can also be used as a rough proxy for accuracy. For most Parties this difference has decreased over time as data collection has improved (Figure 3)

Figure 3. Differences between sectoral and reference approach for calculating CO2 emissions from fuel combustion (selected countries for which data are available)



Source: Authors, based on UNFCCC (2001), UNFCCC (2015c) and Government of Bangladesh (2012).

Note: The significant difference in the 2015 values for Sweden is mainly related to liquid fuels. The Swedish Energy agency has initiated efforts to improve the supply statistics, especially for liquid fuels, and this is expected to reduce statistical differences in future years.

An increasing number of developing countries are using or are planning to use the 2006 IPCC Guidelines[17] for preparing their GHG inventories. In a survey of capacity building needs in developing countries by the Global Support Programme, 50% of respondents reported that they used the 2006 IPCC Guidelines for their latest GHG inventory and 87% responded that they were planning to start or continue using the 2006 IPCC Guidelines for their next inventory (Borgogno, 2016). This demonstrates that many developing countries are moving above and beyond the reporting guidelines, since the use of the 2006 IPCC Guidelines is not mandatory for developing countries. Some developing countries prefer using the 2006 Guidelines to the 1996 Guidelines because the 2006 Guidelines reflect more up-to-date scientific knowledge, the software is designed to be easier to use, and the 2006 Guidelines provide a more integrated view of emissions sources and sinks (e.g. by highlighting links between the agriculture and land use sectors).

2.2.2 Time frames and periods for implementation

Parties have taken different approaches to time frames and periods of implementation for their INDCs. Many have expressed their INDCs as a single-year target (i.e. to reduce GHG emissions by 40% by 2030).

[16] The sectoral approach includes emissions only when the fuel is actually combusted. The reference approach is based on the supply of energy in a country (IEA, 2014).

[17] The 2006 IPCC Guidelines represent an "evolutionary development" from the 1996 IPCC Guidelines, the Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (GPG2000) and the Good Practice Guidance for Land Use, Land-Use Change and Forestry (GPG-LULUCF), taking into account the experience gained with reporting inventories using the previous guidelines (IPCC, 2006).

Most of the single-year targets included in INDCs are for the year 2030. However, some Parties have chosen different end dates for their INDCs, such as 2025 (e.g. Brazil, the US, Grenada, the Marshall Islands, Palau). Further, some Parties have included long-term aspirational goals in their INDCs, such as for 2050 or 2085. Article 4.10 of the Paris Agreement states that common time frames for NDCs are to be considered at the first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA 1).

Single-year targets can complicate accounting and tracking progress towards emission targets. First, emission levels can vary greatly from one year to the next in some sectors, such as the LULUCF sector and the power sector (if there is a significant proportion of hydro and wind energy in the electricity generation mix). There is therefore a risk that the target might be missed, even if mitigation actions have been successfully implemented. Second, if internationally transferred mitigation outcomes (ITMOs) (including those transferred under the forthcoming Article 6 mechanism) are counted towards achievement of the target, it is unclear how ITMOs generated in years other than the target year should be treated (Hood, Briner and Rocha, 2014; Prag, Hood and Martins Barata, 2013; Prag et al., 2011).

Some Parties have expressed their INDCs as targets for cumulative emissions over a period (i.e. multi-year targets or "emission budgets"). Such targets are similar in nature to quantified emission limitation or reduction objectives under the Kyoto Protocol. For example, Norway's INDC will be developed into an emissions budget covering the period 2021-30 (Government of Norway, 2015). Armenia's INDC is to limit its cumulative GHG emissions in the period 2015-2030 to 633 MtCO2-eq (Government of Armenia, 2015). This type of emission target reduces the impact of annual volatility in emission levels on achievement of the target and might make accounting for transfers of ITMOs more straightforward.[18]

In the case of emission goals relative to BAU levels, the start date of the BAU baseline may not necessarily correspond to the start date of the NDC. For example, the period of implementation of Turkey's INDC is 2021-2030, yet the BAU baseline shown in the INDC submission starts in 2012. For this NDC type, clarity can be enhanced by clearly stating the start date of the NDC as well as the start date of the BAU baseline (if they are different).

2.2.3 Use of international market-based mechanisms

In 90 INDCs, governments expressed an intention to use carbon markets to reach part of their mitigation objectives (EDF and IETA, 2016). Further, many make explicit references to the Clean Development Mechanism, reducing emissions from deforestation and forest degradation in developing countries, including the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (REDD+), or the market mechanism established under Article 6 of the Paris Agreement. Regular reporting of information relating to issuance, retirement and transfers of ITMOs could therefore be an important component of tracking progress in implementation of NDCs for Parties choosing to use such mechanisms. Information relating to domestically-governed market-based mechanisms generating ITMOs and how they have been designed to promote environmental integrity and avoid double counting could also be reported.

There is experience with reporting on transfers of units from market-based mechanisms under the Kyoto Protocol for Annex I KP Parties. Outside of the Kyoto Protocol, there is little experience with reporting on transfers of units from market-based mechanisms under the Cancun Agreements. The common tabular

[18] Approaches based on cumulative emissions are more appropriate for long-lived GHGs such as CO_2 and N_2O than short-lived gases such as CH_4. While nearly all INDCs have been based on the GWP-100 metric, alternative metrics are available for aggregating GHG emission totals (e.g. the Global Temperature Potential metric referred to in Brazil's INDC).

format (CTF) tables adopted for biennial reports from developed countries contain tables relating to use of units from market mechanisms (i.e. Tables 2(e)I, 2(e)II, 4 and 4(b)) (UNFCCC, 2012). However, experience in this area remains limited to date, with many Parties leaving these tables blank or only partially filled in their biennial report CTF submissions.

Article 6 of the Paris Agreement calls for robust accounting rules and avoidance of double counting of emission reductions. There are different ways that double counting can be avoided, with implementation depending on the NDC types of the Parties involved and the type of double counting concerned. Possible solutions include strong governance to prevent double issuance of units for the same activity, a robust registry system to prevent double selling or retirement of units, and regular and transparent information on unit flows to underpin accounting provisions that address double claiming of mitigation outcomes by more than one Party (Hood, Briner and Rocha, 2014). Regarding registry systems, it remains unclear if unit transfers will continue to be processed and logged via a centralised international transaction log (as under the Kyoto Protocol), whether a more devolved system will be established, or both will co-exist (Prag, Hood and Martins Barata, 2013).

2.2.4 Approach used to account for emissions and removals from the land sector

Many INDCs contain limited information regarding how Parties intend to account for emissions and removals from the LULUCF sector. Important aspects include the approach taken to forest land, natural disturbances and harvested wood products. Some Parties intend to use a net-net approach to account for all emissions and removals from LULUCF; others indicated they are switching to a comprehensive land-based approach; and some explained that a decision on how to account for LULUCF would be made at a later date (UNFCCC, 2016a).

The existing reporting and accounting arrangements for LULUCF are complex and not applicable to all Parties. As part of the overall reporting and accounting framework under the Paris Agreement, a land sector reporting and accounting framework is therefore needed that is applicable to all countries and increases in comprehensiveness over time. The aspects covered by such a framework could include: agreement to expand the coverage of land sector accounting over time, with a view to achieving broad coverage of key categories of anthropogenic sources as well as sinks in the land sector in all countries; application of the "once in, always in" rule for sources and sinks in the post-2020 period; technical assessments of reference levels; and reporting of qualitative information on holistic landscape management strategies and benefits of actions in areas such as environmental and social safeguards, climate-smart agriculture, and ecosystem-based adaptation (Briner and Konrad, 2015). Such a framework would also need to provide incentives to increase quality and accuracy of reporting for land sector sources and sinks. There is already evidence of improvements being made to national systems for reporting relating to emissions and removals in the land sector. For example, South Africa used the IPCC Tier 3 approach for the first time in its biennial update report to represent land-use areas, while the IPCC Tier 1 approach was used in its second national communication (UNFCCC, 2015d).

2.2.5 Emission projections

The Paris Agreement does not explicitly refer to emission projections in the context of Article 13. Nevertheless, mid-term emission projections (e.g. to 2030) might be reported as a means of demonstrating progress toward and achievement of NDCs. Many developed country Parties have reported emission projections for 2020 and 2030 (e.g. Japan, Norway) or a time series from 2015-2030 (e.g. Canada, the EU, New Zealand, the US) in their biennial reports.

Though not formally within the scope of the enhanced transparency framework under Article 13, communication of long-term emission projections (e.g. to 2050 and beyond) could facilitate the global

stocktake outlined in Article 14. The aim of the global stocktake is to assess collective progress towards the long-term goals of the Paris Agreement, including the long-term goal of holding the increase in global average temperature to well below 2°C above pre-industrial levels. To assess collective progress towards this long-term goal, estimates of the future global GHG emissions trajectory are needed. Parties that have the capacity to do so could therefore report emission projections and long-term goals or low-emission strategies for beyond the time frame of their NDCs.

Some countries have included indicative long-term emission targets for 2050 in their biennial reports or biennial update reports (e.g. EU, Germany, Mexico, Norway, South Africa, UK). Some developing countries have also reported emission projections in their biennial update reports, even though this is not mandatory. For example, South Africa provides two emission scenarios for 2050 in its biennial update report (a reference case without measures, and a case with existing measures), and Bosnia and Herzegovina provides a set of three GHG pathways to 2040 for each sector (the "S1" BAU scenario, the "S2" scenario with partial implementation of some mitigation actions, and the "S3" scenario with full implementation of a comprehensive set of mitigation actions) (Government of Bosnia and Herzegovina, 2015).

3. Review and analysis: Lessons for technical expert review and multilateral consideration of progress under the Paris Agreement

The importance of facilitating improved reporting and transparency over time, as underlined in the Paris Agreement decision text (para. 92), suggests a key role for the technical expert review and the facilitative multilateral consideration of progress established under Articles 13.11 and 13.12 of the Paris Agreement. There are currently processes similar to both a technical review, undertaken by teams of experts, and a "multilateral consideration" (i.e. an in-person exchange between Parties) in place under the Convention (Table 3). Both are based on the reports submitted by Parties. For Annex I Parties, GHG inventories, national communications and biennial reports are subject to technical review by an expert review team. For non-Annex I Parties, biennial update reports are subject to technical analysis by a team of technical experts. All expert teams are drawn from a UNFCCC roster of experts, nominated by Parties, and trained to undertake reviews. Review and technical analysis processes result in the preparation of a report, and bring together experts for approximately six days during a "review/analysis week". This can take place in the country whose report is being reviewed (in-country review), at the UNFCCC offices in Bonn (a centralised review or analysis), or remotely with experts based in their home locations (desk review).

There are two existing processes that could form the basis of a "multilateral consideration", taking the form of written questions and an in-person, peer-to-peer exchange between Parties. The existing processes are separate for Annex I and non-Annex I Parties, and respectively termed "multilateral assessment" and "facilitative sharing of views". In both cases, the basis of multilateral assessment and facilitative sharing of views is the Party's biennial report or biennial update report, along with the corresponding reports produced following technical review or analysis.

Table 3. Overview of existing processes relevant to technical expert review and multilateral consideration of progress under the Paris Agreement

Process	Function/purpose	Outcome
In-depth review of national communications • Annex I Parties • Since 1999, every ~4 years • In-country or centralised (reviewers meet in Bonn)	• Thorough and comprehensive technical review of implementation of reporting obligations under the Convention • Examine adherence to reporting guidelines; promote consistency of information • Help Parties improve reporting of information and implementation of commitments • Ensure COP has reliable information on implementation of commitments	• In-depth review report • For KP Parties: potentially flag questions of implementation for compliance committee
GHG inventory reviews • Annex I Parties • Annually since 2003, following inventory submission • In-country, centralised or desk review	• Objective, consistent, transparent, thorough and comprehensive technical assessment of quantitative and qualitative information on emissions • Examine consistency with reporting guidelines • Ensure COP has adequate and reliable information on emissions and trends • Help Parties improve quality of inventories • Inform biennial report and national communication reviews	• Inventory review report • For KP Parties: potentially inventory adjustments; access to flexible mechanisms
International assessment and review (IAR): technical review of biennial reports • Annex I Parties • Agreed 2011; began 2014 • Every 2 years • In-country (e.g. when submitted alongside national communication) or centralised	• Thorough and comprehensive technical review • To examine adherence to reporting guidelines; promote consistency • Examine progress in achieving target • Help Parties improve reporting of information and implementation of commitments • Ensure COP has reliable information on implementation of commitments	• Technical review report, used as input into multilateral assessment process
International consultations and analysis (ICA): technical analysis of biennial update reports • Non-Annex I Parties • Agreed 2011; started 2015 • ~2 years; variable for SIDS and LDCs • Centralised	• Technical analysis of information reported in biennial update reports to increase the transparency of mitigation actions and their effects • Identify capacity-building needs	• Summary report on the technical analysis, used as input into facilitative sharing of views process
IAR: Multilateral assessment • Agreed 2011; began 2014 • Every 2 years • During UNFCCC SBI sessions	• Exchange of questions and answers between the Party being assessed and other Parties, for clarity on information reported in biennial reports, national communications and GHG inventories, to improve comparability and build confidence • Parties submit written questions in advance, which the Party undergoing multilateral assessment responds to in writing	• Publication of questions submitted to Party and written responses • Record of the multilateral assessment session
ICA: Facilitative sharing of views • Agreed 2011; started 2016 • ~2 years; variable for SIDS and LDCs • During UNFCCC SBI sessions	• Workshop consisting of a brief presentation by the Party on its biennial update report, followed by an exchange of questions and answers among Parties • Parties can submit written questions in advance of the workshop	• Record of the facilitative sharing of views session

Experience to date suggests that these processes play an important role in helping Parties improve the completeness and transparency of reporting. This section highlights current experience with review and multilateral consideration processes that is relevant to the elaboration of modalities, procedures and guidelines for the Paris Agreement's enhanced transparency framework. It draws out both positive and challenging elements of these processes. This section draws on input from 20 delegates and experts, from developed countries, developing countries and the UNFCCC Secretariat, with experience in the review and related processes under the UNFCCC. Because reporting, review, and consideration processes have applied to Annex I Parties for longer than non-Annex I Parties, more lessons can be drawn from their experiences, though several are broadly applicable and relevant to all countries. While this discussion document focusses on mitigation, many of the lessons and examples highlighted below are procedural, and would also be relevant to review and analysis of information on adaptation and support.

3.1 Experience from current technical review and analysis processes: what has worked well

Overall, the current review processes applied to GHG inventories, national communications, and more recently to biennial reports, have had a positive impact on the quality of information reported to the UNFCCC. This is relevant because in many countries the requirement to report information to the UNFCCC has broader impacts on domestic policy planning and monitoring. The implication is that reviews should be maintained given their benefits, though flexibility may be needed regarding their frequency.

To date, the review and analysis processes have successfully led to greater political visibility for climate policy within the country being reviewed. The result is that resources are made available to undertake certain activities that may otherwise be difficult to secure, such as developing GHG inventories or preparing GHG projections. Official, in-country visits by an expert review team can be particularly helpful in raising the profile of issues such as inventory data and related statistics, resulting in more attention and acknowledgement of their importance from high-level decision makers. Review processes can also strengthen the legitimacy and credibility of information reported, for example on emissions and removals; where the review process can attest to the quality and robustness of emissions estimates, this can facilitate their use for other domestic purposes.

The frequency of inventory reviews and the experience of in-country reviews are factors that have helped ensure government departments retain their capacity to maintain and improve the quality of GHG inventories and reporting to the UNFCCC. For example, the expert review process enabled officials in charge of New Zealand's GHG inventory to make a stronger case for additional resources in order to implement the recommendations made by the review team and make their inventory both more complete and accurate (Plume, 2016). This implies that the regular nature of review may have a positive impact on building and maintaining the political salience of and government capacity for climate action. Continuing current reporting and review frequencies under the Paris Agreement for developed countries, and maintaining biennial reporting for developing countries, will be beneficial.

In addition, technical reviews and analyses have substantively helped improve understanding of the information reported by Parties. The expert team asks questions where the information is unclear, and provides a summary both of the information in the report itself (in a more digestible format), as well as any additional information and clarifications provided by the Party in question. This is useful for other Parties and a broad range of stakeholders (e.g. researchers, non-governmental organisations, citizens). The review or analysis process can also help improve the transparency of reporting informally, during exchanges between the expert team and the Party in question regarding whether information was clear, or how to organise or communicate certain types of information. Such exchanges are easiest during in-country

reviews, but have also been facilitated via the use of Skype calls during the centralised analyses of biennial update reports.

The review and analysis processes also help those in charge of reporting understand how to provide information that is clearer and more complete. This happens in part through the exchange of questions and answers between the review or technical expert team and the Party concerned, including informal ones, particularly during in-country reviews. These exchanges help officials gauge the information needed for others to understand their climate actions, and how to report this information more completely and clearly. In cases where the report being analysed has been prepared by external consultants, the process also helps government staff better understand what has been reported, as well as better guide future work undertaken by technical consultants.

Knowledge that helps improve future reporting is acquired through participation in reviews or technical analyses. Members of expert review teams (for Annex I Party reports) and technical teams of experts (for biennial update reports) are drawn from the UNFCCC roster of experts and are in large part also government officials. Participating in reviews and analyses helps them understand how to improve reporting within their own countries, based on their experience reviewing or analysing the reports of others. Both developed and developing country experts cited the participation of government officials in expert teams as being equally beneficial to capacity building as experiencing a review or analysis. Further, some developed countries actively use participation in expert review teams as a way to train new staff working on GHG inventories.[19] The current roster of experts system is stretched thin and may need to be enlarged, in the context of more countries undergoing review processes more frequently, though government officials should continue to act as expert reviewers.

Certain types of flexibility have also been included in review processes, with small emitters more often subject to a centralised review at the UNFCCC Secretariat offices in Bonn, rather than an in-county review. Annex I Parties with total GHG emissions of less than 50 MtCO2e (excluding land use, land-use change and forestry) may choose to undergo a centralised review for their national communications (Decision 23/CP.19).[20] This option has proved useful not only to lighten the workload for smaller emitters and smaller Parties, but also lightens the resource implications for the Secretariat and reviewers. In addition, the scope of technical review has differed from technical analysis; the latter focuses more on identification of capacity-building needs than the robustness of methodologies and consistency with reporting requirements. Under a future transparency framework, Parties may wish to consider whether certain factors lead to different options regarding the types of review and frequency of review, including national circumstances (e.g. size of emissions) and relative capacities (e.g. LDCs may have reviews focused on capacity needs).

Reviews have encouraged Annex I Parties to make continuous improvements to their reporting over time from different starting points. In reviews of Annex I national communications and biennial reports, Parties are encouraged to report as completely as possible, and to report to greater levels of transparency. A Party unable to report complete information will be asked about plans and processes to improve reporting and receive recommendations related to completeness. Where information is more complete, reviewers ask questions to clarify this as needed, and provide recommendations related to transparency. Reviews of Annex I Parties' reports seek to provide recommendations that will improve the transparency and completeness of reporting, but these recommendations will vary with different countries' starting points and reporting capacities. Since reviewers examine past reports, and whether past recommendations have

[19] Comments made during discussions at the September 2016 CCXG Global Forum on the Environment and Climate Change.

[20] Unless they are also Parties listed in Annex II of the Convention.

been acted upon, they can assess whether a given report is in line with previous reporting, and in which areas it has improved.

Finally, experience to date suggests that the review process itself has evolved and improved. The UNFCCC Secretariat has worked to ensure that reviews and analyses are more efficient, by helping team members be better prepared and complete their work on time. Practices such as requiring questions to be submitted to the Party two weeks before the review week also help the Party in question better prepare for and respond to questions. The Secretariat provides tools such as checklists for gauging the completeness and transparency of reports, example questions that can be used to clarify information, and templates for completing the review or summary reports. Since 2014, all experts must undergo training related to the specific sections of the report they will be reviewing, and reviewers must prepare questions for the Party being reviewed well ahead of the review week. Reviews are conducted using different formats, including desk reviews (used for an inventory review in 2015), where individual experts based in different locations work together remotely to complete a review.

The Secretariat has also made efforts to ensure that reviews are more consistent. It has set up a community of practice among reviewers, by instituting regular meetings for lead reviewers (i.e. those that head each review team). These have been in place since 2003 for GHG inventories, and since 2014 for national communications and biennial reports. At their meeting in March 2016, lead reviewers developed a "review practice guidance" for national communications and biennial reports (UNFCCC, 2016c). This is a dynamic, "living" document, which is updated following the experience gained with each review cycle for biennial reports and national communications. These help reviewers apply more consistent terminology, such as regarding what is "complete" and "transparent" reporting, and provide them with a basis for discussing the degree of completeness and transparency (e.g. whether "transparent" or "mostly transparent"). The review practice guidance also provides a more consistent approach to the reviews, e.g. ensuring that only one recommendation for improvement in either the completeness or transparency of reporting is given for each mandatory ("shall") reporting requirement, so that the total number of recommendations between reviews can be broadly comparable. Having tools, such as a review practice guidance, to incorporate experience that can continuously improve the quality and efficiency of each review cycle, could be important for the future transparency framework.

Application of guidance should help ensure reviews are consistent over time for the same Party, as well as more consistent between Parties. This underlines the importance of developing a flexible system for conducting reviews themselves, one that allows for consistency, while acknowledging that the process can improve and evolve in accordance with what Parties seek and expect from the review process. The current review and analysis processes also highlight the importance of time and experience for improved reporting. Annex I Parties currently have relatively robust reporting of GHG emissions and institutional arrangements for inventories and domestic monitoring, which have developed over 20 years.

3.2 Experience from current technical review and analysis processes: what has been challenging

The resources involved in undertaking reviews and analyses, and the experts required to do so, have been a perennial challenge. There are practical limits to the amount of time and resources that could be allocated to each Party under the Paris Agreement for technical review. The benefits of technical review processes are well worth the investment needed, which is nevertheless resource intensive, requiring the time of staff from various government organisations, as well as from the Secretariat.[21] From beginning to end, time

[21] The visible cost of review processes (i.e. Secretariat resources, funding for training experts and supporting their participation in reviews) has increased much less than the increase in review activities. Between 2003-2005 and 2014-

spent on a centralised review of GHG inventories can total over 80 working days across the reviewers and Secretariat review officers, while in-country reviews can amount to over 150 working days (Pulles, 2016a).

For each in-country review of a national communication, there are between five to six experts working for six days during the review week itself, with a minimum of one week of work beforehand, and often one week afterwards (following comments by the country, and quality checks by the Secretariat). This is a minimum of 10 person-weeks per review, not counting the much longer time spent by the UNFCCC Secretariat staff members supporting the review process, or experts within the country being reviewed. The participation of experts from developing countries is financially supported by the UNFCCC, and so any increase in review activity will lead to an increase in the corresponding budget. In addition, governments and organisations will need to find several weeks of their experts' time to participate in a review, even in developed countries.

Based on its present forms, the technical review process will need to receive significant financial and human resources; given the benefits of participation, this could potentially be an activity supported by the Capacity Building Initiative for Transparency. While the process could be streamlined further, overall review might still require more resources over time as an increasing number of countries submit inventories and other reports more frequently and have these reviewed.

There are also moments when reviews will take more time and effort; for example, when reporting and review guidelines are changed, reviewers need to become familiar with a new set of requirements such as the 2006 IPCC Guidelines, which all Annex I countries began using as of 2014 (Pipatti, 2016). Parties may need to anticipate additional resources for review processes following the adoption of a new transparency framework, as even experienced reviewers will need a period of adjustment and likely require more time for reviews. Reviews can also be more challenging the longer the gap between the report being submitted and the review taking place. Where the delay is long (over a year), governments and key policies may change significantly, making the information being reviewed less relevant. In this case, the Party in question must submit new information, which the review team may not be able to fully assess. More frequent reporting and review cycles should minimise the gap between reports and their review, and therefore help address this challenge.

There are several ways in which the usefulness of technical reviews and analysis for Parties could be further enhanced. For GHG inventories, a survey of GHG inventory reviewers found that most feel the process should be more supportive for Parties, by focusing time and energy on helping the Party resolve major issues, rather than a detailed examination of minor overestimations and underestimations with little impact on total emissions (Pulles, 2016a, 2016b).[22] Particularly under the Paris Agreement transparency framework, where not all NDCs are expressed in terms of tonnes, a detailed examination of minor over- and under-estimations that have little impact on total emissions may be less helpful, and could rapidly become logistically unsustainable.

For Annex I Party reports, reviewers can make specific suggestions on how reporting could be more transparent, or note that certain types of information would improve understanding of progress with mitigation commitments – whether or not the information is required in reporting guidelines (e.g. an explanation of how mitigation impacts were assessed, or of significant differences in the reporting of mitigation actions compared with the previous report). However, these types of suggestions may not be

16, the number of review activities increased nearly six times while costs doubled (UNFCCC Secretariat, personal communication, 2016).

[22] Experienced inventory reviewers may also have been shaped by reviews under the Kyoto Protocol, which were focussed on recommendations that related directly to questions of compliance, such as underestimations of emissions, even if these were small.

retained in the final report, given time constraints and limits on report length. The usefulness of the review to the Party also depends on the Party's ability to engage; if the Party does not respond to questions, responds too late or with insufficient detail, the review or summary report will also be less specific and therefore less helpful.

Reviews and analyses also face the challenge of being framed by reporting guidelines, which can potentially limit the scope, depth and rigour of the technical analysis. Where it is clear what information is to be reported, information is easier to assess, and experts can ask more questions and seek more clarification. However, if reporting modalities are mostly optional, or vague, experts may have limited information to assess, spend most of their time obtaining additional information, or be constrained in their mandate to seek further information and clarification. This in turn may lead to fewer and less specific (and therefore useful) observations, encouragements or recommendations. The more vague the reporting guidelines, the more difficult to ensure the review or analysis is useful to the Party in question. In some cases, it can be less clear whether a Party has provided information in accordance with the reporting guidelines; this can affect the comparability of information. Even if reporting guidelines are not followed precisely, a country can still produce a report that is transparent and contains useful information regarding its policies and actions. In other cases, a Party may "tick the boxes" regarding information to be included in its report, but this information may not facilitate understanding of its national context and policies.

The above two challenges, of making reviews and analyses more useful to Parties and working within reporting guidelines, are linked, and have to date also been more pronounced in the case of technical analysis of biennial update reports. This underlines the importance of the mandate and purpose of reviews. In the review of national communications and biennial reports, the review team's primary focus is to provide recommendations and encouragements to improve future reporting. In the technical analysis of biennial update reports, the primary focus is to identify and prioritise capacity building needs; the expert team does not provide recommendations or encouragements, but can make suggestions or note that a given piece of information would enhance transparency. This makes it difficult for technical analysis of biennial update reports to meet its stated purpose of increasing the transparency of mitigation actions and effects. Though limited, current experience with technical analysis suggests the process does not sufficiently accommodate the degree of variation between country capacities and circumstances, in a way that helps all Parties improve their reporting. For many countries, enhancing transparency may best done by identifying clear capacity needs, for example relating to establishing a GHG inventory system, and is a useful feature of technical analysis. For countries that already have systems in place for their GHG inventories, it could mean clarifying the different methodologies used in different sectors. Currently, where the technical analysis process does not identify capacity needs (e.g. the technical analyses of Singapore, Brazil and the Republic of Korea [23]), the summary reports contain no specific or useful conclusions.

3.3 Multilateral assessment and facilitative sharing of views: what has worked well, what has been challenging

Experience to date with "multilateral consideration"-type processes has been more limited; there have been multilateral assessments for the first biennial reports of Annex I Parties and one round of facilitative sharing of views for non-Annex I Parties. Nevertheless, there have been several positive lessons from these processes.

The first is positive from a domestic perspective, for the Party undergoing multilateral assessment or facilitative sharing of views. Similar to the experience with review or analysis, these processes have helped increase the political visibility of climate issues within government. This has also helped ministries or

[23] Submitted biennial update reports and summary reports from the technical analysis are available at: http://unfccc.int/national_reports/non-annex_i_natcom/reporting_on_climate_change/items/8722.php.

agencies responsible for preparing the biennial reports and biennial update reports get buy-in and engagement from relevant experts across the government.

Experience with multilateral assessment for Annex I Parties shows that the process enabled Parties to ask very specific, technical questions of each other, allowing knowledge sharing that is directly useful to the Party requesting more details. These questions can be related to transparency of information contained in reports, such as clarifying base years or the contribution of LULUCF emissions and removals to mitigation targets. They can also be related to understanding policy implementation issues, such as the use of marginal abatement cost curves, the mitigation potential of specific measures as well as their costs, or the interaction between different policy instruments and targets. A large share of questions under multilateral assessment were related to progress with achieving mitigation targets, mostly regarding what additional measures were planned where countries were not on track to meet their 2020 targets according to review reports.

Experience also shows that the multilateral assessment process can be a useful space for Parties to ask more "political" questions, where objective assessments are challenging, and where no established assessment frameworks are in place. For example, Saudi Arabia frequently asked Annex I countries about the assessment of economic and social consequences of response measures, and the Netherlands was asked why it was not able to curb emissions despite implementation of mitigation measures. Countries also asked questions related to the link between GHG emissions and economic development pathways. Maintaining a venue to exchange on such topics is likely to remain important, particularly given that issues related to the provision of support are to fall under the remit of multilateral consideration under the Paris Agreement.

In helping clarify technical issues, and creating a space to ask "political" questions, the multilateral assessment process has helped enhance the transparency of actions and the accountability of Parties. In addition, both multilateral assessment and facilitative sharing of views have provided an opportunity to share good practices and approaches that have been successful for a given country, and could potentially help others with their mitigation actions. For example, South Africa received questions on its domestic measurement, reporting and verification system, as well as the preparation of its GHG inventory, during the facilitative sharing of views from a number of countries (UNFCCC, 2016b). The facilitative sharing of views session has also helped identify the capacity building needs of Parties; Namibia identified enhancing data quality for its inventories, and Tunisia improving statistical systems for activity data and emission factors (UNFCCC, 2016d; 2016e).

One challenge the multilateral assessment and facilitative sharing of views processes have both faced is limited participation by Parties, which reduces the usefulness of peer-to-peer exchange. A limited set of countries have been active participants thus far; as each country tend to ask more questions on topics that are of particular interest to them, the more countries that participate, the more diverse the ensuing exchange. Participating actively in multilateral assessment and facilitative sharing of views requires analysing the biennial reports, biennial update reports, and review or summary reports of the Parties in question ahead of time. This takes time and resources, making it difficult for Parties with less capacity or small administrations to actively participate; during the facilitative sharing of views process, the majority of Parties that asked questions during the workshop were developed countries.

4. Conclusions

Parties to the UNFCCC have agreed that the enhanced transparency framework outlined in Article 13 of the Paris Agreement is to build on experience from the transparency arrangements under the Convention. This framework is an important part of the processes established under the Paris Agreement to support the transition to a low-GHG and climate-resilient development pathway, through building international trust and enabling domestic action. The most important lessons from experience relating to transparency of mitigation are:

- The processes for reporting, review and multilateral consideration of progress need to be **useful domestically**, in addition to internationally, in order for countries to spend their limited time and resources on this issue. Expert review teams can provide practical advice to Parties on where inventories can be strengthened, and how information on mitigation actions can be better understood. Informal exchanges and questions to facilitate this can be built-in to all types of review processes, not just in-country reviews.

- At the national level, reporting, review, analysis and multilateral considerations can **help countries to strengthen their mitigation actions**. These processes can help to: sustain high-level political attention on domestic climate policy; allocate resources to monitor and analyse relevant data and information; provide evidence to domestic stakeholders that other countries are taking action; and facilitate the development of NDCs and domestic mitigation measures. The transparency framework can thus contribute to the dynamic process needed for a low-emissions development pathway.

- **Clearer and more detailed mitigation reporting guidelines based on NDC type** could be helpful, particularly for NDCs that are not absolute emission targets. For example, Parties with goals relative to BAU levels could report information on the model used to calculate the baseline and the assumptions made for key variables (e.g. trends in GDP, population, energy prices and technology developments), as well as whether the baseline is fixed or may be revised. Parties with emission intensity goals could report GDP projections, the source of GDP statistics used, and what happens to the goal if GDP growth is significantly higher or lower than expected. It is unlikely that detailed guidance could be provided for goals for non-GHG indicators, given the wide variety of indicators available, though preferred ways of expressing such goals could be agreed in some cases.

- The information reported by individual Parties as part of the enhanced transparency framework is likely to be one of the **inputs to the global stocktake** of collective progress made towards the long-term global goals of the Paris Agreement. Estimates of the future expected cumulative emissions of long-lived GHGs (in addition to information from other sources on aspects such as investment in low-carbon infrastructure and clean technology research, development and demonstration) could be needed to assess progress being made towards the long-term goal to hold the rise in global average temperature to well below 2°C.

- Regular cycles of reporting, review and multilateral consideration of progress can help facilitate **continuous improvements in measurement and reporting**. For Parties with less reporting experience and with capacity constraints, the immediate priorities regarding mitigation are often setting up or improving data collection and national systems for GHG inventories, as well as establishing institutional arrangements for climate policy implementation and monitoring. For Parties with more reporting experience and greater capacity, improvements can often still be made in terms of improving GHG inventories (taking into account materiality and associated resource implications), increasing the transparency and consistency of emission projections, and

estimating the GHG impact of domestic mitigation policies and measures. Article 13.12 of the Paris Agreement calls for identifying areas of improvement within the scope of technical review (recommendations are currently provided as part of technical review of biennial reports for developed countries but are outside the mandate of technical analysis of biennial update reports for developing countries).

- Technical review **processes themselves can improve and adapt** to changing needs. New training can be introduced, and tools developed to improve efficiency. The UNFCCC Secretariat has facilitated knowledge-sharing among lead reviewers, resulting in the development of good practice guidance for reviews. The use of such guidance has improved the consistency of reviews, both between countries and across time. The review practice guidance also evolves in response to experience gained during reviews.

- The technical review and analysis processes developed under the UNFCCC have been **neither threatening nor intrusive**, nor have the multilateral assessment and facilitative sharing of views; this should remain the case under the Paris Agreement. Concerns that review might impinge on sovereignty or judge countries' actions have not been founded. Review and consideration can remain technical in nature, and focus on improving the clarity and understanding of information on a country's progress with its own nationally-determined objectives.

- Practical ways need to be found to **scale up capacity to undertake technical review and multilateral consideration of progress.** These processes are time and resource intensive for expert teams, the UNFCCC Secretariat and the Parties concerned. An approach is needed that can increase both the quantity of reviews (since many more reviews and multilateral consideration sessions will need to be undertaken post-2020 than at present) and the quality of reviews (i.e. by providing timely feedback and pragmatic recommendations that lead to accelerated improvements in domestic MRV systems). It may help to introduce increased flexibility regarding the use of in-country reviews, centralised reviews and desk reviews for reviews of GHG inventories, national communications and biennial reporting. An expanded roster of experts is likely to be needed, potentially including or combined with greater use of resources available from a broader set of organisations (e.g. non-governmental, inter-governmental and research organisations).

- Technical review and multilateral consideration of progress **provide an opportunity to promote peer learning** among experts from different countries. There can be benefits for both the Party being reviewed and the technical team of experts. The technical review process represents an opportunity for the Party concerned to profit from the experience and insights of an independent team of experts. At the same time, the members of the technical teams of experts can gain in-depth knowledge about the climate policies and approaches being used by other countries. The team members also acquire an increased awareness of what reviewers are looking for, which can be helpful for when they conduct future measurement and reporting activities back in their own countries.

- There may also be **scope to improve peer learning** from the multilateral consideration of progress sessions. In particular, only a small number of questions were asked from developing country Parties to other developing country Parties during the first sessions of international consultations under the Cancun Agreement. Capacity building could help a greater number of developing country Parties (many of which have only small delegations) to participate in the peer learning process.

- **Capacities will need to be enhanced** for many countries to be able to fully participate in, and therefore benefit from, review and multilateral consultation processes. Experience with technical analysis and FSV for developing countries demonstrates that in many countries there may not be a dedicated team of experts for monitoring and reporting, and reliance on external consultants can be high. Combined with institutional arrangements that make co-ordination difficult, these factors make responding to questions quite challenging, whether from the team of experts during technical analysis or from Parties during the facilitative sharing of views. Flexibility under the transparency framework could also mean additional time for some Parties to participate in reviews or prepare for multilateral consideration.

Experience from existing arrangements suggests that flexibility will be essential to incentivise effective universal participation of Parties in the enhanced transparency framework. A balance is needed between providing flexibility for developing country Parties that need it in light of their capacities, and increasing transparency, understanding and clarity of the information provided. Decision 1/CP.21 states that developing country Parties shall be provided with flexibility in the scope, frequency and level of detail of reporting, and the scope of review.

There are different ways in which flexibility could be provided in the enhanced transparency framework under the Paris Agreement. For example, flexibility could be provided for (i) certain groups of developing country Parties (e.g. flexibility in terms of timing of GHG inventories and other reporting for LDCs and SIDS); (ii) developing country Parties with least capacity (e.g. Parties with insufficient capacity could choose not to report emission projections); (iii) Parties with particular national circumstances (e.g. less frequent in-country reviews or multilateral considerations for small emitters); and (iv) Parties who wish to receive more feedback from the technical expert review process (e.g. deeper, in-country technical reviews could be granted to Parties that request them).

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List of acronyms

BAU	Business as Usual
BR	Biennial Report
BUR	Biennial Update Report
CCXG	Climate Change Expert Group
CDM	Clean Development Mechanism
COP	Conference of the Parties to the UNFCCC
CRF	Common Reporting Format
CTF	Common Tabular Format
FSV	Facilitative Sharing of Views
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GWP	Global Warming Potential
IAR	International Assessment and Review
ICA	International Consultation and Analysis
IMF	International Monetary Fund
INDC	Intended Nationally-determined Contributions
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally Transferred Mitigation Outcome
KP	Kyoto Protocol
LDC	Least Developed Country
LULUCF	Land-use, land-use change, and forestry
MA	Multilateral Assessment
MRV	Measurement, Reporting and Verification
NC	National Communication
NDC	Nationally Determined Contribution
OECD	Organisation for Economic Co-operation and Development
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SIDS	Small Island Development States
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change

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