



Robust Accounting of International Transfers under Article 6 of the Paris Agreement

Discussion Paper

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This paper was written for the German Environment Agency (UBA) as part of the project titled “Entwicklung von Konzepten zur Umsetzung von neuen oder Transformation von vorhandenen Marktmechanismen in ein neues UNFCCC Klimaabkommen ” (FKZ 3716 42 501 0). This project is being carried out by Öko-Institut (coordination) in cooperation with Stockholm Environment Institute (SEI) and INFRAS.

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Abstract

This discussion paper explores key issues and options to ensure robust accounting of international transfers from market mechanisms under Article 6 of the Paris Agreement. The paper first provides an overview of key issues that must be addressed to ensure robust account and highlights approaches to address them. The further analysis focuses on: the nature and scope of „internationally transferred mitigation outcomes“ under Article 6.2 of the Paris Agreement, discussing possible definitions and scopes; how double counting of emission reductions could be avoided through „corresponding adjustments“, taking into account the diversity of nationally determined contributions under the Paris Agreement; how the vintage of mitigation outcomes and the timing frames of mitigation targets, including single-year targets, can be accounted for; and how the transfer of mitigation outcomes can be tracked.

Kurzbeschreibung

Das vorliegende Diskussionspapier erörtert wichtige Aspekte und Ansätze, um eine robuste Bilanzierung bei der internationalen Übertragung von Emissionsminderungen aus Marktmechanismen unter Artikel 6 des Pariser Klimaabkommens sicherzustellen. Das Papier gibt zunächst einen Überblick, welche Aspekte geregelt werden müssen, um eine robuste Bilanzierung sicherzustellen, und zeigt mögliche Regelungsansätze auf. Die weitere Analyse fokussiert sich auf folgende Aspekte: zunächst werden mögliche Definition und Geltungsbereiche von „international übertragenen Minderungen“ unter Artikel 6.2 des Pariser Klimaabkommens erörtert. Daraufhin wird untersucht, wie eine Doppelzählung von Emissionsreduktionen durch entsprechende Anpassungen vermieden werden kann, wobei die verschiedenen Ausprägungen der Klimaschutzbeiträge der Staaten unter dem Pariser Klimaabkommen berücksichtigt werden. Schließlich wird untersucht, wie der Zeitpunkt der Minderungen und die verschiedenen Zeiträume von Klimazielen bilanziert werden können, und wie die Übertragung von internationalen Minderungen verfolgt und dokumentiert werden kann.

Executive summary

Article 6 of the Paris Agreement introduces provisions for using international market mechanisms to achieve nationally determined contributions (NDCs). The cooperative approaches under Article 6.2 allow countries to use „internationally transferred mitigation outcomes“ (ITMOs) to achieve their NDCs and Article 6.4 establishes a new crediting mechanism. The Paris Agreement includes several general provisions for accounting for NDC targets under Articles 4 and 13, as well as specific provisions for the accounting of international transfers under Article 6. This discussion paper explores key issues and options to ensure robust accounting of international transfers under the Paris Agreement.

Robust accounting is crucial for ensuring environmental integrity and providing transparency on climate action. If international transfers are not appropriately accounted for, aggregated global greenhouse gas (GHG) emissions could be higher than the levels which countries report. Robust accounting is also needed to assess whether countries are on track towards achieving their mitigation targets and whether the aggregated action of all countries is sufficient to achieve the long-term goals of the Paris Agreement.

Accounting for mitigation targets typically involves (a) defining mitigation targets, in particular expressing targets in quantifiable indicators, defining their scope, specifying the target level, and defining rules for accounting for the land-use, land-use and forestry (LULUCF) sector; (b) tracking progress towards targets; (c) accounting for international or domestic transfers; and (d) international reporting, review and compliance. Accounting for international transfers requires quantifying mitigation outcomes, avoiding double counting of emission reductions, appropriately accounting for the vintage of mitigation outcomes in relation to the time frame mitigation targets, and addressing any non-permanence of mitigation outcomes. Accounting requires action and information at different points in time: *ex-ante*, such as information on the mitigation target, *regularly*, such as information on progress made, and *ex-post*, such as a final accounting balance.

This paper explores four key issues to ensure robust accounting of international transfers: the nature and scope of ITMOs; avoiding double counting; accounting for the vintage of mitigation outcomes and the time frame of mitigation targets; and tracking of international transfers of mitigation outcomes. The paper aims to contribute to the ongoing discussions on international rules governing Article 6.

Nature and scope of ITMOs

The Paris Agreement does not define ITMOs or „mitigation outcomes“. How ITMOs are defined has implications for which rules are necessary to ensure robust accounting. This paper identifies several options for the nature and scope of ITMOs:

- ▶ **Metric of ITMOs:** Many Parties have proposed that t CO₂e be used as the metric for ITMOs. Using only t CO₂e would make the application, compilation, aggregation and reconciliation of „corresponding adjustments“, as referred to in paragraph 36 of decision 1/CP.21, simpler. Moreover, countries with GHG targets can only use ITMOs to achieve their NDC targets if the ITMOs are expressed as or converted to a GHG metric. Furthermore, in the case of other metrics, the mitigation outcomes in terms of emissions may not necessarily „correspond“; one MWh of renewable electricity in country A could lead to higher or lower emission reductions than in country B. And lastly, using t CO₂e as a generic metric would not limit the ability of countries to engage in international transfers, as mitigation outcomes in other metrics could be converted into t CO₂e.
- ▶ **Units versus reported amounts:** ITMOs could constitute (a) units that move across or within electronic registries; or (b) amounts reported by countries. Under option (a), ITMOs could either represent a single international compliance unit or include different type of units. They could also represent an emissions budget or be issued for internationally transferred amounts only. Under option (b), relevant information on ITMOs would have to be provided through appropriate formats of reporting. In principle, both options may provide appropriate means to ensure transparent information and robust accounting, depending how they are implemented.
- ▶ **Relation to the NDC of the transferring country:** Some NDC targets are not economic-wide but only target specific sectors or activities, or only include some GHGs. In these cases, ITMOs could represent (a) only mitigation outcomes that are generated within the scope of the NDC of the transferring country; or (b) mitigation outcomes generated both within and outside the scope. Approach (a) is simpler for accounting purposes but more limiting, as mitigation outcomes occurring outside the scope would have to be transferred through Article 6.4. It may also provide stronger incentives to ensure environmental integrity.

- ▶ **Use of ITMOs by the acquiring country:** Article 6.2 refers to the „use of ITMOs towards NDCs“. This provision clarifies that ITMOs can be used to achieve NDC targets. However, international carbon market mechanisms have also been used for other purposes, beyond compliance. ITMOs could thus represent (a) only mitigation outcomes that are both internationally transferred and used by the acquiring country to achieve its NDC; or (b) mitigation outcomes that are internationally transferred and that may be used for different purposes, such as voluntary cancellation. The latter option may provide for broader uses of ITMOs but also requires a broader scope of accounting.
- ▶ **Mechanism type:** The term ITMO does not imply what type of mechanism may underline the international transfer. This could potentially include trading mechanisms, such as international linking of ETSs; crediting mechanisms; or other types of government-to-government transfers which may or may not involve a market mechanism.
- ▶ **Fungibility of ITMOs:** How ITMOs are defined could have implications for their fungibility, meaning whether they could be mutually substituted in place of one another.
- ▶ **Relationship to Article 6.4:** The relationship between transfers under Article 6.2 and the Article 6.4 mechanism is not yet clear. Article 6.2 refers to „mitigation outcomes“, whereas Article 6.4 refers to „emission reductions“. Emission reductions generated under Article 6.4 could always, never, or under certain conditions be considered as ITMOs.

Avoiding double counting

Double counting of emission reductions occurs when a single GHG emission reduction is counted more than once towards achieving mitigation targets. Double counting can occur in three ways:

1. **Double issuance** occurs if more than one unit is issued for the same emissions or emission reductions;
2. **Double claiming** occurs if the same emission reductions are counted twice towards fulfilling mitigation targets: by the country or entity where the reductions occur, through reporting of its reduced GHG emissions, and by the country or entity using the units issued for these reductions towards meeting its mitigation target;
3. **Double use** occurs if the same issued unit is used twice to achieve a mitigation target.

The Paris Agreement includes specific provisions to address double counting in the context of international transfers: Article 6.2 and paragraph 36 of decision 1/CP.21 specify that double counting should be avoided on the basis of „corresponding adjustments“, and Article 6.5 clarifies that emission reductions resulting from the Article 6.4 mechanism shall only be used by one Party to demonstrate achievement of its NDC. This report focuses on options for avoiding double claiming through corresponding adjustments, in particular in the light of the diversity of NDC targets. For emission reductions generated under Article 6.4, Parties could – depending on the definition of ITMOs – either establish separate accounting rules or also apply corresponding adjustments. The latter would be less complex.

Corresponding adjustments could, in principle, be implemented in two ways:

1. **Emissions based approach:** Applying corresponding adjustments to the total net GHG emissions level as reported by the country through its GHG inventory (or possibly to any non-GHG indicators used to track progress towards NDCs), or
2. **Emission budget based approach:** Applying corresponding adjustments to an emissions budget that corresponds to the GHG emissions level of the NDC target of the country (or possibly to any budgets in non-GHG metrics).

The two approaches have a mathematically equivalent outcome and both effectively avoid double claiming. Creating emissions budgets, however, could pose a risk of creating assets that countries may not wish to forego when they over-achieve mitigation targets. The creation of emission budgets could therefore be perceived as involving a higher risk of transferring „hot air“ – i.e. surplus allowances that do not arise from mitigation action. In the light of this risk and noting that paragraph 36 of decision 1/CP.21 points to the adjustment of reported emissions, we recommend that all Parties apply an emissions based approach. The application of corresponding adjustments should be clearly separated from GHG inventory estimates, for example, by using separate tables to transparently report on corresponding adjustments.

Double claiming does not occur, and hence corresponding adjustments would theoretically not need to be applied by the transferring country, if:

1. The mitigation outcomes occur outside the scope of the NDC target of the transferring country: in this case, clarity of NDC targets is important to be able to identify whether a mitigation outcome is generated within or outside the scope. For crediting mechanisms, practical challenges can arise, as crediting programs often credit reductions that occur upstream or downstream of where the mitigation action takes place. Not applying corresponding adjustments for mitigation outcomes outside the scope of NDC targets could also provide a disincentive for countries to move over time towards economy-wide targets, as envisaged under Article 4.4 of the Paris Agreement.
2. The mitigation outcomes are not reflected in the GHG inventory of the transferring country: not applying corresponding adjustments in such cases could, however, create disincentives for countries to improve GHG inventories. It could thus undermine the general accounting principles of accuracy, completeness and consistency, as reflected in Article 4.13 of the Paris Agreement.
3. The mitigation outcomes are used for purposes other than achieving international mitigation targets.

Double claiming of emission reductions could also occur with international market mechanisms that address emissions from international aviation and maritime transport, in particular the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) adopted by the International Civil Aviation Organization. To avoid double claiming between the Paris Agreement and CORSIA, corresponding adjustments could also be applied for transfers for use under CORSIA, in a similar way to corresponding adjustments for international transfers between countries.

An important, practical challenge for applying corresponding adjustments is the diversity of NDC targets. This challenge could be addressed by ensuring that the NDC targets of the countries involved are expressed in similar ways or by appropriately converting corresponding adjustments. Key issues include:

- ▶ **Global warming potentials (GWPs):** Paragraph 31(a) of decision 1/CP.21 envisages that, for second and subsequent NDCs, Parties account for emissions and removals in accordance with „common metrics assessed by the IPCC“. This provision points to the use of common GWP values. In their first NDCs, however, countries use different GWP values. This exacerbates robust accounting for ITMOs, as international transfers under different GWPs could lead to higher or lower aggregated emissions. To address this challenge for first NDCs, (a) all countries – or a group of countries – could use the same GWP values; (b) corresponding adjustments could be converted to reflect differences in GWP values; or (c) the GWP values of the transferring country could be applied.
- ▶ **Relative and intensity targets:** Many countries have established targets relative to a future hypothetical business as usual scenario (BAU) or as an emissions intensity per gross domestic product (GDP). To apply corresponding adjustments, countries would have to convert their target into an absolute level – either *ex-ante*, e.g. based on BAU emissions projections, or *ex-post*, e.g. based on the actual GDP development.
- ▶ **Non-GHG targets:** Some countries communicated *only* non-GHG mitigation targets in their NDCs, such as energy efficiency or renewable energy targets. A first challenge is that transfers in non-GHG metrics do not necessarily have the same GHG emissions impact in the two countries involved in the transfer. A second challenge arises if the countries involved in the transfer have targets with different metrics. These challenges could be addressed by (a) converting non-GHG mitigation targets into corresponding GHG emission targets; or by (b) converting the corresponding adjustments so that they are consistent with the metrics of the two mitigation targets and, at the same time, correspond to the same mitigation outcome.
- ▶ **Multiple overlapping targets:** Many countries have communicated multiple targets in their first NDCs. In many instances, the scope of the targets overlaps, in particular when an economy-wide GHG target is combined with non-GHG targets for specific sectors or measures. In such instances, corresponding adjustments could be applied to the GHG target only, to all relevant targets, or to the most stringent target. Applying corresponding adjustments only to GHG targets could, in some instances, lead to higher aggregated GHG emissions. Applying corresponding adjustments also to non-GHG targets is, however, more complex and in some instances not feasible.

- ▶ **Conditional targets:** Many countries have communicated NDCs that are conditional on support from other countries, such as climate finance, access to international market mechanisms, technology transfer or capacity building. If mitigation outcomes are used to achieve a conditional target of the transferring country as well as the target of the acquiring country, this constitutes double claiming and leads to a weakening of overall ambition, compared to the situation that the conditional target is achieved through climate finance.
- ▶ **Target ranges:** Some countries communicated target ranges, without specifying the conditions when the upper or lower threshold will apply. This situation could be addressed by applying the more stringent target range to net transfers, and the less stringent target range to net acquisitions. Alternatively, the country could specify which level applies to international transfers.
- ▶ **NDCs with actions:** Some NDCs, in particular those of LDCs, only include non-quantitative actions, such as a general objective of promoting renewable energy. It could be argued that such actions form part of the mitigation efforts that countries undertake and should therefore not be counted twice. On the other hand, it could be argued that double claiming can only occur when countries have quantified targets and that non-quantified actions are thus not relevant for accounting purposes. To address this issue, countries could be required to convert their actions into quantitative (GHG) targets in order to participate in international transfers under Article 6. An alternative, less stringent approach could be applying corresponding adjustments for reporting purposes only. This would provide transparency and thus facilitate understanding of the global aggregated emissions outcome.
- ▶ **Updates of NDCs:** Article 4.9 of the Paris Agreement requires Parties to communicate an NDC every five years. A change of an existing target or the introduction of a new target for a future year or period could, in some instances, pose challenges for the country in order to avoid double counting. If the coverage of the NDC is enhanced or if the target becomes more stringent and if the country already engaged in or committed to international transfers, it could become more difficult for the country to achieve its target.

Accounting for the vintage of mitigation outcomes and the time frame of mitigation targets

In their first NDCs, many countries specify mitigation targets for single years, such as 2025 or 2030. Single-year targets provide countries more flexibility as to when they reduce emissions. They might also be easier to communicate and agree upon in national approval processes. However, they provide less certainty in terms of cumulative emissions. They could also pose greater risks for the country to achieve the target, for example, due to weather effects or climate policies such as ETs which provide entities flexibility when they reduce emissions. Multi-year targets mitigate these risks.

When countries engage in international transfers, single-year targets or a mismatch in target time frames between countries pose significant accounting challenges. The key underlying risk is that international transfers can impact the GHG emissions paths of the participating countries in periods not covered by a mitigation target. The impact on cumulative emission pathways is complex and depends on the specific context. However, the risk of an increase in aggregated cumulative GHG emissions is higher if:

- ▶ mitigation outcomes occurring over several years are used in a single year;
- ▶ the target year or period is further in the future (e.g. in 2030);
- ▶ the countries involved in the transfer have different target periods or years;
- ▶ ITMOs are generated for mitigation outcomes occurring in periods not covered by a mitigation target;
- ▶ the acquiring country does not have an international mitigation target in the period up to 2020.

Article 4.10 of the Paris Agreement envisages „common time frames for NDCs“. However, such common time frames still have to be agreed upon and are only applicable to future NDCs. International rules for international transfers may thus have to address the diverse time frames of mitigation targets in first NDCs.

We identify four broad approaches for accounting for the vintage of mitigation outcomes in relation to the time frame of mitigation targets:

- A. Continuous, multi-year target periods:** All countries – or the two countries involved in an international transfer – have targets for the same continuous, multi-year periods. This approach greatly facilitates accounting for ITMOs. It provides a high assurance that aggregated cumulative GHG emissions do not increase as a result of the transfer during the target period. The approach is also compatible with market mechanisms. All established ETSs have continuous multi-year target periods and crediting mechanisms usually issue credits for continuous emission reductions over time. The main challenge is that most countries have communicated in their first NDCs only single-year targets with varying time frames. To engage in international transfers under this approach, countries would thus have to update their NDCs and align the time frame of their targets. Hence, alternative approaches could be considered for current NDCs.
- B. Single-year targets, with ITMOs generated and used in target years only:** All countries – or the two countries involved in an international transfer – have targets for the same single years. ITMOs are only generated and used in target years. An ITMO has to be generated and used in the same target year. Under this approach, the aggregated cumulative GHG emissions outcome is less certain, and depends on as of when and to which degree countries engage in higher or lower GHG emissions in other years as a result of the transfer. The approach also does not align well with carbon market mechanisms. It could be difficult to align the transfer and accounting of ITMOs with the transfer of allowances between internationally linked ETSs, which may vary over time and is driven by private sector entities. For crediting mechanisms, demand could be distorted, as buyers may only wish to acquire emission reductions occurring in the target years. This could lead not only to one-off measures but also to economically less efficient outcomes. A further, practical challenge is identifying when the mitigation outcomes occur. While ETS allowances are typically issued annually, the international transfer of an allowance does not necessarily entail that the emission reductions are triggered in the same year.
- C. Various target time frames, ensuring that accounting for ITMOs is more representative for ITMO generation and use over time:** Countries could have various – and possibly differing – target time frames, but the accounting for ITMOs – through corresponding adjustments – is made more representative for the cumulative ITMO generation or use over time. Approaches could, for example, include linearizing ITMO activity, calculating a linearly increasing or decreasing ITMO activity over time, or averaging ITMO activity, calculating the average ITMO generation or use over a defined period. The approach could thus potentially allow transfers between countries with different target periods or years. A critical challenge is that the aggregated cumulative GHG emissions outcome strongly hinges on whether the emissions level in a single-year target is representative for other years. If the emissions in the single-year target are lower than in other years during the period, the country would have to acquire fewer ITMOs for the entire period. The overall GHG emissions outcome is thus rather uncertain. The approach would enable countries to understand only ex-post – after the single-year target – how many units they can transfer or have to acquire to achieve their target. A transferring country may be reluctant to endorse the transfer of ITMOs, if its ability to then achieve its NDC would strongly depend on the particular conditions in that year.
- D. Multi-year emission trajectories:** For ITMO accounting purposes, all countries – or the two countries involved in an international transfer – establish for the same period a multi-year emissions trajectory that is consistent with their NDC target. The transfer and use of ITMOs is accounted against this trajectory. Emission trajectories could, for example, be established by countries or by linear interpolation between single-year targets. If fully implemented for a common period, including an accounting balance for all ITMO transfers over that period, the implications of this approach could practically be the same as for multi-year targets. At the same time, this approach might be politically more acceptable to countries, as it would avoid the submission of a new NDC. A possible shortcoming is the legal status of the trajectory if not included in the formal NDC submission.

Tracking of international transfers of mitigation outcomes

The Kyoto Protocol provides comprehensive rules and regulations for the issuance, transfer, use for compliance or cancelling of international units. Countries must establish national registry systems that are linked through an International Transaction Log (ITL). In contrast, the Paris Agreement includes neither provisions for issuing international units nor centralized oversight on transfers of ITMOs. Article 6.2 simply requires countries to “ensure environmental integrity and transparency”, to apply “robust accounting”, and to “authorize” transfers (Articles 6.2 and 6.3). Thus, more decentralized and more heterogeneous systems for tracking ITMO transfers may be expected. This poses a key challenge: in decentralized systems, the information reported by countries could be inconsistent – the transferring country may provide different information on a specific transfer than the acquiring country, e.g. because the two countries use different approaches and rules to account for international transfers.

Countries have several options for assuring consistency in information on international transfers of ITMOs under decentralized governance: a country may (a) join one or several international transaction log(s); (b) use the registry system of linked or joint emission trading schemes (ETSs); or (c) use a crediting mechanism's own registry.

Another important aspect is the comprehensiveness of information provided on international transfers. Countries could either provide only a minimum set of information on ITMOs – such as the country of origin and the vintage of the mitigation outcomes – or comprehensive information, including on the programme standard of a crediting mechanism or on the design of an ETS, on the permanence of the ITMO, on its contribution to the „promotion of sustainable development“, or on how the provision of „higher ambition“ under Article 6.1 is achieved. The provision of additional information may make ITMOs more attractive for acquiring countries and could help to transparently demonstrate unit quality to potential buyers.

The enhanced transparency framework of Article 13 requires Parties to track progress made in implementing and achieving their NDCs and to account for their NDCs. Information on international transfers could be reported and reviewed in this context. More comprehensive information on international transfers would contribute to a clearer understanding of climate action and facilitate tracking of progress. Regarding transparency in governance (Article 6.2), Parties could, for example, be required to use a common form assuring consistent and standardised information.

Conclusions

A key feature of the Paris Agreement is the national self-determination of contributions. As a consequence, current NDCs show a large diversity. This makes accounting for international transfers more complex. This paper identified two generic ways of ensuring robust accounting: (a) by developing rules that reflect the diversity of NDCs and thereby enable international transfers between countries with different types of NDCs, or (b) by agreeing – internationally, among groups of countries, or bilaterally – on common elements that make NDCs more compatible for international transfers. These approaches can be combined and Parties may have to carefully balance when to pursue which approach.

The Paris Agreement provides for some elements that may, over time, moderate the current diversity of NDCs and make accounting for international transfers under future NDCs less complex, including „common time frames“ for NDCs, the formulation of targets as „economy-wide emissions targets“, and the use of „common metrics“. If mitigation targets are applicable to common time frames, economy-wide, and expressed in common GHG metrics, accounting for international transfers would be already greatly facilitated compared to the current diversity of NDCs.

Finally, we recommend exploring a tiered or modular approach, with general accounting provisions being applicable to all countries, and specific provisions required for robust accounting of international transfers being applicable to those countries wishing to engage in international transfers.

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Abbreviations

AFOLU	Agriculture, Forestry and Other Land Use
AAU	Assigned Amount Unit
BAU	Business-As-Usual
CDM	Clean Development Mechanism
CER	Certified emission reduction
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties, the governing body of the UNFCCC
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DOE	Designated Operational Entity
ERU	Emission reduction unit under the Joint Implementation mechanism
ETS	Emissions trading system
EU	European Union
GDP	Gross domestic product
GHG	Greenhouse gas
GWP	Global warming potential
ICAO	International Civil Aviation Organization
IMO	International Maritime Organization
INDCs	Intended nationally determined contribution
IPCC	Intergovernmental Panel on Climate Change
ITL	International transaction log
ITMO	Internationally transferred mitigation outcome
JCM	Joint Crediting Mechanism established by Japan
JI	Joint Implementation
LDC	Least Developed Country
LULUCF	Land use, land use change and forestry
MW	Megawatt
MWh	Megawatt hour
NDC	Nationally determined contribution
REC	Renewable energy certificate
RMU	Removal units from LULUCF activities in Annex I countries under the Kyoto Protocol
SEF	standard electronic format for reporting of information on Kyoto Protocol units
t CO₂e	Tonnes of CO ₂ equivalent
TL	Transaction log
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard

1 Introduction

International carbon market mechanisms have been part of the international climate regime for two decades. They aim to reduce the cost of achieving mitigation goals by providing flexibility in how and where emissions are reduced, and could thereby enable countries to adopt more ambitious mitigation targets. They also facilitate international cooperation on climate action, e.g. by international linking of emissions trading systems (ETSs).

Article 6 of the Paris Agreement introduces provisions for using international market mechanisms to achieve nationally determined contributions (NDCs). The cooperative approaches under Article 6.2 allow countries to use „internationally transferred mitigation outcomes“ (ITMOs) to achieve their NDCs. The cooperative approaches are commonly understood to enable Parties to transfer mitigation outcomes among each other – be it through international linking of emission trading schemes, international crediting mechanisms, or direct government-to-government transfers – and to use these outcomes to achieve their NDC targets.

Article 6.4 establishes a new crediting mechanism under the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA). The provisions resemble strongly those of the Clean Development Mechanism (CDM): the mechanism has a dual objective of supporting mitigation action as well as sustainable development, is supervised by a body designated by the CMA, involves public as well as private entities, requires mitigation action to be additional, real, measurable, long-term, and to be verified by designated operational entities.

The Paris Agreement includes several provisions that aim to ensure robust accounting for mitigation targets. These include general provisions for accounting for NDCs under Articles 4 and 13 of the Agreement, as well as specific provisions to account for international transfers under Article 6. The Paris Agreement provides only generic elements or principles; detailed rules governing these elements are currently being negotiated.

Robust accounting is crucial for ensuring environmental integrity and providing transparency on climate action. If international transfers are not appropriately accounted for, aggregated global greenhouse gas (GHG) emissions could be higher than the levels which countries report. Robust accounting is also needed to assess whether countries are on track towards achieving their mitigation targets and whether the aggregated action of all countries is sufficient to achieve the long-term goals of the Paris Agreement.

This discussion paper explores key issues and options to ensure robust accounting of transfers from international market mechanisms under Article 6 of the Paris Agreement. The paper aims to contribute to the ongoing discussions on international rules governing Article 6. It draws upon the relevant literature, the experiences with accounting under the Kyoto Protocol and other market mechanisms, and submission by Parties and non-governmental organizations.

The paper is part of a larger research project exploring different aspects of international rules for Article 6. This paper is a revision and amendment of an earlier discussion paper with preliminary findings on robust accounting (Schneider et al. 2016). Other discussion papers provide a categorization of NDCs in light of Article 6 of the Paris Agreement (Graichen et al. 2016) and discuss environmental integrity under Article 6 of the Paris Agreement (Schneider et al. 2017).

In this paper, we first provide an overview of what robust accounting is and what elements it entails, both generally with regard to mitigation targets in NDCs (section 2), and specifically with regard to international transfers under Article 6 (section 3). These overviews aim to facilitate understanding of what issues have to be addressed to ensure robust accounting and what approaches could be pursued to address these issues. We then explore several aspects in more detail: the nature and scope of NDCs (section 4), the avoidance of double counting (section 5), accounting for the vintage of mitigation outcomes and time frame of mitigation targets (section 6), and tracking and reporting of international transfers (section 7). Finally, we provide preliminary conclusions (section 8).

This research project does not explore options for addressing the potential non-permanence of emission reductions or removals, such as for mitigation actions in the forest sector. We also limit our consideration to accounting for the GHG emissions impact of mitigation action; we do not explore other potential accounting issues, such as accounting for international support provided and received or any accounting for sustainable development impacts. We also limit our analysis to robust accounting for the purpose of achieving NDC targets. We do not consider accounting rules for market mechanisms which are implemented at domestic or bilateral level but not used and accounted for when achieving NDC targets.

The specific terminology used in this report should be briefly explained. Article 6.2 refers to „ITMOs“, while the Article 6.4 mechanism refers to „emission reductions“. For simplicity, we use the term „international transfers“ to refer to transfers of both mitigation outcomes generated under Article 6.2 and emission reductions resulting from the Article 6.4 mechanism. The term „mitigation outcomes“ is used to refer to both ITMOs generated under Article 6.2 and emission reductions resulting from the Article 6.4 mechanism. We use the term „transferring country“ for the country that transfers a mitigation outcome to another country and „acquiring country“ for the country acquiring the transferred mitigation outcome, noting that such transfers do not necessarily have to involve a price or purchase of the mitigation outcomes. When referring to „NDCs“ we also include intended nationally determined contributions (INDCs) submitted prior to the adoption of the Paris Agreement. Finally, we refer to mitigation targets communicated in NDCs as „NDC targets“.

When exploring and discussing options for robust accounting, we also make several assumptions. The term „environmental integrity“ is used in several parts of the Paris Agreement but is not defined therein. In the context of Article 6, we assume that environmental integrity means that the use of international transfers under Article 6 does not result in higher global emissions than if the NDCs had been achieved only through domestic action. In this context, we define that a mitigation outcome or unit has „quality“ if it corresponds to an emission reduction of at least 1 t CO₂e in the transferring country, compared to the situation in the absence of the issuance or transfer of the mitigation outcome or unit.

Another important assumption is that we presume that countries achieve their NDC targets. While the submission of NDCs and the pursuit of mitigation measures are mandatory under the Paris Agreement, the achievement of NDCs is not. Article 4.2 of the Agreement, however, envisages that Parties „intend to achieve“ their NDCs. If it would not matter to a country whether or not it achieves its NDC target, then the overall environmental outcome of an international transfer may not depend on whether robust accounting is applied. A country could, for example, transfer a large amount of mitigation outcomes to another country. If the transfers are accounted for, it may no longer achieve its own NDC target. If the country nevertheless intends to achieve its NDC target, it would have to pursue further mitigation action to compensate for the transfers. If achieving the NDC target does not matter to the country, however, the overall environmental outcome could be the same as if the transfer were not be accounted for.

2 Accounting for NDC targets: overview of key issues and approaches

The Paris Agreement includes several general provisions for accounting for NDC targets under Articles 4 and 13, as well as specific provisions for the accounting of international transfers under Article 6. This section provides an overview of all issues relevant for accounting for NDC targets.

In the context of climate mitigation targets, the term „accounting“ is often understood as referring to a system that allows comparison of mitigation targets with the progress made, i.e. to understand whether mitigation targets have been achieved (Prag et al. 2013). Robust accounting generally aims to appropriately reflect levels and changes to anthropogenic emissions by sources or removals by sinks as a result of mitigation actions by countries or other entities. Accounting also aims to provide transparency and comparability between mitigation efforts and to preserve environmental integrity. Article 4.13 of the Paris Agreement specifies that Parties, in accounting for their NDCs, should promote environmental integrity, transparency, accuracy, completeness, comparability, consistency, and ensure the avoidance of double counting.

Accounting for mitigation targets typically involves the following elements:

- ▶ **Defining mitigation targets:** Accounting for mitigation targets requires (a) that the targets are expressed in *quantifiable indicators* – such as absolute GHG emissions, GHG emissions per gross domestic product (GDP), or Megawatts (MW) of installed renewable power capacity –, (b) that the scope of the mitigation targets is clearly defined – including the geographical coverage; the emission sources, removals, and GHGs included; and the time frames covered –, and (c) that the target level is clearly specified – e.g. in relation to historical reference year or projected business-as-usual (BAU) emissions. The definition of mitigation targets often includes specific ways of accounting for the land-use, land-use and forestry (LULUCF) sector.

- ▶ **Tracking progress towards targets:** Accounting for mitigation targets requires establishing systems and procedures to track progress towards the targets. This includes defining the methodologies and data sources to quantify the progress, such as relevant guidelines by the Intergovernmental Panel on Climate Change (IPCC); making institutional arrangements to collect relevant data, calculate the progress achieved, and report on the outcome; and establishing means and methods to compare the reported progress with the mitigation targets.
- ▶ **Accounting for international transfers:** Robust accounting for international transfers from or to other countries requires, inter alia, standards and procedures to robustly quantify mitigation outcomes; accounting rules to account for net flows of such transfers, including their vintage; and establishing systems to transparently track and reconcile transfers. It may also involve defining which transfers are eligible or any conditions or limits on transferring or using mitigation outcomes.
- ▶ **Accounting for domestic transfers:** Domestic transfers could include transfers from emission sources not included in the scope of the mitigation target, or intertemporal transfers from prior to future target periods („banking“ or „carry-over“). Robust accounting requires standards and procedures to robustly quantify mitigation outcomes and accounting rules to account for flows of mitigation outcomes. It may also involve defining which transfers are eligible or any conditions or limits on transferring or using mitigation outcomes.
- ▶ **International reporting, review and compliance:** All or some of the information and steps may be subject to an international reporting and review, and an international mechanism to facilitate compliance.

Accounting for mitigation targets requires action and information at different points in time:

- ▶ **Ex-ante information** defining the mitigation target and the methods used to assess progress towards the target, as well as relevant information on the accounting approaches used for the LULUCF sector, for international or domestic transfers, and for addressing the temporary nature of any emissions or removals (Levin et al. 2014).
- ▶ **Regular information** on progress made towards achievement of the mitigation target, possibly including information on transfers. Regular reporting could also be used to further clarify or adjust ex-ante information.
- ▶ **Ex-post information**, including a final accounting balance that compares the mitigation target with the progress made, adjusting appropriately for any transfers.

Table 1 provides an overview of key accounting provisions under the Paris Agreement. Several provisions in the agreement relate to providing robust ex-ante information in defining NDC targets (e.g. Articles 4.8 and 4.10, and paragraphs 27-30 of decision 1/CP.21). The Agreement also establishes key principles for accounting, including promoting environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensuring the avoidance of double counting (Article 4.13, paragraph 31 of decision 1/CP.21). Countries have to regularly provide a national inventory report as well as other information necessary to track progress towards achieving the target, (Articles 13.7, paragraphs 91-98 of decision 1/CP.21). Robust accounting shall be applied to the international transfer of mitigation outcomes under the cooperative approaches (Article 6.2, paragraph 36 of decision 1/CP.21). Emission reductions resulting from the Article 6.4 mechanism should only be used by one Party towards achieving its NDC (Article 6.5). Finally, countries shall account for their NDCs, which can be understood to include a final accounting balance to demonstrate whether their NDC was achieved (Article 4.13, paragraph 31 of decision 1/CP.21). Several of these provisions may be subject to a technical expert review (Article 13.11, paragraphs 91-98 of decision 1/CP.21). Moreover, a mechanism is established to facilitate implementation and promote compliance with the provisions of the Agreement in a non-adversarial and non-punitive manner (Article 15). The detailed provisions governing these approaches are currently being negotiated with a view to agreeing upon a set of international rules to be adopted by the CMA.

An important question for the negotiations is how the general accounting provisions under Article 4 and the provisions on the transparency framework of Article 13 will relate to the specific provisions for international transfer under Article 6. How the general accounting provisions under Article 4 and 13 evolve could have implications on what accounting provisions are needed under Article 6, and vice-versa. Some countries may not engage in international transfers and hence a more limited or simpler set of accounting provisions could apply to them. In this regard, Parties could explore a **tiered approach**, with general accounting provisions applicable to all Parties, and more specific provisions only applicable to Parties wishing to engage in international transfers.

General accounting provisions could then address all elements in Table 1, except for the accounting of international transfers. Alternatively, Parties could also adopt a single set of accounting rules that address both general accounting matters and specific aspects relating to international transfers.

In this context, an important question is when international accounting rules will be agreed and when they will be applicable. Paragraph 32 of decision 1/CP.21 requires countries to apply international guidance on Article 4.13 to second and subsequent NDCs, whereas its application is voluntary for first NDCs. By contrast, the provisions of Article 6 and 13 are already applicable to first NDCs. However, accounting for NDCs is a prerequisite for also accounting for international transfers. Moreover, rules to account for international transfers should be consistent with the general accounting provisions for NDCs. For these reasons, the general accounting guidance under Article 4.13 could, for those countries that wish to engage in international transfers, already be applicable to first NDCs. This approach could also help to improve accounting systems over time: countries that wish to engage in international transfers would have incentives to take action for ensuring robust accounting. The approach would, however, only be possible if the general accounting guidance under Article 4.13 is not finalized later than the specific accounting guidance under Article 6.2.

Table 1: Key elements of accounting for mitigation targets

Element	Timing	Key issues	Provisions in the Paris Agreement
Definition of mitigation targets, methods and accounting approaches	Ex-ante and regular	Clearly defined and quantitative mitigation targets Consistent and accurate methods to track progress (e.g. IPCC Guidelines) Transparent and robust accounting methods	Clarity, transparency and understanding of NDCs (Art. 4.8, para. 28) Common time frames for NDCs (Art. 4.10) Public registry of NDCs (Art. 4.12, para. 29) Accounting for NDCs, including promoting environmental integrity, transparency, accuracy, completeness, comparability and consistency, and ensuring the avoidance of double counting (Art. 4.13, para. 31)
Tracking progress	Regular and ex-post	Transparent, accurate, complete, comparable and consistent reporting on progress made	Reporting of national inventory report and information necessary to track progress (Art. 13.7, para. 91-98)
Accounting for international transfers	Regular or ex-post	Robust accounting rules to avoid double counting and to account for the vintage of mitigation outcomes and time frames of mitigation targets Tracking transfers Appropriate design of mechanisms to quantify mitigation outcomes	Robust accounting to ensure, inter alia, the avoidance of double counting on the basis of corresponding adjustments (Art. 6.2, para. 36) Emission reductions only used by one Party towards NDC achievement (Art. 6.5, para. 37-38)
Accounting for domestic transfers	Regular or ex-post	Robust accounting rules Appropriate quantification of mitigation outcomes	Not specified
Final assessment	Ex-post	Final accounting balance	Accounting for NDCs (Art. 4.13, para. 31)
Review and compliance	Regular and ex-post	International technical expert review of information Compliance assessment	Technical expert review (Art. 13.11, para. 91-98) Mechanism to facilitate implementation and promote compliance (Art. 15, para. 104)

Source: Authors' own compilation

3 Accounting for international transfers under Article 6: overview of key issues and approaches

Robust accounting of international transfers involves a number of different *issues*, which could be addressed through several *approaches*, under a range of different *governance arrangements*. In this section, we identify which issues have to be addressed to ensure robust accounting and which general approaches could be pursued towards this end. In the next chapters, we explore key issues and approaches further, including possible governance arrangements.

Key issues that must be addressed to ensure robust accounting of international transfers include (Hood et al. 2014; Howard et al. 2017; Lazarus et al. 2014; Levin et al. 2015; Kreibich and Hermwille 2016; Kreibich and Obergassel 2016; Prag et al. 2013; World Resources Institute 2014):

- ▶ **Quantifying mitigation targets and progress towards mitigation targets:** Appropriate quantification of mitigation targets and progress towards achieving the mitigation targets is a key prerequisite for robust accounting of international transfers. Without quantification, it is not possible to „count“ the transferred mitigation outcomes towards achieving mitigation targets. Quantification of mitigation targets is always required for the acquiring country. For the transferring country, quantification of the mitigation targets is required if the mitigation outcomes are generated within the scope of the target. It is also important that mitigation targets can be expressed – at least *ex-post* – in absolute terms, e.g. as absolute GHG emissions. Absolute terms are needed to enable the accounting for transfers, e.g. through corresponding adjustments.
- ▶ **Quantifying mitigation outcomes:** Appropriate quantification of mitigation outcomes is another key prerequisite of robust accounting of international transfers. Mitigation outcomes are quantified through relevant standards and procedures of the underlying mechanisms. Appropriate design of the market mechanisms, including its standards, procedures, and governance arrangements, is thus important. Under Article 6.2, quantification of mitigation outcomes and ensuring environmental integrity is mainly the responsibility of the Parties involved in the transfer. Article 6.2 requires countries engaging in cooperative approaches to ensure environmental integrity and apply robust accounting. Parties have different views as to whether the guidance under Article 6.2 extends to all elements of Article 6.2, including environmental integrity, or only to robust accounting. The quantification of mitigation outcomes could also be seen as one of the elements to ensure „robust accounting“. Article 6.4 and decision 1/CP.21 establish specific principles that aim to ensure appropriate quantification of emission reductions, including „additionality“, „real, measurable and long-term benefits“, and „verification and certification of emission reductions (...) by designated operational entities“. Under Article 6.4, the CMA and the body assigned by the CMA may develop rules to implement these principles.
- ▶ **Avoiding double counting of emission reductions:** Double counting of emission reductions occurs when a single GHG emission reduction is counted more than once towards achieving mitigation targets. If emission reductions are double counted, actual global GHG emissions are higher than the sum of what individual countries or entities report. As a result, countries or entities could appear to meet their mitigation targets, while total emissions exceed these levels. Avoiding double counting is thus a key element of robust accounting of international transfers.
- ▶ **Accounting for the vintage of mitigation outcomes in relation to the time frame mitigation targets:** Appropriately accounting for the vintage of mitigation outcomes and the time frame of mitigation targets is an important and complex issue for ensuring robust accounting. Not appropriately accounting for the vintage of mitigation outcomes in relation to time frames of mitigation targets can, in some instances, lead to higher cumulative global GHG emissions.
- ▶ **Addressing any non-permanence of mitigation outcomes:** In some sectors, such as the LULUCF sector or in the case of geological storage of CO₂, the mitigation outcomes may not be permanent and could be reversed, if the stored carbon is released again. When transferring mitigation outcomes internationally, accounting rules may be needed to account for such reversal. This issue is not explored further in this paper.

A variety of (accounting) approaches could be used to address these issues, including:

- ▶ **Accounting rules for international transfers**, including rules to appropriately account for the net flow of international transfers, such as through the „corresponding adjustments“ referred to in paragraph 36 of decision 1/CP.21;
- ▶ **Tracking the transfer and use of mitigation outcomes**, such as through registry systems or systems allowing Parties to report on transferred mitigation outcomes and applied corresponding adjustments;
- ▶ **Appropriate design of market mechanisms**, including standards and procedures to quantify mitigation outcomes or to avoid double issuance of units;
- ▶ **Ensuring clarity of NDCs**, such as guidance on elements that countries could clarify when communicating their NDCs (e.g. the coverage of the NDC in terms of sectors, geographical area and GHGs);
- ▶ **Ensuring that NDCs have common features**, such as agreements between countries or on international level to use common time frames, common Global Warming Potential (GWP) values or IPCC methodologies;
- ▶ **Eligibility requirements for the participation in international market mechanisms**, such as requirements to have quantitative NDCs and a system in place to track progress towards NDCs;
- ▶ **Procedures for reporting and review of relevant information**, such as biannual reports by countries on progress towards NDCs and international expert reviews of the submitted information.

In many instances, a combination of approaches may be most suitable or even necessary to address a particular issue; for example, avoiding double counting requires not only robust accounting rules but also clarity on NDCs and tracking international transfers. In some instances, different approaches could be pursued to address an issue. In the sections that follow, we explore key issues in the ongoing negotiations.

4 Nature and scope of ITMOs

Article 6.2 of the Paris Agreement allows countries to engage in cooperative approaches that involve the use of „internationally transferred mitigation outcomes“ (ITMOs) towards NDCs. ITMOs or „mitigation outcomes“ are not further defined in the Agreement. Understanding and defining the nature of ITMOs is one important question in the negotiations on guidance under Article 6.2. How ITMOs are defined has implications for which rules are necessary to ensure robust accounting. This section explores different aspects of the definition and scope of ITMOs. Table 2 provides an overview of the aspects that are discussed in greater detail below.

Table 2: Options for the nature and scope of ITMOs

Issue	Options
Metric of ITMOs	<ul style="list-style-type: none"> ▶ One common metric (e.g. t CO₂e) ▶ Several metrics (e.g. t CO₂e, MW of renewable power capacity installed)
Units versus reported amounts	<ul style="list-style-type: none"> ▶ Units transferred within or across electronic registries ▶ Amounts reported by countries in tables
Relation to the NDC of the transferring country	<ul style="list-style-type: none"> ▶ Mitigation outcomes can be generated only <i>within</i> the scope of NDCs ▶ Mitigation outcomes may be generated both <i>within</i> and <i>outside</i> the scope of NDCs
Use of ITMOs by the acquiring country	<ul style="list-style-type: none"> ▶ Mitigation outcomes are only considered as ITMOs if they are both internationally transferred and used by the acquiring country towards achieving its NDC ▶ Mitigation outcomes are considered as ITMOs whenever they are internationally transferred; they could be used for various purposes, including NDC achievement or voluntary cancellation
Mechanism type	<ul style="list-style-type: none"> ▶ Trading schemes, such as international linking of ETSS ▶ Crediting schemes ▶ Other types of government-to-government transfers which may or may not involve a market mechanism
Fungibility of ITMOs	<ul style="list-style-type: none"> ▶ ITMOs as a single international compliance unit ▶ Different types of ITMOs recognized by different countries or groups of countries

Issue	Options
Relationship to Article 6.4	<ul style="list-style-type: none"> ▶ Emission reductions generated under the Article 6.4 mechanism are considered as ITMOs if they are (a) internationally transferred and (b) used by the acquiring country to achieve its NDC ▶ Emission reductions generated under the Article 6.4 mechanism are considered as ITMOs if they are (a) internationally transferred, (b) used by the acquiring country to achieve its NDC, and (c) covered by the scope of the NDC of the transferring country ▶ Emission reductions generated under Article 6.4 are always considered as ITMOs ▶ Emission reductions generated under Article 6.4 are never considered as ITMOs

Source: Authors' own compilation

4.1 Metric of ITMOs

The metric of ITMOs relates to the question of how „mitigation outcomes“ are defined. Under the United Nations Framework Convention on Climate Change (UNFCCC), the term „mitigation“ relates to „mitigation of climate change“, which has been linked to reducing GHG emissions or enhancing removals in several places.

Article 2(a) of the Convention requires Parties to take measures on the „mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs“. Similarly, Article 4.14 of the Paris Agreement refers to „mitigation actions with respect to anthropogenic emissions and removals“. One could thus argue that the outcome of mitigation is ultimately a reduction in GHG emissions or an enhancement of removals. This would point to using GHG metrics for international transfers, such as t CO₂e, which has been used under the Kyoto Protocol. Alternatively, the mitigation outcomes could be measured in a variety of other metrics that would relate more to the specific mitigation actions taken, such as Megawatt hour (MWh) of renewable electricity generated, MWh of energy saved through demand side energy efficiency measures, hectares of land forested, etc.).

Many Parties have proposed that t CO₂e be used for ITMOs. Using t CO₂e as the only or predominant metric for transfers under Article 6.2 could have several advantages. Countries with GHG targets can only use ITMOs to achieve their NDC targets if the ITMOs are expressed as or converted to a GHG metric. So far, all countries that have indicated in NDCs that they intend to purchase international carbon market units have communicated GHG targets in their NDCs. The Paris Agreement also encourages that targets be expressed as „emissions“ targets. According to Article 4.4, developed countries should express their targets as „emission reduction targets“ and developing countries are encouraged to move over time towards „emission reduction or limitation targets“. This suggests that, over time, most NDCs will include targets expressed in GHG metrics. For transfers between countries with GHG targets, t CO₂e is a well-established and straight-forward metric for mitigation outcomes. Using t CO₂e requires either that common GWP values be applied by the countries involved in an international transfer or that differences in GWP values between countries be accounted for (see section 5.6).

Using only t CO₂e for transfers under Article 6.2 would make accounting for ITMOs through „corresponding adjustments“ simpler. Corresponding adjustments, as referred to in paragraph 36 of decision 1/CP.21, could be compiled, aggregated and reconciled more easily if a common metric is used. It may also provide for more clarity and make it easier to ensure that what is transferred from country A corresponds to what country B receives.

A further important advantage of t CO₂e is that it reflects the ultimate outcome in terms of GHG emissions and removals. Indeed, for other metrics, the mitigation outcome in terms of emissions and removals may not necessarily „correspond“ but could be different in the two countries engaging in cooperative approaches. Assume, for example, two countries that have targets for renewable electricity generation and use a system of renewable energy certificates (RECs) to achieve their targets. The two RECs systems are interlinked, enabling private sector entities to trade RECs between the two countries. The countries may wish to account for the net transfer of RECs when accounting for their NDCs, to ensure that both countries achieve their NDC targets. However, if their electricity systems are not connected and have a different carbon intensity, the emission reductions from one MWh of renewable electricity may differ between the two countries. One MWh of renewable electricity in country A could lead to higher or lower emission reductions than in country B. Transferring MWh of renewable electricity as ITMOs would thus not correspond to the same mitigation outcome and could lead to higher or lower aggregated GHG emissions from the two countries.

The diversity of mitigation targets and the application of „corresponding adjustments“, as referred to in paragraph 36 of decision 1/CP.21, are important considerations for potential other metrics than t CO₂e. 32 countries have communicated only non-GHG mitigation targets or actions in their NDCs (Graichen et al. 2016). To engage in international transfers and avoid double claiming, these countries would either need to convert their non-GHG mitigation target into a GHG emissions target – which would allow them to make a corresponding adjustment for an ITMO in t CO₂e – or the corresponding adjustment would need to be made in the non-GHG metric. This latter option could involve a pair of corresponding adjustments in different metrics for one ITMO (see section 5.8).

This raises the question of how the metrics of ITMOs and corresponding adjustments relate to each other. The metric of ITMOs could be defined independently of the metric of the corresponding adjustments. In that case, t CO₂e could be used as the single metric of ITMOs, whereas different metrics may be used for corresponding adjustments to account for non-GHG mitigation targets. This may be a simple approach to ensure consistent tracking and reporting on ITMOs. Alternatively, ITMOs might be defined in the same metrics as the corresponding adjustments. This could require a single ITMO to be expressed in two different, corresponding metrics, to account for the different metrics of mitigation targets of two countries involved. This latter approach may be more complex for reporting and tracking international transfers.

In conclusion, t CO₂e is a well-established metric for ITMOs, which fits the purpose under most circumstances. This metric would also ensure that the mitigation outcome of the transferring and the acquiring country corresponds. Using t CO₂e as a generic metric would also not limit the ability of countries to engage in international transfers, as the mitigation outcome from mechanisms in other metrics, such as international transfers of RECs, could be converted into t CO₂e.

4.2 Units versus reported amounts

The term ITMO is not further defined in the Paris Agreement and decision 1/CP.21. In the negotiations, the term was mainly introduced to avoid implicit references to market mechanisms (Marcu 2016). ITMOs could constitute:

- ▶ units that move across or within electronic registries; or
- ▶ amounts reported by countries for the purpose of accounting for international transfers and implementing corresponding adjustments.

The first option would require registry systems to be established to transfer ITMOs. Formalized registries may facilitate the tracking of the issuance, transfer and use of ITMOs, because registry systems could effectively prevent double use of units. Relevant information on the mitigation outcomes could be attached to the units in the form of serial numbers, in a similar way to registry systems used under the Kyoto Protocol or in ETSs. This option may also facilitate the reconciliation of international transfers between countries, i.e. ensuring that the transferring and acquiring countries report consistent information. However, it also requires the necessary infrastructure to be established and common international standards for such transfers to be agreed. If ITMOs are considered as units transferred across or within electronic registries, several additional questions arise:

- ▶ Do they represent a single international compliance unit or do they include different types of units generated under the governance of the Parties involved in the transfer (e.g. units transferred in a bilateral registry of a bilateral mechanism)?
- ▶ Do they represent an emissions budget such as assigned amount units (AAUs) under the Kyoto Protocol or are they issued for internationally transferred amounts only?
- ▶ What information should be attached to the units (e.g. country of origin, vintage)?
- ▶ Would unit transfers occur in bilateral arrangements for registries and what (type of) international oversight would be provided for such transfers?

In the second option, ITMOs would be considered as amounts that are reported by countries, possibly in tables, such as tabular reporting formats. Relevant information about the mitigation outcomes, such as the country of origin, whether the mitigation outcomes are generated within or outside the scope of the NDC of the originating country, and in which time periods the mitigation outcomes were generated, would have to be provided through appropriate formats of reporting.

Under this option, countries involved in international transfers may still wish to operate electronic registries to track unit transfers. However, these registries would be operated under the responsibility of the countries involved. Different registries may exist for different mechanisms, but reporting on transfers to UNFCCC would follow common formats (see section 7 below).

In principle, both options may provide appropriate means to ensure transparent information and robust accounting, depending how they are implemented, in particular whether all relevant information is reported in a consistent and complete manner. Reporting on ITMOs may provide more flexibility to countries to set up their own registries, suited to their own purposes. However, it might also be more prone to errors; the countries involved in international transfers would need to report information consistently, and errors or inconsistencies may need to be resolved through corrections ex-post. Registries or an international transaction log (ITL) as under the Kyoto Protocol may provide higher assurance that unit transfers are consistently tracked and double counting is avoided but may be politically more difficult to agree upon (see section 7 below).

4.3 Relation of ITMOs to the scope of the NDC of the transferring country

Most developed countries and a number of developing countries have pledged economy-wide mitigation targets in their NDCs. These NDCs cover about 58 % of global GHG emissions. However, 108 NDCs, covering about 38 % of global GHG emissions, only cover part of the countries' GHG emissions (Graichen et al. 2016). Some NDCs only include mitigation targets or actions targeting specific sectors or activities, and some NDCs do not include all GHGs. Whether or not emissions are covered by mitigation targets in NDCs has implications for robust accounting. When emissions are not covered by mitigation targets, double claiming does not occur. Therefore, the application of „corresponding adjustments“, as referred to in paragraph 36 of decision 1/CP.21, would theoretically not be necessary on the side of the transferring country if the relevant emission sources are not covered by its NDC (see section 5.2 below).

Parties could consider two options for defining the scope of ITMOs in relation to the NDC of the transferring country:

- ▶ ITMOs represent only mitigation outcomes that are generated within the scope of the NDC of the transferring country; or
- ▶ ITMOs represent mitigation outcomes that may be generated both within and outside the scope of the NDC of the transferring country.

The first approach is simpler for accounting purposes but more limiting, as it would only enable transfers from mitigation outcomes generated within the scope of NDCs. While most global GHG emissions fall within the scope of NDCs, many Least Developed Countries (LDCs) do not have economy-wide mitigation targets and would thus have only limited access to cooperative approaches under Article 6.2. Under this approach, these countries would have to use Article 6.4 to address emission sources outside the scope of their NDC. One argument supporting this interpretation could be that the adjustments, referred to in paragraph 36 of decision 1/CP.21, should be „corresponding“; this could be interpreted as requiring adjustments on two sides and, hence, to be only applicable to transfers of mitigation outcomes generated within the scope of NDCs.

One consideration for limiting the scope of cooperative approaches to emission sources covered by NDCs could be the incentives for countries to ensure environmental integrity in quantifying mitigation outcomes. Countries with ambitious mitigation targets have incentives to ensure the environmental integrity of mitigation outcomes generated within the scope of their mitigation targets. If a country over-estimates mitigation outcomes and transfers them to another country, it would have to compensate for the transfer in order to still achieve its mitigation target, by either further domestic mitigation action or acquiring mitigation outcomes from other countries. By contrast, if the mitigation outcomes are not included within the scope of the NDC target, countries could transfer over-estimated mitigation outcomes without infringing their ability to achieve their mitigation targets, so they do not have incentives to ensure environmental integrity (Kreibich and Obergassel 2016; Schneider et al. 2016).

This point relates to the question of whether and what type of international guidance on environmental integrity may be provided under Article 6.2. If no or only general international guidance is provided, defining ITMOs as mitigation outcomes that are generated within the scope of NDCs may provide a higher assurance of environmental integrity. It would imply that those countries that do not have economy-wide emission targets would need to engage with the Article 6.4 mechanism for engaging in international transfers from emissions sources not covered by their NDC. This could be seen as providing higher assurance of environmental integrity given that emission reductions from the Article 6.4 mechanism are generated under international oversight.

Another reason for limiting cooperative approaches to mitigation outcomes generated within the scope of NDCs could be avoiding disincentives for governments not to move over time to economy-wide emissions targets, as envisaged under Article 4.4 of the Paris Agreement. If countries can engage in cooperative approaches for mitigation outcomes generated outside the scope of their targets, they might accrue fewer revenues from ITMO transfers if they expand their target to an economy-wide level. By contrast, limiting international transfers under Article 6.2 to emission sources within the scope of NDCs could provide incentives to broaden the scope of mitigation targets in the future.

The second approach would enable a broader participation in cooperative approaches under Article 6.2; countries that do not yet have economy-wide targets could transfer ITMOs originating from all emission sources, within or outside the scope of their NDC. If Parties agreed that corresponding adjustments would not be necessary for the transferring country if the ITMOs are generated outside the scope of the NDC target, this approach would require two types of ITMOs to be distinguished: those generated within and those generated outside the scope of the NDC of the transferring country.

4.4 Use of ITMOs by the acquiring country

Article 6.2 refers to the „use of ITMOs towards NDCs“. This provision clarifies that ITMOs can be used to achieve NDC targets; it could also be interpreted such that the „construct“ of an ITMO only „exists“ under the Paris Agreement in the context of its use, i.e. if two conditions are met: the mitigation outcome is (a) internationally transferred, and (b) used by the acquiring country to achieve its NDC. This would imply that any domestic units, such as from ETSSs, do not represent ITMOs (Marcu 2016). For the international linking of ETSSs, it would imply that only the net flow of units from one system to the other may be accounted for under Article 6.2. This also suggests that the accounting for ITMOs could be de-linked from the registry systems operated by the underlying mechanisms, such as the ETS registries. Allowances in ETS registries may flow between two internationally linked ETSSs, while the net flow may be separately accounted for, ex-post, as ITMOs.

International carbon market mechanisms have also been used for other purposes, beyond compliance. International mechanisms, such as the CDM, have been used as a tool for achieving emission reductions domestically (i.e. without international transfers). For example, South Korea recognizes certified emission reductions (CERs) from domestic projects under its ETS. Mechanisms can also be used for voluntary offsetting of emissions by governments, the private sector, individuals, or non-governmental organizations, or for the verification of mitigation outcomes from climate finance, e.g. by purchasing and cancelling carbon market units as part of results-based climate finance programmes.

This raises the question of whether ITMOs could also be generated and used beyond achieving NDCs. The narrow definition of ITMOs as mitigation outcomes that are both internationally transferred and used by the acquiring country would not necessarily limit the scope and purpose of the underlying market mechanisms. For example, a bilateral crediting mechanism, such as the Joint Crediting Mechanism (JCM) established by Japan, could operate its own registry system and the units generated from the mechanism may be partially internationally transferred, and partially used for various purposes, including voluntary cancellation. However, only those units that are internationally transferred and used by another country towards achieving its NDC would be considered as ITMOs under the Paris Agreement.

An alternative approach could be defining the scope of ITMOs more broadly to include functions beyond achieving NDCs, such as voluntary cancellation. This approach may provide for broader uses of ITMOs; however, as pointed out above, such uses could also be pursued with the underlying market mechanisms, without considering such uses as ITMOs in the context of Article 6.2.

Defining ITMOs more broadly may also require a broader scope of accounting, because it may involve tracking and reporting the different uses of ITMOs, in order to reconcile accounting between transferring and acquiring countries. It would thus make international accounting guidance more complex.

In summary, Parties could define ITMOs in at least two ways:

- ▶ ITMOs represent only mitigation outcomes that are both internationally transferred and used by the acquiring country towards achieving its NDC;
- ▶ ITMOs represent mitigation outcomes that are internationally transferred and that may be used for different purposes, such as voluntary cancellation.

4.5 Mechanism type

The term ITMO does not imply what type of mechanism may underline the international transfer. This could potentially include

- ▶ trading mechanisms, such as international linking of ETSs;
- ▶ crediting mechanisms, possibly either under the governance of Parties under Article 6.2 or under UNFCCC governance if emission reductions resulting from the Article 6.4 mechanism are considered as ITMOs;
- ▶ other types of government-to-government transfers which may or may not involve a market mechanism (e.g. approaches similar to Green Investment Schemes implemented under the Kyoto Protocol).

Article 6.2 does not seem to place a limit on the type of mechanisms that could be pursued.

4.6 Fungibility of ITMOs

How ITMOs are defined could have implications for their fungibility, i.e. meaning whether they could be mutually substituted in place of one another. Full fungibility would only be provided if Parties agree that ITMOs are an international compliance unit. This would at least require that they have the same metric – presumably t CO₂e –, that countries apply the same set of GWP values to account for their NDCs, and that countries apply common time frames for mitigation targets. ITMOs of the same vintage (for the same time frame) might then be fully fungible.

In practice, mechanisms operated under Article 6.2 may have different features and groups of countries may apply different scopes, rules and standards for international transfers. It is thus unlikely that ITMOs will be fully fungible, even if the conditions above are met.

4.7 Relationship to Article 6.4

The relationship between the cooperative approaches under Article 6.2 and the Article 6.4 mechanism is one of the issues that require further clarification in the negotiations ahead. Article 6.2 refers to „mitigation outcomes“, whereas Article 6.4 refers to „emission reductions“. How they could relate depends on how other aspects of ITMOs are defined and how the scope of the Article 6.4 mechanism will be defined.

The provisions in the Paris Agreement suggest that emission reductions from the Article 6.4 mechanism could, but do not necessarily have to, be internationally transferred and used by another Party to achieve its NDC. The purpose of Article 6.4 could be broader, promoting mitigation more generally, allowing the mechanism to be used as a tool to achieve domestic emission reductions or for purposes such as voluntary cancellation or delivering results-based climate finance.

One possible interpretation is that emission reductions generated under the Article 6.4 mechanism would be considered as ITMOs whenever they meet the definition of an ITMO – which could include various options, as discussed above. The main difference between Article 6.2 and Article 6.4 would then be how the mitigation outcomes are generated: under Article 6.2 they are generated by mechanisms operated by Parties or non-governmental organizations, and under Article 6.4 they are generated under UNFCCC oversight. This interpretation may also imply that the same accounting rules are applied to international transfers under Article 6.2 and Article 6.4. Most Parties seem to support this interpretation in their submissions to the UNFCCC.

Another possible interpretation could be that emission reductions generated under Article 6.4 are treated and accounted for under a separate track and are not considered as ITMOs, even if they were internationally transferred and used towards achieving a NDC.

In summary, drawing on our analysis of the different possible interpretations of what an ITMO is, there could be several options for the relationship between emission reductions generated under the Article 6.4 mechanism and ITMOs, including at least the following:

- ▶ Emission reductions generated under the Article 6.4 mechanism are considered as ITMOs if they are (a) internationally transferred and (b) used by the acquiring country to achieve its NDC;
- ▶ Emission reductions generated under the Article 6.4 mechanism are considered as ITMOs if they are (a) internationally transferred, (b) used by the acquiring country to achieve its NDC, and (c) covered by the scope of the NDC of the transferring country;
- ▶ Emission reductions generated under Article 6.4 are always considered as ITMOs;
- ▶ Emission reductions generated under Article 6.4 are never considered as ITMOs.

5 Avoiding double counting

Double counting of emission reductions occurs when a single GHG emission reduction is counted more than once towards achieving mitigation targets. If emission reductions are double counted, actual global GHG emissions are higher than the sum of what individual countries or entities report. As a result, countries or entities could appear to meet their mitigation targets, while total emissions exceed these levels (Schneider et al. 2015). Avoiding double counting is thus an important prerequisite for ensuring environmental integrity.

In the context of mechanisms transferring mitigation outcomes, double counting can occur in three ways (Hood et al. 2014; Prag et al. 2011, 2013; Schneider et al. 2015; UNFCCC 2012):

1. **Double issuance** occurs if more than one unit is issued for the same emissions or emission reductions. For example, in a fragmented carbon market, with multiple mechanisms under international, bilateral, national or non-governmental governance, two mechanisms could issue units for the same emissions or emission reductions. A particular challenge is addressing double issuance when mechanisms account for indirect life-cycle emissions that occur upstream or downstream of the entities taking the mitigation action.
2. **Double claiming** occurs if the same emission reductions are counted twice towards fulfilling mitigation targets: by the country or entity where the reductions occur, through reporting of its reduced GHG emissions, and by the country or entity using the units issued for these reductions towards meeting its mitigation target. As with double issuance, double claiming can occur in more indirect ways when mechanisms account for indirect emissions.
3. **Double use** occurs if the same issued unit is used twice to achieve a mitigation target. Double use may occur, for example, if a unit is duplicated in registries, or if one country uses the same unit in two different years to achieve its mitigation target.

Under the Paris Agreement, avoiding double counting is relevant with regard to achieving NDCs and international transfers of mitigation outcomes between countries. The Paris Agreement and decision 1/CP.21 include provisions to avoid double counting in several contexts: accounting for NDCs under Article 4, international transfers under Article 6, the transparency framework under Article 13, as well as enhanced action prior to 2020 (see Table 3). The first three provisions intend to avoid double counting towards NDCs, while the fourth provision relates to double counting with regard to mitigation action prior to 2020. Double counting could not only occur between NDCs but also between NDCs and international mechanisms for addressing emissions from international aviation or international shipping (see section 5.4 below).

Table 3: Provisions for avoiding double counting in the Paris Agreement

Issue	Applicable provisions
Accounting for NDCs (Article 4)	Article 4.13: Parties shall avoid double counting in accounting for their NDCs.
International transfers (Article 6)	<p>Article 6.2: Parties engaging in international transfers of mitigation outcomes shall apply robust accounting to ensure, inter alia, the avoidance of double counting.</p> <p>Paragraph 36 of decision 1/CP.21: The guidance under Article 6.2 should „ensure that double counting is avoided on the basis of a corresponding adjustment by Parties for both anthropogenic emissions by sources and removals by sinks covered by their NDCs“.</p> <p>Article 6.5: Emission reductions resulting from the Article 6.4 mechanism shall not be used to demonstrate achievement of the host Party’s NDC if used by another Party to demonstrate achievement of its NDC.</p>
Transparency framework (Article 13)	Paragraph 92: The modalities, procedures and guidelines for Article 13.13 should take into account the need to ensure that double counting is avoided.
Enhanced action prior to 2020 (decision 1/CP.21)	<p>Paragraph 106: Parties are encouraged to promote the voluntary cancellation by Party and non-Party stakeholders, without double counting, of units issued under the Kyoto Protocol, including certified emission reductions that are valid for the second commitment period.</p> <p>Paragraph 107: Host and purchasing Parties are urged to report transparently on internationally transferred mitigation outcomes, including outcomes used to meet international pledges, and emission units issued under the Kyoto Protocol with a view to promoting environmental integrity and avoiding double counting.</p>

Source: Authors' own compilation

Addressing double counting requires action at different levels (Schneider et al. 2015), including accounting rules for international transfers, tracking the transfer and use of mitigation outcomes, appropriate design of market mechanisms, and ensuring clarity on NDCs. Avoiding double issuance requires mainly appropriate international oversight of market mechanisms. For example, third party entities auditing projects could be required to check that the same activity or the same reductions are not credited through another activity. Market mechanisms could appropriately account for cross-effects between activities and programs. Avoiding double use mainly requires systems to track the transfer of mitigation outcomes, such as registries or appropriate forms of reporting. Avoiding double claiming mainly requires rules for accounting of international transfers which ensure that only one country claims the reductions.

Avoiding all three forms of double counting is important to ensure robust accounting. Avoiding double claiming, though, is particularly challenging, as it requires coherent accounting systems between the countries involved in international transfers. Avoiding double claiming is also a focus of the ongoing international negotiations. This discussion paper therefore focuses on approaches for avoiding double claiming.

The Paris Agreement includes specific provisions to address double claiming with regard to both the cooperative approaches under Article 6.2 and the Article 6.4 mechanism:

- ▶ Article 6.2 requires countries to apply „robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the CMA“. Paragraph 36 of decision 1/CP.21 specifies that the guidance under Article 6.2 should ensure that double counting is avoided „on the basis of a corresponding adjustment by Parties for both anthropogenic emissions by sources and removals by sinks covered by the NDC“.
- ▶ Article 6.5 clarifies that emission reductions resulting from the Article 6.4 mechanism shall only be used by one Party to demonstrate achievement of its NDC.

Both provisions aim to address double claiming. Corresponding adjustments can avoid double claiming between countries by appropriately accounting for the net transfer of mitigation outcomes between countries. Article 6.5 establishes the general objective of avoiding double claiming. How the two provisions relate and whether the same or different sets of rules should apply to them is one of the key questions for the negotiations ahead. Regardless of how this will be approached, a similar set of rules will be required to effectively address double claiming. Developing one set of coherent accounting rules for all transfers under Article 6 might be a simpler approach.

We therefore focus our analysis on the application of corresponding adjustments under Article 6.2, noting that the substantive issues are equally applicable to international transfers of emission reductions resulting from the Article 6.4 mechanism.

How corresponding adjustments could be implemented, in particular in the light of the diversity of NDCs, will be one of the key aspects in the negotiations on guidance under Article 6.2. Below we explore several important aspects.

5.1 Should corresponding adjustments be applied to reported emissions or emission budgets?

Corresponding adjustments could, in principle, be implemented in two ways:

1. **Emissions based approach:** Applying corresponding adjustments to the total net GHG emissions level as reported by the country through its GHG inventory (or possibly to any non-GHG indicators used to track progress towards NDCs), or
2. **Emission budget based approach:** Applying corresponding adjustments to an emissions budget that corresponds to the GHG emissions level of the NDC target of the country (or possibly to any budgets in non-GHG metrics).

To illustrate the two approaches, we assume two countries (A and B) that both have economy-wide absolute emission targets for the same basket of GHGs and for the same time period (either the same single year or the same multi-year period). We also assume that both countries express their targets in metric tonnes of CO₂ equivalent and apply the same GWPs.

Country A (the transferring country) has projected BAU emissions of 100 Mt CO₂e and pledged in its NDC to limit its emissions to 80 Mt CO₂e. Country B (the acquiring country) has projected BAU emissions of 110 Mt CO₂e and pledged in its NDC to limit emissions to 70 Mt CO₂e. Hence, the two countries together pledged to limit their total emissions to 150 Mt CO₂e. The two countries engage in a cooperative approach involving the transfer of mitigation outcomes of 30 Mt CO₂e from country A to country B.

The first approach is illustrated in Figure 1 below. Under this approach, country A adds the transferred mitigation outcomes to its reported GHG emissions, whereas country B subtracts them. Country A reduces its emissions by 50 Mt CO₂e, enabling it to transfer 30 Mt CO₂e to the acquiring country; it adjusts its reported emissions by adding the amount transferred, resulting in an adjusted emissions level of 80 Mt CO₂e, which equals its emissions target. Country B reduces its emissions only by 10 Mt CO₂e and achieves the remainder of the required emission reduction by using the ITMOs from country A; it adjusts its reported emissions by subtracting the ITMOs transferred, resulting in an adjusted emissions level of 80 Mt CO₂e, which equals its emissions target. In sum, both countries still emit 150 Mt CO₂e; double claiming is avoided.

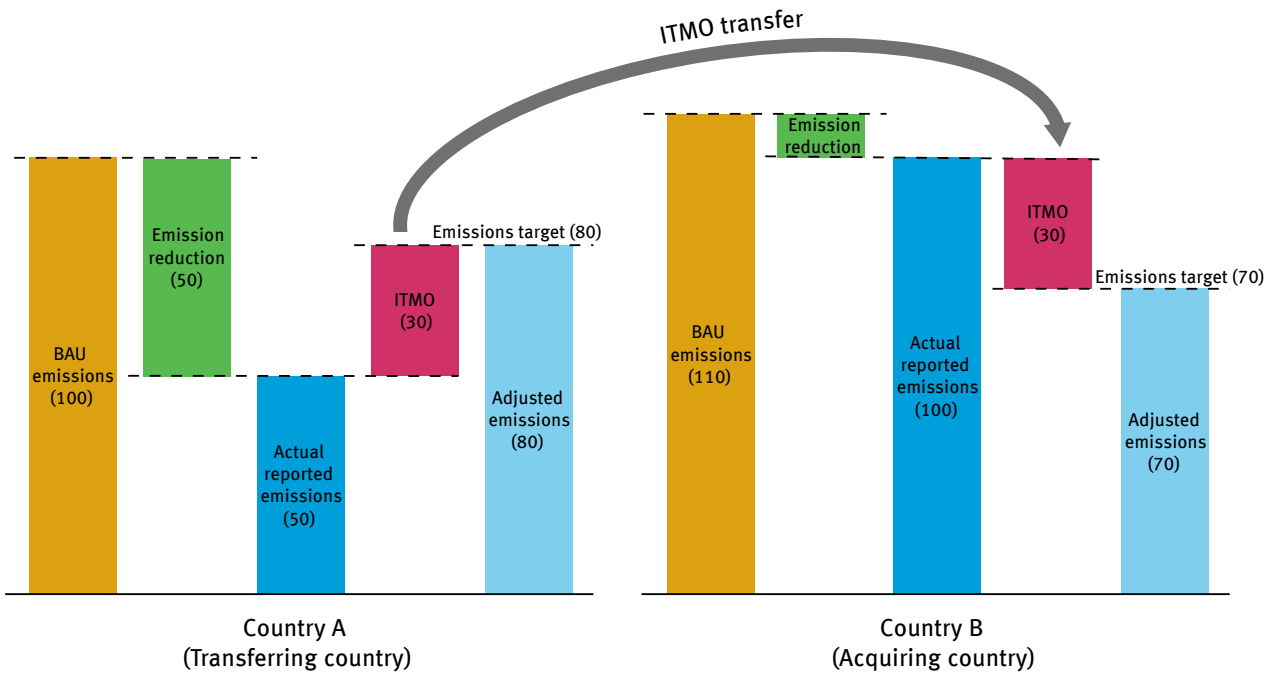


Figure 1: Application of corresponding adjustments to reported emissions

The second approach is illustrated in Figure 2. The figure starts on the left-hand side from the emissions budget that corresponds to the mitigation target. Under this approach, country A adjusts its emission target by subtracting the amount of mitigation outcomes transferred from its emission budget, resulting in a downward adjustment from 80 to 50 Mt CO₂e. Country B adds the transferred mitigation outcomes to its emissions target, resulting in an upward adjustment from 70 to 100 Mt CO₂e.

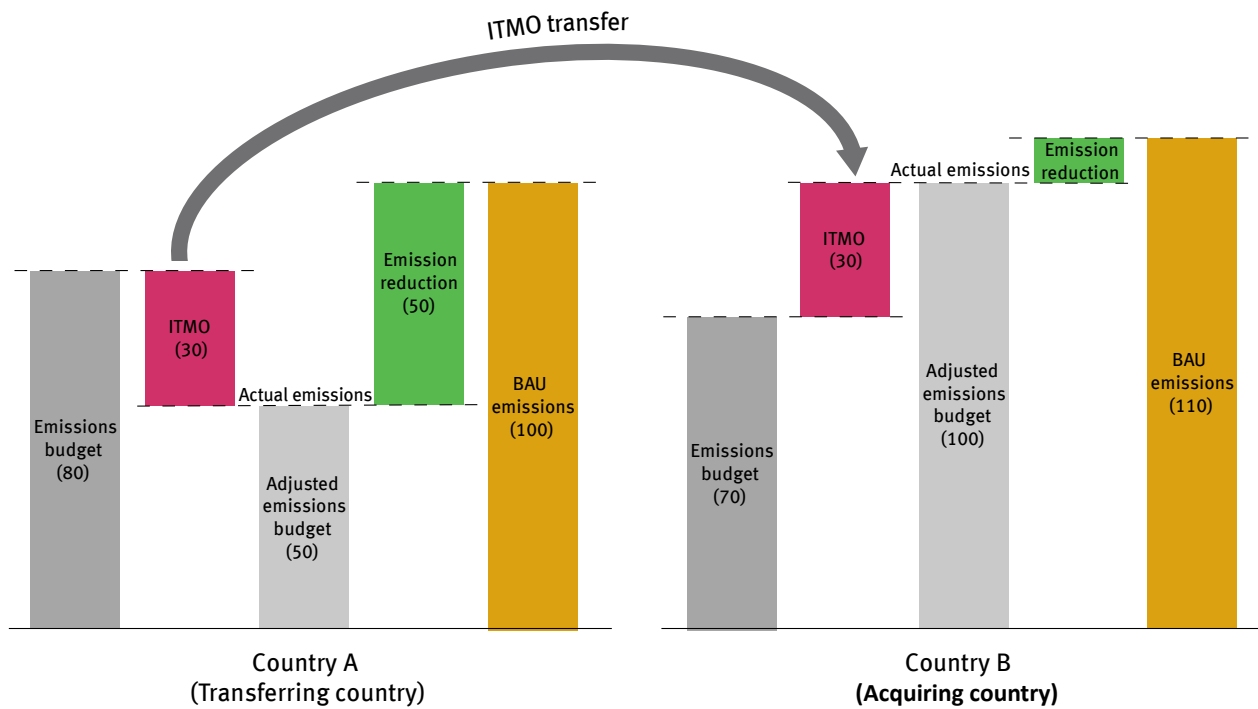


Figure 2: Application of corresponding adjustments to emission budgets

The two approaches have a mathematically equivalent outcome and both effectively avoid double claiming. The second approach is applied under the Kyoto Protocol: unit transfers are subtracted from the Parties' assigned amount, unit acquisitions are added. The language in paragraph 36 of decision 1/CP.21 refers to corresponding adjustments for „emissions by sources and removals by sinks“. This seems to point to the first approach illustrated in Figure 1.

The first approach could be perceived as changing GHG inventories. Indeed, GHG inventories should reflect the actual emissions of a country, reported in accordance with relevant IPCC Guidelines and independent of any accounting for transferred mitigation outcomes. The application of corresponding adjustments should therefore be clearly separated from GHG inventory estimates, for example, by using separate tables to transparently report on corresponding adjustments. The second approach could be perceived as changing the target level or ambition. As for adjustments to the assigned amount under the Kyoto Protocol, corresponding adjustments to the emissions budget should therefore be clearly separated from the communication and quantification of the mitigation target.

While the two approaches have mathematically an equivalent outcome, creating emissions budgets, as under the Kyoto Protocol, could pose a risk of creating assets that countries may not wish to forego when they over-achieve mitigation targets. The creation of emission budgets could therefore be perceived as involving a higher risk of transferring „hot air“ – i.e. surplus allowances that do not arise from mitigation action. Creating emission budgets might also hinder enhancing the ambition of NDC targets; once a formal budget is created, it could be politically difficult for a country to enhance its target, since this would require the country to reduce an already established budget. This is particularly problematic in the light of the current ambition of NDC targets, which are not sufficient to achieve the long-term goals of the Paris Agreement, as recognized in paragraph 17 of decision 1/CP.21. Moreover, if emission budgets were banked across compliance periods – similar to the banking of AAs under the Kyoto Protocol – the risk of „hot air“, or NDC targets that are not consistent with the long-term goals of the Agreement, could be perpetuated beyond the current NDC cycle.

In principle, the two countries involved in an international transfer would not necessarily have to apply the same approach. For example, the transferring country could add the transferred mitigation outcomes to its reported emissions, while the acquiring country could add them to its emissions budget. Respectively, the transferring country could subtract the transferred mitigation outcomes from its emissions budget, while the acquiring country subtracts them from its reported emissions. Theoretically, it is even conceivable that one country applies both approaches at the same time; for instance, country A could engage with countries B and C in cooperative approaches and might agree bilaterally with country B to adjust reported emissions and agree bilaterally with country C to adjust emission budgets. If implemented appropriately, the parallel implementation of the two approaches could be possible without infringing robust accounting. This would mean that some countries may need to apply both approaches at the same time, i.e. adjusting the reported emissions and the emissions budget. In practice, the application of the two approaches in parallel would make the tracking and reconciliation of corresponding adjustments more complex.

International guidance under Article 6.2 could include different provisions with regard to the general approach towards corresponding adjustments. The guidance could:

- ▶ establish one of the two approaches as being applicable to all Parties;
- ▶ require each Party to select one of the two approaches and to apply it consistently to all ITMOs;
- ▶ allow Parties to apply any of the two approaches in a cooperative approach but require that the same approach be applied by the two Parties involved in the international transfer consistently; or
- ▶ allow any Parties to apply any of the two approaches in any international transfer.

The first option would be the simplest one. It would avoid complexity and facilitate transparent tracking and reconciliation of ITMOs and corresponding adjustments. Agreeing internationally on one of the two approaches does not limit the ability of countries to engage in cooperative approaches, as both approaches are mathematically equivalent and have the same practical implications for Parties. In this regard, the other options do, in practice, not provide more flexibility to Parties. In the light of the possible risks of creating emission budgets and noting that that paragraph 36 of decision 1/CP.21 points to the adjustment of reported emissions and removals – rather than creating emission budgets – we recommend that all Parties adjust the reported emissions and removals (or possibly other indicators used to track progress towards NDCs).

5.2 Under what circumstances do corresponding adjustments need to be applied?

Double claiming in the context of international transfers technically occurs if all of the following conditions apply (Schneider et al. 2015):

1. The mitigation outcome falls within the scope of the NDC target of the transferring country;
2. The mitigation outcome is reflected in the GHG inventory of the transferring country (or in other indicators used to measure progress towards achieving its NDC);
3. The acquiring country accounts the acquired mitigation outcome to achieve its NDC target, by applying a corresponding adjustment;
4. The transfer of the mitigation outcome is *not* accounted for by the transferring country, i.e., the transferring country does *not* apply a corresponding adjustment.

Conversely, double claiming does not occur, and hence corresponding adjustments would theoretically not need to be applied by the transferring country, if *one* of the above conditions does not apply. A range of scenarios are possible:

Mitigation outcomes occur outside the scope of the NDC target of the transferring country: If corresponding adjustments were not applied if the mitigation outcome does not fall within the scope of its NDC target, clarity of NDC targets is important to be able to identify whether a mitigation outcome is generated within or outside its scope. For international linking of ETSs, it is usually straight-forward to identify what emission sources are covered, as the scope of ETSs is clearly defined. For crediting mechanisms, practical challenges can arise, as crediting programs often credit reductions that occur upstream or downstream of where the mitigation action takes place. In some instances, the installations in which the reductions occur are not known or they could be located in other countries (Schneider et al. 2015).

While double claiming does not occur if the mitigation outcomes do not fall within the scope of the NDC target, not applying corresponding adjustments in such instances could provide a disincentive for countries to move over time towards economy-wide targets, as envisaged under Article 4.4 of the Paris Agreement. To avoid such disincentives, international rules could alternatively require that corresponding adjustments be applied by both countries regardless of whether the emission reductions fall within or outside the scope of the NDC target of the transferring country. However, this approach could make it more difficult for transferring countries to achieve their NDC targets; if their NDC target is ambitious and the transferred mitigation outcomes occur outside the scope of their NDC target, they would have to compensate for the transfer by further reducing emissions.

Mitigation outcomes are not reflected in the GHG inventory of the transferring country: In some instances, mitigation outcomes could not be reflected in GHG inventories or other indicators used to measure progress. Emission reductions from mitigation actions are often automatically reflected in GHG inventories. Take, for example, a wind power project. By feeding electricity into the grid, the wind power plant reduces fossil fuel consumption in other power plants connected to the grid. If fossil fuel consumption statistics are used to prepare that country's GHG inventory, then the reductions from the wind farm will be automatically reflected in the GHG inventory. In some instances, however, more advanced inventory methods (IPCC Tier 2 or 3) are needed for mitigation actions to be reflected in GHG inventories. This holds true particularly for non-CO₂ gases. Take, for example, a country that uses a simple Tier 1 default emission factor for estimating N₂O emissions from nitric acid production. In this case, the emissions impact of a crediting mechanism targeting N₂O emissions from nitric acid production would not show up in the GHG inventory; the project would impact the average emission factor from nitric acid production, which, however, is not reflected as a lower emission factor in the GHG inventory. This issue has also been referred to as „visibility“ of emission reductions in GHG inventories (Prag et al. 2013). There could also be instances in which emission sources are not yet included in GHG inventories. Some GHG inventories of developing countries provide GHG emission estimates at a relatively aggregated level, e.g. for broad sectors of the economy. In some instances, specific emission sources may not be included in these aggregated estimates.

If the mitigation outcomes were not reflected in the GHG inventory, theoretically, the transferring country would also not have to apply a corresponding adjustment in order to avoid double claiming. However, enabling countries not to apply corresponding adjustments in such situations could create disincentives for countries to improve GHG inventories. It could thus undermine the general accounting principles of accuracy, completeness and consistency, as reflected in Article 4.13 of the Paris Agreement. For these reasons, not applying corresponding adjustments in such situations may not be advisable.

Mitigation outcomes are used for other purposes: Double claiming does not occur and corresponding adjustments are thus not necessary on the side of the transferring country, if the acquiring country uses the mitigation outcomes for other purposes, such as delivering results-based climate finance, but does not use them to achieve its NDC target. There could also be instances where jurisdictions, entities or non-governmental organizations from two countries could decide to engage in international transfers of mitigation outcomes, while the countries do not count them towards their NDC targets. For example, any net transfers between the international linking between the ETSs in California and Quebec are currently not internationally accounted for by the United States and Canada. In these cases, emission reductions are not double claimed – only the country that has transferred a net amount of allowances to the other country would account for the emission reductions from such transfers, through its reported GHG emissions. This might be a simple and practical option for instances where only small amounts of mitigation outcomes are transferred between countries.

In summary, corresponding adjustments on the side of the transferring country may not be necessary if the mitigation outcomes are:

- ▶ generated outside the scope of the NDC target of the transferring country; or
- ▶ not used by the acquiring country to achieve its NDC target.

5.3 Should corresponding adjustments apply to emission reductions generated under Article 6.4?

In section 4.5 we discussed how ITMOs relate to emission reductions resulting from the Article 6.4 mechanism. Depending on the definition of the nature of ITMOs, emission reductions generated under the Article 6.4 mechanism could be:

- ▶ considered as ITMOs if they are (a) internationally transferred and (b) used by the acquiring country to achieve its NDC;
- ▶ considered as ITMOs if they are (a) internationally transferred, (b) used by the acquiring country to achieve its NDC, and (c) covered by the scope of the NDC of the transferring country;
- ▶ always considered as ITMOs; or
- ▶ never considered as ITMOs.

Under the first three options, the approaches for corresponding adjustments under Article 6.2 would automatically apply to emission reductions resulting from the Article 6.4 mechanism. Under the last option, a different set of accounting rules may apply.

Using the same set of accounting rules provides several advantages. It would be less complex. And importantly, the issues that have to be addressed, such as avoiding double counting, are the same for any type of international transfers, independent of whether the mitigation outcomes are generated under a UNFCCC mechanism with international oversight or under different governance arrangements. As the ultimate requirements are likely to be similar, the emerging rules are also likely to be similar.

A case for different accounting rules could be made if the scope of Article 6.2 and Article 6.4 were clearly different; for instance, if Article 6.2 only covered mitigation outcomes that fall within the scope of mitigation target of the transferring country and if Article 6.4 only addressed emission reductions not included in the scope of the mitigation targets. In this case, corresponding adjustments by the transferring country would only be applicable under Article 6.2 but not under Article 6.4. This, however, would limit the scope of both approaches.

5.4 How could double claiming with ICAO or IMO be avoided?

Under the UNFCCC and applicable IPCC Guidelines, the emissions from international aviation and maritime transport are usually reported by countries as memo items, but not included in their total national GHG emissions. The Paris Agreement does not explicitly refer to the emissions from international aviation and maritime transport. Since these emissions are clearly anthropogenic, they are implicitly included in the scope of Article 4.1 of the Paris Agreement. However, drawing upon the approach in the IPCC Guidelines for reporting of GHG inventories, most countries did not include these emissions in the scope of their NDCs. The EU is an exception: international aviation occurring within the scope of the EU ETS is included in the target under the UNFCCC (European Commission 2015). Under the current scope of the EU ETS, this includes all flights within the EU, but it has not yet been decided what the scope will be in 2030. Some other Parties, such as Switzerland, have not included emissions from international aviation and maritime transport in their NDCs but explicitly support their inclusion on the basis of future internationally agreed rules applicable to all Parties.

Efforts are underway – though at different paces – to address emissions from international aviation and maritime transport under the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO). At its 39th assembly in October 2016, the ICAO adopted the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). The scheme allows the use of emission units generated from mechanisms established under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement for offsetting the CO₂ emission growth beyond 2020, provided that „they align with future decisions, including on avoiding double counting“. IMO may also pursue offsetting emissions from international maritime transport in the longer term.

Double claiming of emission reductions could occur if an airline under ICAO (or a shipping company under IMO) used a mitigation outcome that is also used by a Party to achieve its NDCs. This can occur if the mitigation outcome falls within the scope of the NDC of the transferring country and if the transfer and use under ICAO or IMO were not reflected appropriately through a corresponding adjustment by the transferring country.

Corresponding adjustments to avoid double claiming between mitigation targets in NDCs and obligations under ICAO or IMO could be implemented in a similar way to corresponding adjustments for international transfers between countries: countries transferring mitigation outcomes for use under ICAO or IMO would need to add a corresponding adjustment to their reported progress, or subtract a corresponding adjustment from their emissions budget. Such adjustments would only be necessary if the mitigation outcome falls within the scope of the countries' NDC.

An important practical and legal question is whether the Paris Agreement includes elements that provide interpretation on avoiding double counting with ICAO and IMO. Article 6.2 applies to mitigation outcomes that are used by Parties to achieve NDCs; this raises the question of whether the article is applicable to any transfers for the purpose of offsetting emissions from international aviation or maritime transport. Article 4.13 requires countries to ensure the avoidance of double counting in the context of accounting for their NDCs. This provision could be interpreted to be broader in applicability, as to mean avoiding double counting between the countries' NDC and mitigation actions by other countries or under other international treaties. This interpretation may also be supported by the fact that the scope and objective of the Paris Agreement includes all anthropogenic emissions including those from international aviation and maritime transport.

The challenge of avoiding double claiming between UNFCCC and ICAO or IMO applies not only to the Paris Agreement but also to the Kyoto Protocol, should units generated under the Kyoto Protocol be used under ICAO or IMO. For example, emission reduction units (ERUs) from Joint Implementation (JI) may need to be cancelled or retired in specific accounts when used for compliance under ICAO or IMO, to avoid double claiming with targets of Annex I countries with a commitment inscribed in Annex B of the Kyoto Protocol. A practical challenge is that effectively avoiding double claiming requires coordination between different regimes: the UNFCCC and ICAO, and the UNFCCC and IMO.

5.5 How can the diversity of NDCs generally be addressed?

In introducing the two approaches for corresponding adjustments in Figure 1 and Figure 2 above, we have made several assumptions with regard to how NDC targets are formulated. In practice, the mitigation targets or actions communicated in NDCs are rather diverse (Graichen et al. 2016). This diversity poses considerable challenges for accounting for ITMOs (Hood et al. 2014). Generally speaking, the diversity of NDC targets can be addressed in two broad ways to enable robust accounting for international transfers:

- ▶ **Ensuring compatibility of NDC targets:** Accounting for international transfers is greatly facilitated if the NDC targets of the countries involved are expressed in similar ways. Compatibility of NDC targets could be achieved in different ways: first, a country could decide to convert (part of) its NDC target in a way that it becomes compatible with the NDC target of a country with which it wishes to engage in cooperative approaches. A group of countries could also agree to formulate their NDC targets in a consistent way, in order to facilitate robust accounting of international transfers among them. Second, international guidance under Article 6.2 could require a certain level of compatibility to ensure robust accounting, e.g. by establishing eligibility criteria for participation in international market mechanisms or by requiring that certain elements (e.g. GWP values) need to be common between countries engaging in an international transfer (Kreibich and Hermwille 2016). Third, international rules under Article 4, in particular with regard to transparency, clarity and understanding of NDCs, or further clarification of NDC targets as part of regular reporting under Article 13.7, could help to clarify the scope of NDC targets. And fourth, international rules might facilitate that NDC targets have common elements from the onset, such as common time frames, as envisaged under Article 4.10, or common metrics, as envisaged under paragraph 31(a) of decision 1/CP.21.
- ▶ **Conversion of corresponding adjustments:** If the mitigation targets or actions of two countries involved in cooperative approaches are not expressed in the same way, the corresponding adjustments (or mitigation outcome) could be appropriately converted.

Which approach is more suitable, may depend on the context. Ensuring compatibility of NDC targets makes accounting for ITMOs simpler and provides more certainty that double claiming is effectively avoided and environmental integrity is not undermined. Conversion of corresponding adjustments is more complex and involves a higher uncertainty with regard to the environmental outcome, but allows NDC targets to be more diverse, which may facilitate participation in Article 6. In the next sections, we explore how the diversity of NDC targets could be addressed when implementing corresponding adjustments.

5.6 How could the use of different GWP values in first NDCs be addressed?

In Figure 1 and Figure 2 in section 5.1 above, we assumed that the two countries apply the same GWP values. The scientific understanding of the GWP of gases has advanced over time and the GWP values depend on the current concentrations of these gases in the atmosphere. Therefore, GWP values are updated in each IPCC assessment report, sometimes leading to significant revisions compared to previous estimates. In their first NDCs, countries use different sets of GWP values, including from the 2nd, 4th and 5th IPCC assessment reports, to account for their mitigation targets (Graichen et al. 2016).

Paragraph 31(a) of decision 1/CP.21 establishes that the guidance for accounting for Parties' NDCs under Article 4.13 should ensure that Parties account for emissions and removals in accordance with „common metrics assessed by the IPCC“. This provision points to the use of a common set of GWP values under the Paris Agreement. However, according to paragraph 32 of decision 1/CP.21, the guidance under Article 4.13 „shall“ only be applied to second and subsequent NDCs, and countries „may elect to“ apply it to their first NDC.

The use of different GWP values in first NDCs exacerbates robust accounting for ITMOs, as illustrated by the following example: Assume a transferring country that uses a GWP of 28 for CH₄, as included in the 5th IPCC assessment report, to account for its NDC. The country transfers a mitigation outcome of 100 t CH₄ from an emission reduction project under a crediting programme to an acquiring country, which uses a GWP of 21 for CH₄, as included in the 2nd IPCC assessment report.

To transfer the mitigation outcome, the transferring country converts it into t CO₂e, using its own GWP value of 28, resulting in an amount of 2,800 t CO₂e (100 times 28). The transferring country applies a corresponding adjustment and adds this amount to its reported emissions. If the acquiring country applied the same corresponding adjustment and subtracted 2,800 t CO₂e from its reported emissions, the aggregated emissions from both countries could change. The subtraction of 2,800 t CO₂e could, for example, allow the acquiring country to emit 133 t CH₄ more (2800 divided by 21), which would result in an aggregated net increase of emissions from both countries by 33 t CH₄.

Transferring mitigation outcomes under different GWP values of the countries involved could lead to both higher or lower aggregated emissions compared to achieving emission reductions domestically. The impact depends on the GWP values applied and how the acquiring country uses the mitigation outcomes.

To avoid increases or decreases of aggregated emissions due to such transfers, an appropriate conversion of corresponding adjustments could be explored. Under this approach, each country would apply a different value of corresponding adjustments to the same international transfer, consistent with its GWP values. In the example above, the transferring country would calculate a corresponding adjustment of 2,800 t CO₂e (100 times 28), whereas the acquiring country would apply a corresponding adjustment of 2,100 t CO₂e (100 times 21). In other words, the value of the corresponding adjustments is converted to reflect the differences in GWP values. This provision would ensure that the transferred mitigation outcome has the same emissions impact if the acquiring country would take the same type of mitigation action, i.e. if it reduced the same gases domestically instead of acquiring the ITMO. It could thus be argued that the adjustments would better „correspond“, though the values applied are different.

Using different corresponding adjustment values might be feasible in instances where the exact composition of GHGs of the transferred mitigation outcomes is known, such as in the case of emission reductions from a project capturing and using landfill gas for electricity generation. This is, however, not always the case. Many ETSs do not only address CO₂ emissions but also other GHGs. The European Union (EU) ETS includes, for example, N₂O emissions from nitric and adipic acid production.

If the EU ETS were linked to an ETS in another country, and if the two jurisdictions wished to account for the net transfer of allowances towards achieving their NDCs under the Paris Agreement, they would need to apply corresponding adjustments. ETS allowances, however, represent a permit to emit and do not correspond to specific emission reductions. For each allowance transferred, a t CO₂e of emissions is reduced in the transferring jurisdiction, because the overall amount of allowances available to the entities in that jurisdiction is lowered. However, the exact emission source and GHGs reduced are not known; the emission reductions could include CO₂ or non-CO₂ gases. Without identifying the composition of GHGs of the mitigation outcome, however, the application of two different adjustment values is not possible. Similar practical challenges could arise from crediting programmes, which sometimes use simple default emission factors that include different GHGs from different sources.

For both international linking of ETSs and international crediting programs, simplified estimates of the approximate composition of GHGs could be a practical – though less accurate – approach. For example, the average composition of GHGs in reported emissions under ETSs could be used as a proxy for the emission reductions induced through international transfers of ETS allowances.

Alternatively, all countries or a group of countries engaging in international transfers could agree to use common GWP values for accounting international transfers under first NDCs. This would avoid any indirect effects on aggregated emissions that may result from the transfer of mitigation outcomes under different national GWP values. This approach is thus significantly less complex and would considerably facilitate accounting for international transfers, but requires coordination and international agreement on which GWP values should be applied, and possibly an update of NDCs, which is politically challenging.

Finally, Parties could also decide to neglect this effect in the context of first NDCs. Given that the aggregated mitigation outcome could increase or decrease as a result of different GWP values, it could be argued that the aggregated effect from all transfers may balance to some degree and might thus not be very significant. In this case, a simple approach could be that the GWP values of the transferring country are used to determine the CO₂e of a mitigation outcome.

In summary, this accounting challenge could be addressed in several ways:

- ▶ **Common GWP values for all countries:** Parties could internationally agree to apply a consistent set of GWP values to mitigation targets over time, for instance, to apply the latest 100-year GWP values from the 5th IPCC assessment report to targets in the period of 2021 to 2030.
- ▶ **Common GWP values for the countries involved in a cooperative approach:** A group of countries wishing to engage in international transfers could agree among themselves to use the same GWP values to account for their NDCs. Parties could also internationally agree, e.g. as part of guidance under Article 6.2, that two countries engaging in a cooperative approach should apply the same GWP values to account for their NDCs. This may require some countries to update their NDCs.
- ▶ **Conversion of corresponding adjustments:** The guidance under Article 6.2 could allow countries to convert the corresponding adjustments to reflect differences in GWP values, possibly using simplifications to estimate the composition of GHGs from mitigation outcomes transferred.
- ▶ **Application of the GWP values of the transferring country:** The guidance under Article 6.2 could specify that the GWP values of the transferring country be applied to convert mitigation outcomes into t CO₂e. This would neglect the effect that use of such outcomes by a country with different GWP values could lead to higher or lower aggregated GHG emissions.

The first option would be the simplest and would facilitate implementing cooperative approaches under Article 6.2. It would ensure compatibility of NDCs from the onset. It may also facilitate comparability of GHG mitigation targets and accounting for NDCs under the Paris Agreement. Conversion of corresponding adjustments faces practical challenges and is more complex and less accurate, but could be another option for addressing different GWP values communicated in first NDCs.

5.7 How could corresponding adjustments be applied to intensity and relative targets?

While a number of countries have communicated absolute GHG emission targets in their first NDCs, most countries have established „relative targets“ or „intensity targets“. Relative targets establish a reduction of emissions in relation to a future hypothetical BAU scenario. For example, Vietnam communicated a deviation of 8 % from its BAU emissions in 2030 as an unconditional target in their NDC. Intensity targets relate an emissions level to an indicator, such as GHG emissions per unit of GDP. For example, China sets out, in its NDC, its intention to lower carbon dioxide intensity (carbon dioxide emissions per unit of GDP) by 60 to 65 % from the 2005 level.

In the case of a relative or intensity target, a key question is when the absolute GHG emissions level of the target is determined:

- ▶ **Ex-ante determination:** Most NDCs include an ex-ante projection of future BAU emissions or, the indicators used to establish intensity targets, such as the GDP development. This ex-ante projection could be used to quantify an absolute emissions level *ex-ante*, when communicating the NDC. In this case, the BAU emissions projection would not be updated at a later stage.
- ▶ **Ex-post determination:** Countries could also determine the absolute emissions level of the target *ex-post*, after the target year or period, based on the observed development of relevant indicators or developments. For example, an intensity target based on GDP could be converted ex-post into an absolute GHG target, taking into account the actual GDP development (Kreibich and Obergassel 2016).

Once an absolute emissions level of the target has been determined, corresponding adjustments could be applied to this absolute level. When the absolute emission levels of relative or intensity targets are determined therefore has implications on the timing of corresponding adjustments.

Many of the NDCs communicated so far have not specified whether their relative or intensity targets are fixed ex-ante or will be updated ex-post. For intensity targets, determining the absolute target level ex-post may be reasonable, as the target has been set in relation to an indicator that typically drives GHG emissions. The conversion of such an intensity GHG target into an absolute emission reduction would require accurate and up-to-date information on the country's GDP development.

Indicators, such as GDP, are usually readily available and are determined using well-established methods. Information to track progress towards achieving the target under Article 13.7 would thus also include information on the GDP, which may then also be subject to the international expert review under Article 13.11.

For relative targets, updating the BAU emissions projection could be methodologically challenging. BAU emission scenarios are rather uncertain and often represent a range rather than a single value, depending on the assumptions used to derive these estimates. Determining BAU emission levels ex-post is even more hypothetical and relies strongly on assumptions as to which policies would have been implemented in the past without the NDC target and which not. If BAU emissions levels were updated ex-post, after the target year, there would also not be clarity and transparency on future GHG emission pathways, which may be important when assessing the achievement of the long-term goals of the Paris Agreement in the context of the global stocktakes. Updating BAU emission projections ex-post could also be an avenue for countries to adjust mitigation targets ex-post if they did not manage to achieve them.

5.8 How could corresponding adjustments be applied under non-GHG mitigation targets?

Many NDCs include a GHG target, often in combination with other non-GHG mitigation targets. A number of countries, however, communicated *only* non-GHG mitigation targets in their NDCs, such as energy efficiency or renewable energy targets. 18 NDCs covering about 2 % of global GHG emissions do not include a GHG target, but only non-GHG mitigation targets. Applying corresponding adjustments for international transfers involving countries with non-GHG targets is a particular accounting challenge.

A first challenge is that transfers in non-GHG metrics, such as MWh of renewable electricity, do not necessarily have the same GHG emissions impact in the two countries involved in the transfer: producing one MWh of electricity in country A may generate a larger or smaller mitigation outcome than producing a MWh in country B, depending on the composition of the power plants in the electricity grids. A transfer of one MWh may thus lead to different mitigation outcomes in the two countries involved (see section 4.1). Such transfers could thus alter the aggregated GHG emissions outcome, compared to the situation in which the transfer would not take place.

A second challenge arises if the two countries involved use different metrics for their mitigation targets. Assume, for example, a transferring country which communicated only a non-GHG mitigation target to expand its renewable power generation capacity and an acquiring country with a GHG target. Assume further that the acquiring country funds a new wind power plant and purchases emission reductions credits generated by that plant. The acquiring country also accounts the credits as ITMOs, expressed in t CO₂e, towards its NDC.

Without applying corresponding adjustments on the side of the transferring country, the emission reductions resulting from the renewable energy target would be double counted. The aggregated global GHG emissions outcome would be lower, compared to the situation that the transfer would not take place. Not applying corresponding adjustments in the case of non-GHG targets could also provide disincentives for countries to move over time towards GHG targets, as envisaged under Article 4.4 of the Paris Agreement. Transferring countries could formulate non-GHG targets rather than GHG targets, in order not to be subject to rules to avoid double counting.

However, if the two countries involved in a transfer have targets in different metrics, corresponding adjustments cannot be applied in the same metric. In principle, this issue could be addressed by the following two options:

- ▶ **Conversion of non-GHG mitigation targets:** Any non-GHG mitigation targets could be converted into corresponding GHG emission targets. This would enable both countries to make a corresponding adjustment in t CO₂e. It may require updating the NDC or providing additional information how already communicated targets are converted in their metrics.
- ▶ **Conversion of corresponding adjustments:** The two countries could convert the corresponding adjustments so that they are consistent with the metrics of their mitigation targets and, at the same time, correspond to the same mitigation outcome.

It could be argued that the first option is supported by paragraph 36 of decision 1/CP.21, because the corresponding adjustments should be applied to „emissions“ or „removals“, and not to other metrics. In this regard, international guidance under Article 6.2 could specify that countries should express or convert their non-GHG mitigation targets in GHG metrics if they wish to engage in international transfers for mitigation outcomes that are generated within the scope of their NDCs.

The second option is illustrated in Figure 3 below. We assume in the figure that country A has a mitigation target to expand its renewable power capacity to 100 MW. The country wishes to transfer the mitigation outcome from a 20 MW wind power plant to country B, through a bilateral crediting mechanism. Country B purchases a corresponding amount of credits generated by the 20 MW wind power plant. The amount of credits is calculated in a way that is consistent with recognized standards, e.g. by monitoring the amount of electricity generation from the plant and multiplying it with a grid emission factor of country A. The emission reductions may vary from year to year, subject to the level of wind power generation and changes in the grid emission factor. Country B has an absolute GHG emissions target and wishes to account for the mitigation towards achieving its target.

To accommodate the different metrics of mitigation targets, the two countries could apply a pair of corresponding adjustments, expressed in different metrics, but implying the same mitigation outcome. For instance, country A could subtract 20 MW from its reported level of installed renewable power capacity and country B could subtract a corresponding amount of emission reductions from its reported emissions. The two adjustments by the transferring and the acquiring country would „correspond“ to the same mitigation outcome, although two different metrics are used. To ensure robust accounting under this option, adequate methods and approaches to convert mitigation outcomes are important.

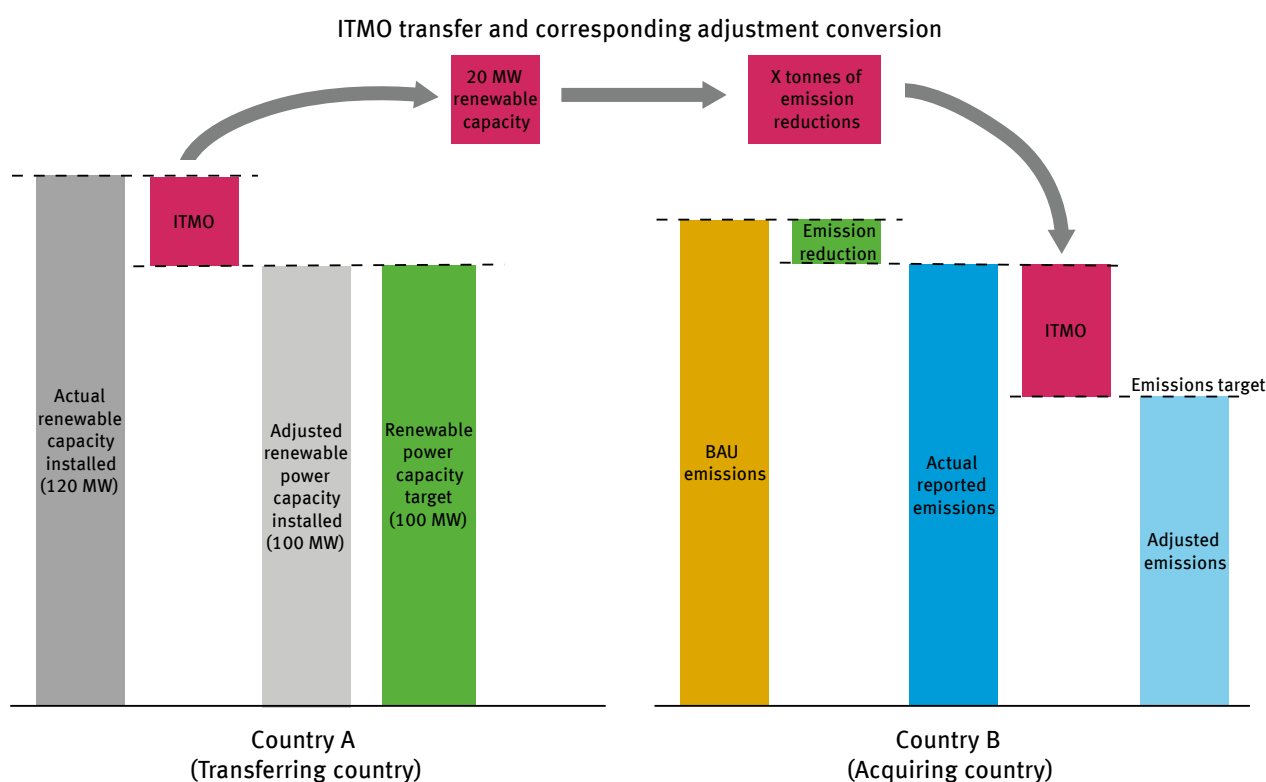


Figure 3: Application of corresponding adjustments for an international transfer between a country with a renewable power target and a country with a GHG emissions target

5.9 How could corresponding adjustments be applied under overlapping multiple targets?

Many countries have communicated multiple targets in their first NDCs. Most of them complement GHG emission targets with targets in other metrics, such as renewable energy or energy efficiency targets. In many instances, the scope of the targets overlaps, in particular when an economy-wide GHG target is combined with non-GHG targets for specific sectors or measures. This raises the question of how corresponding adjustments should be applied under overlapping multiple targets. Different approaches are possible:

1. **Accounting for GHG targets only:** For the purpose of accounting for ITMOs, only the GHG target is considered. The GHG target would thus be considered as the primary target, and corresponding adjustments would only be applied to the GHG target. Implications of international transfers on the achievement of other target types would not be accounted for.

Accounting for all relevant targets: Corresponding adjustments are applied to all targets that are *relevant* for the transfer. For example, if credits are issued and transferred for the emission reductions from a wind power plant in a host country that has a renewable energy target and a GHG emissions target, a corresponding adjustment could be applied to both the renewable energy target (e.g. as MW installed capacity) and to the GHG target (as t CO₂e achieved from the wind power plant).

2. **Accounting for the most stringent target:** Corresponding adjustments could be applied to the target type that is most stringent, i.e. that corresponds to the lowest GHG emissions level.

The three approaches could have different global GHG emissions implications. Ideally, GHG targets reflect the implications of overlapping non-GHG targets. For example, in setting an economy-wide GHG target, a country could consider the GHG emissions impact of a renewable energy target, so that the two targets are congruent. In practice, the GHG emission outcome of different target types could differ. The Climate Action Tracker (2017) evaluates the GHG emissions levels of different target types communicated in NDCs, including for all G20 countries. The evaluation shows that, in some instances, different target types imply rather different emission levels. The NDC of India, for example, includes three target types: (a) to reduce the emissions intensity of GDP by 33 %–35 % by 2030 below 2005 levels, (b) to increase the share of non-fossil based energy resources to 40 % of installed electric power capacity by 2030, and (c) to create an additional (cumulative) carbon sink of 2.5–3 Gt CO₂e through additional forest and tree cover by 2030. Climate Action Tracker (2017) estimates that the GHG intensity target could result in an emissions level of 5.9–6 Gt CO₂e by 2030, whereas the target for non-fossil based energy resources is estimated to result in an emissions level of 5.2–5.3 Gt CO₂e by 2030. In this case, the non-GHG target would thus lead to a lower level of emissions than the GHG target.

If corresponding adjustments were applied to both targets, the transferring country would need to ensure that it overachieves both targets by the amount of mitigation outcomes that are internationally transferred. In the above example of crediting the emission reductions from a wind power plant, the transferring country would need to ensure that its GHG emissions exceed the GHG target by the amount of credits transferred and that the share of non-fossil based energy resources exceeds the target by the amount of renewable energy generation subject to crediting and international transfers of mitigation outcome. In the case of India, the non-GHG target is more stringent. Applying corresponding adjustments to both targets would therefore imply that the GHG emissions are lowered beyond the emissions level of the non-GHG target. If corresponding adjustments were only applied to the GHG target, the country could use the transferred mitigation outcomes to achieve its non-GHG target, rather than overachieving it. In this case, aggregated global GHG emissions would be higher than if the transfer would not have taken place. Accounting for the international transfer only with regard to the GHG target would thus undermine environmental integrity in this situation.

Accounting for international transfers for all types of NDC targets would also help to better understand the global GHG emissions impact of all targets aggregately, which is important for the regular global stock take. If mitigation outcomes are only accounted for by some countries, projections of global aggregated GHG emissions under current targets could be underestimated. In the above example of a wind power plant in India, for example, the country could appear to achieve its non-GHG NDC target, whereas the emission reductions are also claimed by another country towards achieving its NDC target.

However, accounting for ITMOs in the context of non-GHG targets raises practical challenges and is not always possible. In the example of crediting emission reductions from wind power generation, the transferred mitigation outcomes are clearly attributable to a specific action. This is not necessarily the case for all types of international transfers. In the case of international linking of ETSs, the transfer of allowances between countries cannot be attributed to a specific mitigation action. Applying corresponding adjustments to any non-GHG targets would be difficult in such instances.

5.10 How should double claiming be avoided under conditional NDCs?

Many countries have communicated NDCs that are conditional on support from other countries. Targets may be partially or entirely conditional on climate finance, access to international market mechanisms, technology transfer or capacity building. If corresponding adjustments are made to emission budgets, they could be applied to either to the unconditional or conditional target level, which has different consequences for the aggregated mitigation outcome from both countries.

The conditionality of NDC targets is not formally acknowledged in the Paris Agreement, which poses challenges for how to reconcile conditional targets with the Agreement's various proscriptions on double counting (Schneider et al. 2017).

Specifically, if countries agree to internationally transfer mitigation outcomes that are within the scope of a conditional mitigation target, the same mitigation outcome may then be counted towards meeting the conditional pledge of the transferring country and at the same time towards meeting the pledge of the acquiring country. This constitutes double claiming and leads to a weakening of overall ambition, compared to the situation that the conditional target is achieved through climate finance, which goes against the purpose of the cooperative approaches (Article 6.1).

A solution for this dilemma might be to use *domestic* market mechanisms to achieve conditional NDCs, funded by international climate finance, and to refrain from transferring mitigation outcomes from within the conditional NDC target.

5.11 How could NDCs with target ranges be accounted for?

NDCs with target ranges provide an additional challenge to ensuring robust accounting of international transfers. For example, China has communicated an NDC target to reduce its carbon dioxide emissions per unit of GDP by 60 to 65 % from 2005 levels. However, no conditions have been specified for when the upper or lower threshold will apply. Given this uncertainty, there is a danger that emission reductions could be double counted if emission reductions within this range are both internationally transferred and also counted towards the achievement of the country's NDC. In order to address this, countries which communicated NDCs with target ranges could clarify how the two levels should be applied for the purpose of accounting for international transfers under Article 6.

Accounting for international transfers could be implemented in two ways for NDCs with target ranges:

- 1. Application of the more stringent target range to net transfers, and the less stringent target range to net acquisitions:** Only emission reductions exceeding the more stringent target range could be internationally transferred, with no transfer of emission reductions within the target range itself, whereas the country would acquire international transfers (or increase domestic efforts) if its emission reductions fall short of the less stringent target range.
- 2. Clarifying the range applicable to international transfers:** Alternatively, the country could specify which level applies to international transfers. This could be the upper or the lower end of the range, or a new value within the range could be defined. International transfers and corresponding adjustments would then be accounted against this defined level.

Regardless of the option implemented, increasing the clarity of NDC targets will be vital to ensure robust accounting for international transfers.

5.12 Should corresponding adjustments be applied to NDCs with actions?

Most NDCs include quantitative mitigation targets. However, some NDCs, in particular those of LDCs, only include non-quantitative actions, such as a general objective of promoting renewable energy. 14 countries, representing less than 2 % of global GHG emissions, have communicated only actions and no quantitative emissions target, with Saudi-Arabia being the largest economy among these countries. In addition, a number of countries have communicated actions in sectors that are not covered by their quantitative target.

A first important question is whether transferring ITMOs from sectors that are only subject to actions poses a risk of double claiming. It could be argued that actions – though not quantified – form part of the mitigation efforts that countries undertake to contribute to the long-term goal. To understand the global mitigation effort and achievement of long-term goals, these efforts should not be counted twice. If global emission projections for the year 2030 included such actions while not accounting for any international transfers, they could underestimate the aggregated mitigation efforts by countries. On the other hand, it could be argued that double claiming can only occur when countries have quantified targets and that non-quantified actions are thus not relevant for accounting purposes. Practically, accounting for international transfers is not possible without quantifying mitigation targets. An accounting balance which involves international transfers requires measured progress to be compared with a target level, while adding or subtracting international transfers.

To address this issue, countries could be required to convert their actions into quantitative (GHG) targets in order to participate in international transfers under Article 6. This would enable the application of corresponding adjustments and the establishment of an accounting balance.

An alternative, less stringent approach could be applying corresponding adjustments for reporting purposes only. The transferring country could add, for any transferred mitigation outcome, an equivalent amount of t CO₂e to its reported emissions. This would provide transparency with regard to how many ITMOs a country intends to transfer or has transferred, and thus facilitate understanding of the global aggregated emissions outcome. However, such corresponding adjustments would not address double claiming as the transferring country does not have a mitigation target and would thus not establish an accounting balance.

5.13 How could updates of NDCs be considered?

According to Article 4.9 of the Paris Agreement, Parties need to communicate an NDC every five years. Additionally, Article 4.11 states that „a Party may at any time adjust its existing NDC with a view to enhancing its level of ambition“. A new NDC or an adjustment of an NDC could involve a change of existing NDCs targets as well as the communication of a new target for a future year or period. Both cases could, in some instances, pose challenges for the country in order to avoid double counting:

- ▶ **Change of scope:** According to paragraph 31(c) of decision 1/CP.21, any activity, source or sink once included in an NDC should continue to be included from then on. In other words, a change of scope can only increase the coverage of an NDC. Enhancing the scope could pose challenges for the country in cases in which emission reductions outside of the original scope of the NDC are transferred to another Party. If that emission source is included in the new scope, the transferring country has to apply corresponding adjustments for any transferred mitigation outcomes that occur after the scope extension has become effective.
- ▶ **Raising the ambition of the target:** A country may decide to raise the ambition of its target by contributing a higher emission reduction without changing other parts of the NDC. If the country has already engaged in or committed to international transfers, it could make it more difficult to achieve the target.
- ▶ **Adjustment of BAU projections:** In cases of relative targets expressed against a BAU projection, Parties might decide to update their projection based on the real development of certain parameters (see section 5.7). As long as corresponding adjustments are applied appropriately this would not lead to double counting. Countries might face a challenge, though, with regard to achieving their NDC target in cases in which the new BAU emissions level is lower than the original one, because already transferred reductions were based on the assumption of a higher deviation from BAU.
- ▶ **Change of target type:** A change of the target type could simplify the application of corresponding adjustments, if the change is from a non-GHG type to a GHG type or from intensity or relative targets to absolute targets. It could exacerbate the application of corresponding adjustments if non-GHG metrics were introduced or a relative or intensity target was introduced. A change of the target type could also mean a change in the ambition of the target level.

- ▶ **Change of target year or period:** International alignment of target time frames, and moving from single-year targets to multi-year targets, would facilitate accounting for international transfers (see section 6). A new future target year would not have implications for targets of previous years.
- ▶ **Clarifications of NDCs:** In some cases, NDCs are not entirely clear with respect to their coverage, target or target type. In other cases, NDCs already state that some issues have not yet been resolved and will be clarified at a later date (e.g. the treatment of LULUCF by the EU). If a Party clarifies its NDC, accounting implications may have to be assessed for already transferred mitigation outcomes. For example, if an activity was assumed to be outside of the scope of an NDC target, it will be necessary to apply corresponding adjustments if the clarification shows that the activity is part of the contribution.

6 Accounting for the vintage of mitigation outcomes and the time frame of mitigation targets

The time frame of mitigation targets – i.e. the year or period in which emissions are accounted for – is a critical issue when accounting for internationally transferred mitigation outcomes. Under the Paris Agreement, many NDCs only specify mitigation targets for single years, such as 2025 or 2030. This poses several accounting challenges, in particular if countries intend to engage in international transfers of mitigation outcomes (Hood et al. 2014; Lazarus et al. 2014; Prag et al. 2013; World Resources Institute 2014). If transferred mitigation outcomes occur in a different time period than the year or period in which they are used to achieve a mitigation target, cumulative global GHG emissions could increase, even if the transferred mitigation outcomes have environmental integrity.

Appropriately accounting for the vintage of mitigation outcomes in relation to the time frame of mitigation targets is a complex issue. In the following, we approach this issue in several steps: we first provide an overview of the time frame of mitigation targets under the Kyoto Protocol and the Paris Agreement (section 6.1), followed by a brief discussion of the general challenges with mitigation targets for single years, without considering international transfers of mitigation outcomes (section 6.2). We then describe the challenges when accounting for international transfers under different target time frames and assess how and under which circumstances cumulative GHG emissions could increase as a result of international transfers (section 6.3). Based on this analysis, we identify and discuss options for accounting for the vintage of mitigation outcomes in relation to the time frame of mitigation targets (section 6.4).

6.1 Time frame of targets under the Kyoto Protocol and the Paris Agreement

Under the Kyoto Protocol, all countries with commitments inscribed in Annex B have mitigation targets for the same defined multi-year commitment periods. The commitment periods are continuous, the first lasting from 2008 to 2012 and the second from 2013 to 2020. For each commitment period, targets are expressed as an absolute GHG emissions budget for the entire commitment period. Countries with commitments inscribed in Annex B have to report annually their GHG emissions as well as the information on the issuance, transfer and use of units. After the end of each commitment period, an accounting balance is established to compare the reported GHG emissions with the emissions budget, while accounting for international transfers of units and for land-use, land-use change and forestry (LULUCF).

Under the Paris Agreement, countries communicated in their first NDCs mitigation targets for a variety of time frames. Most NDCs include only targets for single years: 106 countries, representing about 70 % of global GHG emissions, communicated a single-year target for the year 2030, 11 communicated targets for another single year (e.g. 2025), and another 11 communicated targets for several single years, such as 2025 and 2030 (Graiichen et al. 2016). A number of these countries indicated that their target is applicable to a target period and some countries explicitly say that a multi-year target will be derived, though it has not yet been quantified. The periods of multi-year targets also vary: several countries have a period from 2021 to 2030, but some countries use other time frames. For example, Armenia establishes an absolute emissions budget of 633 million t CO₂e for the period of 2015 to 2050. Most countries use calendar years, but Japan uses a fiscal year that starts on 1 April and ends on 31 March.

The variety of time frames is due to a lack of international agreement on the specific content and scope of INDCs in the run-up to COP21 in Paris. However, Article 4.10 of the Paris Agreement stipulates that the CMA „shall consider common time frames for NDCs at its first session“. This provision could facilitate common time frames of mitigation targets for subsequent NDCs, though it is yet unclear whether such time frames will include single-year and/or multi-year time frames.

6.2 General challenges with single-year targets

The time frame of mitigation targets is not only important when accounting for international transfers, but can have more general implications for the ambition and comparability of mitigation efforts. We distinguish between two main target types in this context: multi-year and single-year targets. Multi-year targets limit total cumulative emissions over a continuous period of years (e.g. from 2021 to 2030). In contrast, a single-year target represents a goal for the target only (e.g. 2030), with no accountability for the years prior to or in between single target years.

Single-year targets provide countries more flexibility as to when they reduce emissions. Under single-year targets, countries could reduce emissions early on or only shortly before the target year. For this reason, they could also be perceived as being less restrictive. Single-year targets might also be simpler to understand than multi-year targets, and might therefore be easier to communicate and agree upon in national approval processes.

An important challenge of single-year targets is that they provide less certainty in terms of cumulative emissions (Howard et al. 2017; Lazarus et al. 2014; Prag et al. 2013; World Resources Institute 2014). Countries could achieve a single-year target through different emissions pathways which imply different levels of cumulative emissions. This is a crucial difference to multi-year targets because what matters for mitigating climate change is how much is emitted as a whole: cumulative emissions (Lazarus et al. 2014). The impact that a country has on atmospheric GHG concentrations will be the accumulation of emissions over time, rather than emissions levels in a single year. Since emission levels can fluctuate significantly, a single year's emissions may not be representative (Prag et al. 2013). This challenge may be partially mitigated if the time interval between the target years is short.

A second challenge is that single-year targets pose greater risks for the country to achieve the target. First, temporary changes of emissions could occur due to unexpected economic changes or weather effects, such as the availability of water resources to generate hydro power (Lazarus et al. 2014; Prag et al. 2013; World Resources Institute 2014). For example, if hydro power generation is unusually low in the target year due to low precipitation, a country could miss its target in the single target year, although it is generally well on track towards achieving its target. Second, a risk with regard to achieving the target could arise if a country implements a multi-year mitigation policy, such as an ETS with a multi-year target period, but has a single-year international target. As entities under the ETS have flexibility when they reduce the emissions, it is not certain whether the emissions from entities will match the country's single target year. For example, if the entities reduce emissions more strongly in early years in order to emit higher levels in later years, the country may not achieve its single-year target. Lastly, countries with single-year targets could potentially also achieve emission reductions through one-off measures, such as temporary plant closures. These risks would be less relevant if countries do not intend to ensure that they achieve their NDC target but rather view their target as an approximate milestone.

Multi-year targets mitigate many of the risks and challenges of single-year targets. They mitigate the impact of unexpected economic changes or weather effects and allow multi-year climate policies to be aligned with the international target period. They would also address the potential risk that countries with single-year targets could achieve emission reductions through one-off measures in the target year, such as temporary plant closures. Multi-year targets also provide more ex-ante clarity about the expected emissions pathway and reveal whether cumulative emissions are limited sufficiently to meet temperature targets. They may also lead to transformed emissions pathways in which emissions continue to be reduced after the goal period, as opposed to with single-year goals, which may be met more easily without requiring necessary transformations in emission-intensive sectors (World Resources Institute 2014).

6.3 GHG emission implications of international transfers under different target time frames

In general, a mismatch in target time frames between countries poses significant challenges when they engage in international transfers. The global GHG emissions implications depend on (a) when the mitigation outcomes occur in the transferring country, (b) when they are used by the acquiring country, and (c) the target time frames (if any) of the countries involved (Figure 4). Numerous combinations are possible, as countries have communicated a variety of single- and multi-year targets or only actions, and as ITMOs could be generated and used in various time periods. ITMOs could originate from countries with single-year targets, multi-year targets or they could be generated for emission reductions that fall outside the scope of any targets. The mitigation outcomes could either occur during a target year or period, or before or between target years or periods. Similarly, the acquiring countries could use the ITMOs towards achieving single- or multi-year targets, or possibly also between or before target periods or years.

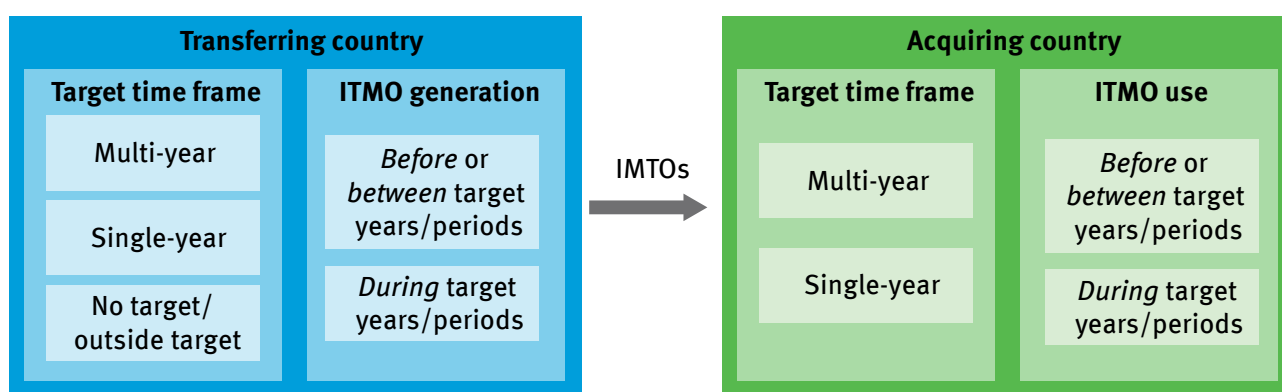


Figure 4: Time frame of mitigation targets, ITMO generation, and ITMO use

To identify and discuss critical challenges, we use a simple hypothetical representation of two countries A and B. For simplicity, we assume that both countries have the same emissions in 2010 and that both countries have economy-wide targets to stabilize their emissions at the 2010 level. We discuss the implications of a single-year target for 2030 (i.e. stabilizing emissions in the year 2030 at the 2010 level) and a multi-year target for the period of 2021 to 2030 (i.e. stabilizing average emissions over the period of 2021 to 2030 at the 2010 level). We assume that the countries intend, and have sufficient policy levers, to achieve their targets, and that their targets are well below what their BAU emissions would be in the target year or period without additional efforts. Achieving the mitigation targets thus requires the countries to implement further mitigation action. For simplicity, we also assume that the countries did not have any prior international mitigation targets under the Kyoto Protocol or the Cancun Agreements. We further assume that there are no issues with respect to the accuracy and completeness of GHG emissions reporting and that quality of the transferred mitigation outcomes.

We assume as a „reference scenario“ that the countries achieve their mitigation targets domestically, without engaging in international transfers of mitigation outcomes. We also assume that the countries achieve their mitigation targets in a linear fashion and not through temporary or one-off measures; while the countries' emissions in the period between the reference year (2010) and the target years (either 2021-2030 or only 2030) could, in principle, be higher or lower than their 2010 level, we assume in the reference scenario that both countries keep their emissions at a constant level throughout the period of 2010 to 2030.

Below we discuss the global GHG emissions implications of different scenarios for transferring mitigation outcomes from country A to country B.

6.3.1 Single-target years

In the first case, shown in Figure 5, both countries have a single-year target for 2030. Country A implements a market mechanism which reduces the country's emissions incrementally over the period of 2021 to 2030 (by the green area), beyond the emissions level it would achieve in the reference scenario (red line). Country A transfers these mitigation outcomes to country B, which uses them to achieve its single-year emissions target in 2030 (green area), by adding the transferred mitigation outcomes to its emissions budget (or subtracting them from its reported emissions).

The acquisition of ITMOs allows country B to achieve its mitigation targets more cost-effectively. The country thus implements less domestic mitigation action than in the reference scenario, which leads to a higher emissions path (black line).

Country B compensates the increase of its 2030 emissions above its target with the ITMOs created in country A from 2021 to 2030. But the ability to use all ITMOs in a single year enables country B to pursue a higher emissions path in the period up to 2030. This could thereby significantly increase the aggregated *cumulative* GHG emissions from both countries (by the grey area) since the transfer enables country B to increase its cumulative emissions to a larger extent than they are reduced in country A.

The extent to which cumulative GHG emissions increase depends on over how many years the emission reductions occur and as of when and how they affect the emissions pathways of both countries in pre-target years. In Figure 5, we assumed that both countries would start deviating from their emissions path in 2021 due to the transfer. Alternative pre-target year emission pathways would have different implications for aggregated GHG emissions. For example, if country B already starts deviating from its emissions path in 2015 without international transfers, cumulative GHG emissions would increase more.

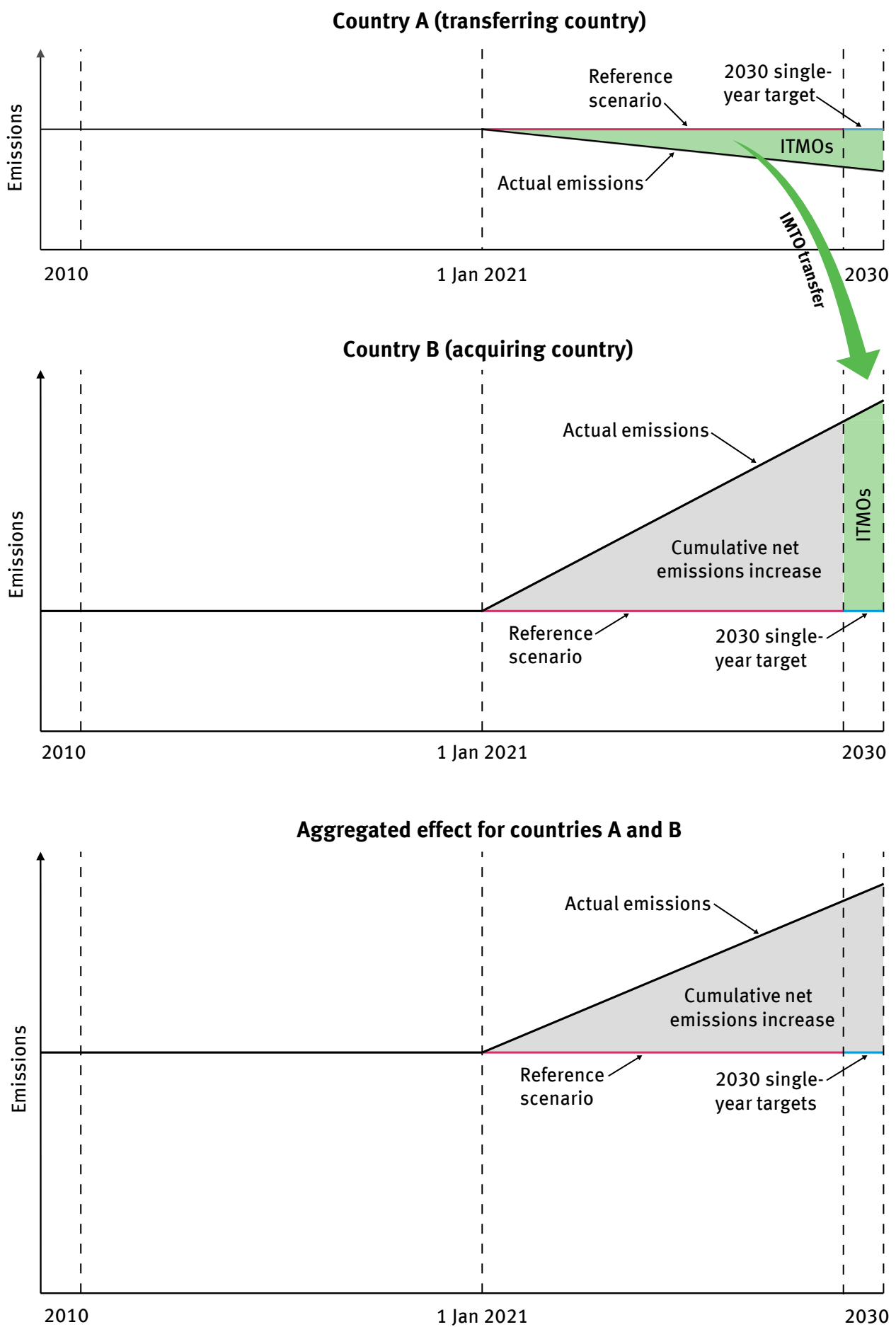


Figure 5: Using multi-year ITMOs towards a single-year target

In the second case, shown in Figure 6, the two countries have the same single-year targets, and country A generates the same amount of emission reductions through a market mechanism. In this case, however, the ITMOs are generated, transferred and accounted for in 2030 only. Country A transfers the mitigation outcomes occurring in 2030 to country B, which uses them to achieve its single-year target in 2030. Similar to the situation in the first case, the use of ITMOs enables country B to achieve its target more cost-effectively and to implement less domestic mitigation action, which leads to higher emissions in 2030. As in the first case, the ability to use ITMOs enables country B to pursue a higher emissions path in the period up to 2030, but only to the same or a similar extent to which country A engages in emission reductions in the period up to 2020. If both countries start deviating from their reference scenario (red line) at the same point in time and in a linear fashion, the cumulative aggregated emission outcomes of both countries would be the same as in the reference scenario.

Accounting for international transfers only in a common single target year could, in principle, thus address the risk that the transfer leads to higher aggregated cumulative emission pathways from both countries. However, aggregated cumulative emissions could still increase or decrease to some extent, depending on how and when each country deviates from its reference scenario. For example, if country A keeps its emissions constant until 2029, reduces emissions through one-off measures in 2030, and transfers ITMOs corresponding to the over-achievement to country B, aggregated cumulative GHG emissions could increase, since country B could increase its emissions in pre-target years, while country A would not reduce them. By contrast, if country A deviates from its emissions path without international transfers (black line) at an earlier point in time than country B, aggregated cumulative GHG emissions could decrease as a result of the transfer.

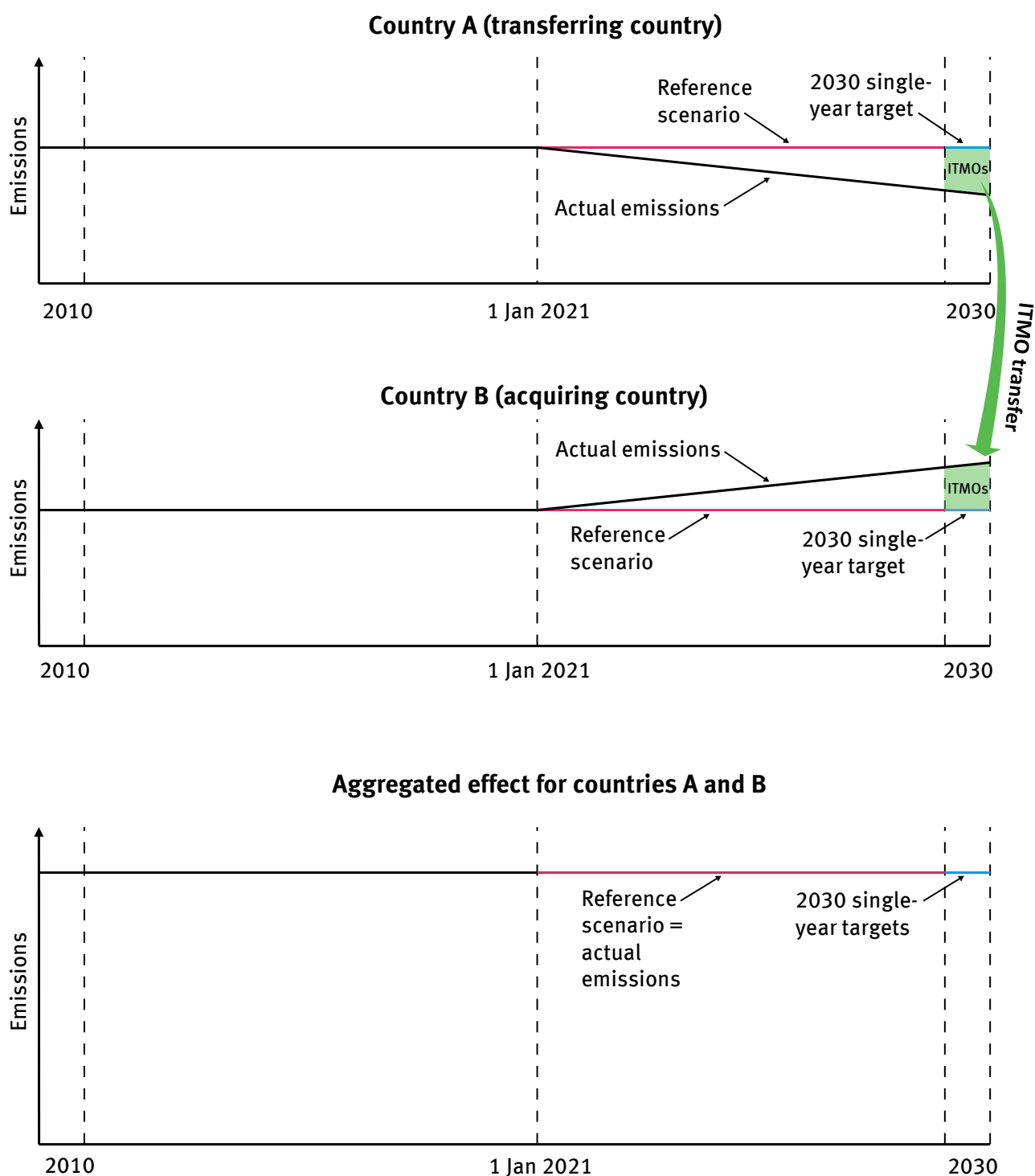


Figure 6: Using ITMOs towards single-year targets

6.3.2 Multi-year targets

We now turn to the situation in which both countries have multi-year targets for the period of 2021 to 2030 (Figure 7). In this case, the transfer of mitigation outcomes occurring within that period would not change the aggregated cumulative emissions of both countries during the period, regardless of the emission pathways of the two countries in that period. Figure 7 assumes the same linear decrease of emissions in country A as in the previous figures. For country B, the figure shows the same increase in emissions and, in addition, an alternative emissions pathway (dashed black line) that leads to the same cumulative emissions from country B. Whatever the distribution of mitigation outcomes across the period, the emissions increase in country B during the period is equal to the reduction in country A. Hence, the multi-year targets provide certainty that the aggregated cumulative emissions level of both countries is unaffected over the target period.

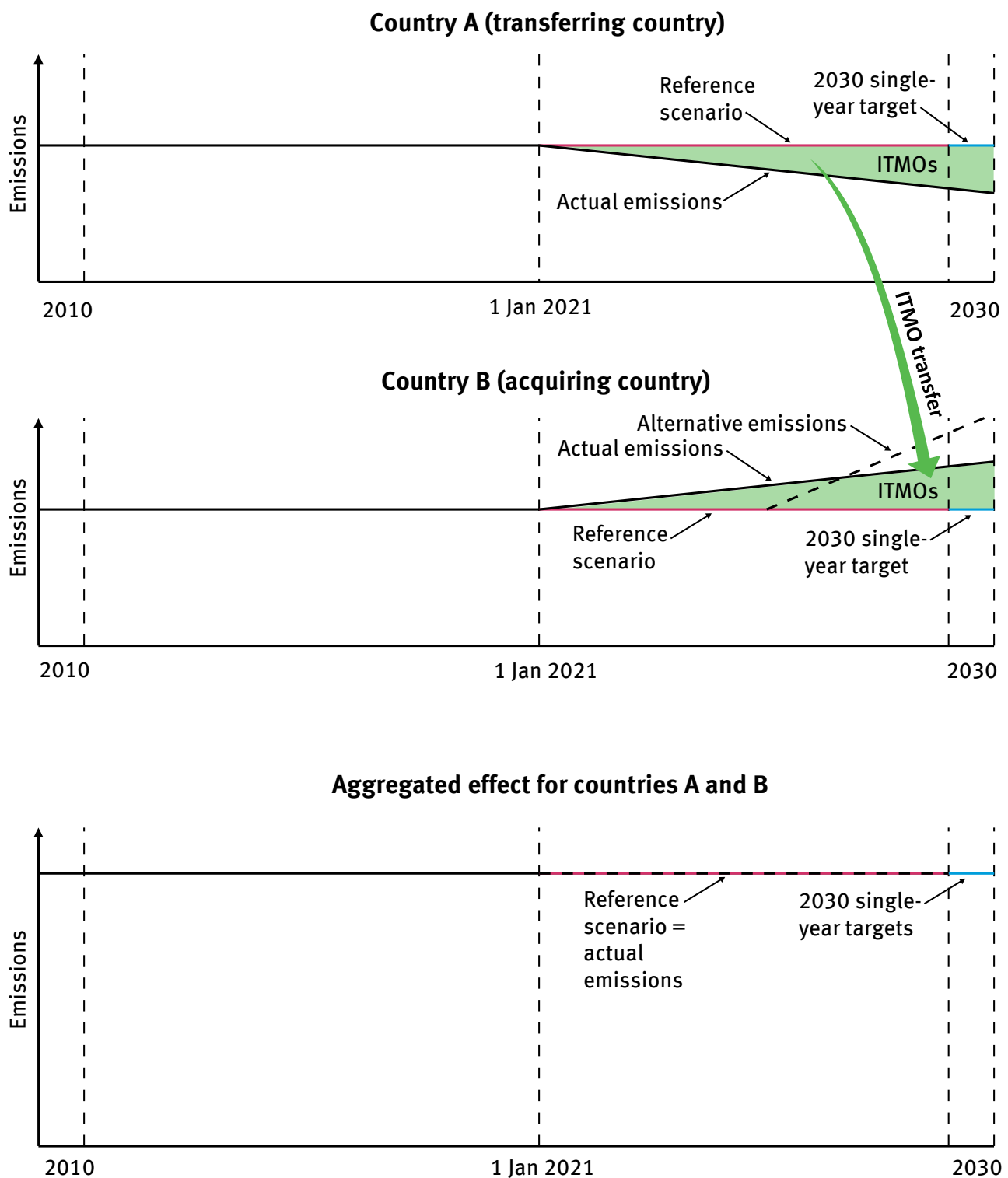


Figure 7: Accounting for the transfer of ITMOs under multi-year emissions targets

While common multi-year target periods provide certainty with regard to the GHG emissions outcome within the target period, international unit transfers could still have an impact on the pre-target emission levels – though to a much lesser degree than for single-year targets. In Figure 8, country A starts to generate mitigation outcomes as of 2021, as also assumed in Figure 7 above. However, country B, when adopting its target in 2015, already plans to use ITMOs to achieve its target and therefore implements less domestic policies and starts to deviate from the reference scenario already in 2015. The international transfer thus enables country B to engage in a higher emissions path in the pre-target years up to 2020. In this case, the aggregated cumulative GHG emissions of both countries would increase (by the grey area).

However, different outcomes are possible. For example, country A could engage in an international market mechanism before 2020 and thus already deviate from its reference scenario before 2020. In this case, the aggregated cumulative emissions of both countries would depend on the time period over which ITMOs are generated and how the transfer impacts the emissions path of the acquiring country B in the period up to 2020:

- ▶ If country A generates ITMOs only for reductions occurring in the target period of 2021 to 2030 and if country B deviates from its reference scenario only as of 2021, then aggregated cumulative GHG emissions would *decrease*. This is because country A reduces emissions before its target period and, at the same time, does not use these reductions to achieve its target, nor does it transfer them to another country.
- ▶ If country A generates ITMOs only for reductions occurring in the target period of 2021 to 2030 and if both countries start deviating from their reference scenario as of 2015, then aggregated cumulative emissions would *remain the same*. This is because the increase in pre-target year emissions by country B is offset by the decrease in country A.
- ▶ If country A generates and transfers ITMOs for reductions as of 2015 and if both countries start deviating from their reference scenario as of 2015, then aggregated cumulative GHG emissions would *increase*. The increase occurs because country A transfers the early emission reductions, whereas country B does not account for its increase in pre-target year emissions.

In conclusion, common multi-year target periods largely address concerns over higher cumulative GHG emissions due to international transfers during the target period. However, they could have some effect on pre-target year emission pathways – though much less so than for single-year targets.

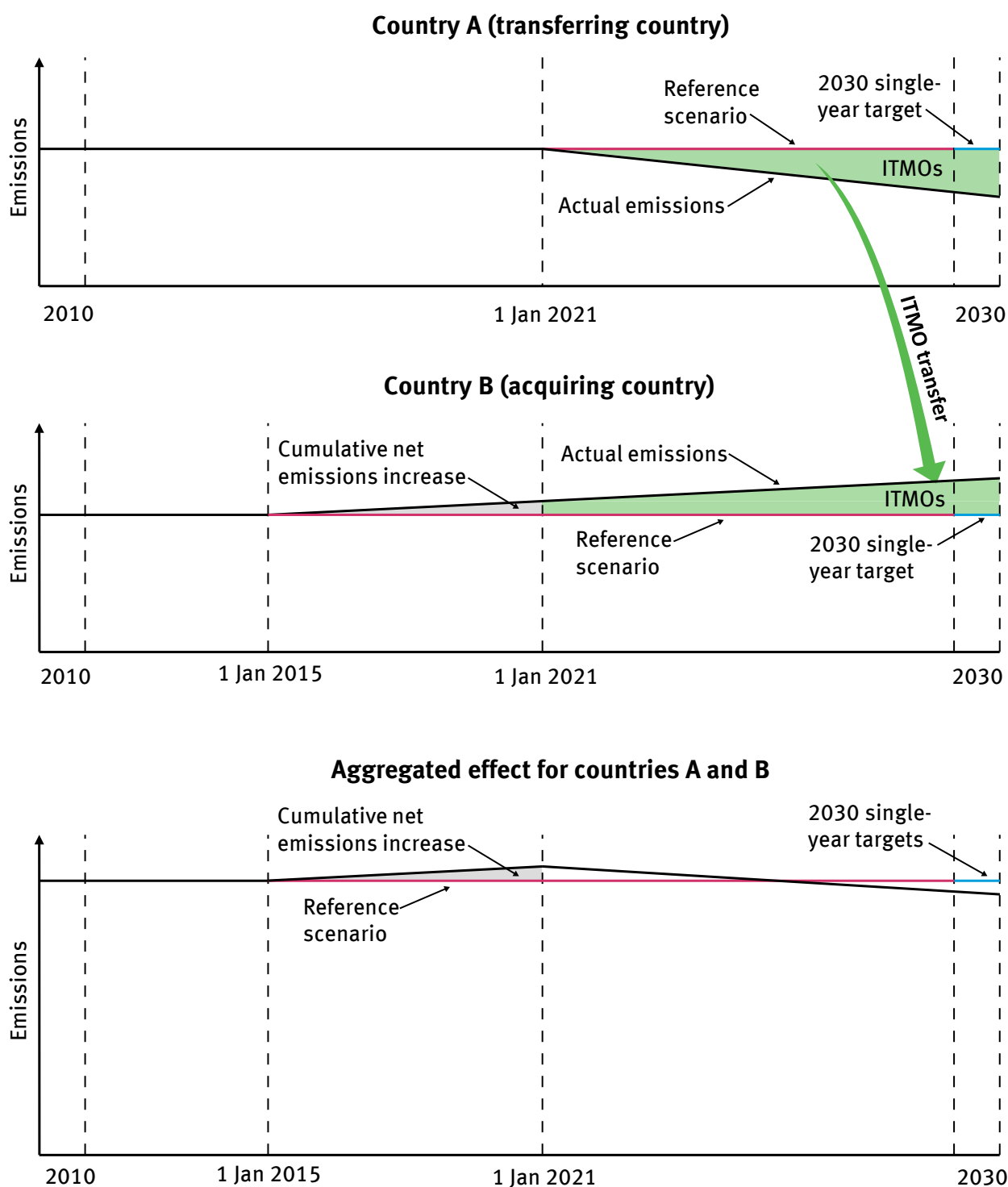


Figure 8: Accounting for the transfer of ITMOs under multi-year emissions targets with the acquiring country engaging in higher pre-target year emissions

6.3.3 Combinations of different target time frames

In the figures above, we assumed that both countries have the same target year or period. There could be multiple scenarios in which the two countries do not have the same target time frame.

For example, if country A had a multi-year target for the period of 2021 to 2030 and country B a single year target for 2030, the overall impact could be similar as for the first case illustrated in Figure 5. Country A could transfer reductions over the period of 2021 to 2030 to country B which could use them to achieve its single-year target in 2030. Lazarus et al. (2014) highlight that limiting the accounting of transfers to mitigation outcomes occurring only in 2030, as discussed in the second case and shown in Figure 6 above, would not address the issue in this case.

It could lead to arbitrage or “leakage” as countries with multi-year targets could use mitigation outcomes occurring in the period of 2021 to 2029 to meet their 2030 target and thereby free up mitigation outcomes occurring in 2030 that are eligible for use by countries with single-year targets, defeating the intent of such a restriction.

Further difficulties arise if the countries have different single-year targets (e.g. for 2025 and for 2030), or if one country has two single-year targets (e.g. 2025 and 2030) while the other country has only a target for one of the years.

6.3.4 Discussion of findings

The previous analysis showed that the aggregated cumulative emissions outcome of international transfers under different target time frames could vary considerably. In the figures above, we make several assumptions. In practice, the GHG emissions outcome can differ if some of these assumptions are changed. Key considerations include:

- ▶ **Quality of mitigation outcomes:** We assume that mitigation outcomes have quality. If mitigation outcomes correspond to less or more than 1 t CO₂e, the impact on aggregated cumulative GHG emissions could change.
- ▶ **Pre-target emissions paths:** We assume that countries achieve their emission targets through linear emissions pathways. The outcome would change under different emissions pathways. However, although emission paths are usually not fully linear, it is reasonable to assume that countries achieve their targets through similar emission pathways.
- ▶ **International mitigation targets in the period up to 2020:** In the figures above, we assume that both countries do not have mitigation targets in the period up to 2020. If the acquiring country B has an international mitigation target in that period (e.g. a target under the Kyoto Protocol), the outcome may change, depending on the ambition of the target and whether overachievement of that target could be carried-over into the Paris Agreement. If a country has an ambitious target, then using ITMOs after 2020 may not impact the emissions path in the period up to 2020: the country may, with or without the use of ITMOs, have to take action to achieve its target. By contrast, if the target is less stringent than the likely BAU emissions and if the country cannot carry-over its „hot air“ into the Paris Agreement, then the use of ITMOs after 2020 could impact the emissions pathway of the country in the period up to 2020.

These considerations suggest that the exact impact on cumulative emission pathways is rather complex and depends on the specific context. However, some general conclusions can be drawn.

First, the key underlying issue is that international transfers can impact the GHG emissions paths of the participating countries in periods not covered by a mitigation target – most importantly, in pre-target years, but potentially also in periods between single-year targets. Under some scenarios it is plausible or likely that the cumulative GHG emissions of both countries increase, whereas under other scenarios they could remain the same or decrease.

Second, the risk of an increase in aggregated cumulative GHG emissions is higher if:

1. Mitigation outcomes occurring over *several years* are used in a *single year*, which is not representative for cumulative mitigation efforts over time;
2. The target year or period is further in the future (e.g. in 2030), which implies a longer period over which pre-target year emission pathways could deviate due to a transfer;
3. The countries involved in the transfer have different target periods or years, involving less comparability of the mitigation outcomes;
4. ITMOs are generated for mitigation outcomes occurring in pre-target years (or in periods between target years), thereby enabling the acquiring country to engage in a higher pre-target emissions path while the transferring country does not have to account for the transfer (because it does not have a target in that period);
5. The acquiring country does not have an international mitigation target in the period up to 2020 or its target is not ambitious.

In the next section, we explore different options to address this accounting challenge.

6.4 Options for accounting for the time frame of mitigation targets

Options for accounting for ITMOs in relation to the time frame of mitigation targets are discussed in the literature (Howard et al. 2017; Lazarus et al. 2014; OECD/IEA 2017; Prag et al. 2013) and in submissions by Parties and non-governmental organizations. We identify four broad approaches that aim to address the accounting challenges described above (Table 4). These approaches are not necessarily mutually exclusive. One or more approaches could be reflected in international rules under the Paris Agreement, or they could be implemented bilaterally between countries involved in international transfers.

Table 4: Approaches for accounting for the vintage of mitigation outcomes in relation to the time frames of mitigation targets

Approach	Description and options for implementation
A. Continuous, multi-year target periods	All countries – or the two countries involved in an international transfer – have targets for the same continuous, multi-year periods.
B. Single-year targets, with ITMOs generated and used in target years only	All countries – or the two countries involved in an international transfer – have targets for the same single years. ITMOs are only generated and used in target years. An ITMO has to be generated and used in the same target year.
C. Various target time frames, ensuring that accounting for ITMOs is more representative for ITMO generation and use over time	Countries could have various – and possibly differing – target time frames, but the accounting for ITMOs – through corresponding adjustments – is made more representative for the cumulative ITMO generation or use over time. Approaches could, for example, include: <ul style="list-style-type: none"> ▶ Linearizing ITMO activity, calculating a linearly increasing or decreasing ITMO activity over time, or ▶ Averaging ITMO activity, calculating the average ITMO generation or use over a defined period.
D. Multi-year emission trajectories	For ITMO accounting purposes, all countries – or the two countries involved in an international transfer – establish for the same period a multi-year emissions trajectory that is consistent with their NDC target. The transfer and use of ITMOs is accounted against this trajectory. Emission trajectories could, for example, be established by countries or by linear interpolation between single-year targets.

We discuss these broad approaches, and options for their implementation, with regard to four criteria:

Effectiveness in addressing the environmental integrity risks arising from accounting for timing of the generation and use of ITMOs and the time frame of mitigation targets – assuming, as above, that other accounting aspects, such as avoiding double counting, are addressed, that the transferred ITMOs represent emission reductions of 1 t CO₂e, and that the possibility to participate in international transfers does not affect the level of NDC targets.

6. *Potential impacts on the establishment of international market mechanisms*, in particular, the ability for countries to account for international linking of ETSs and international crediting mechanisms;
7. *Practical considerations in the design and implementation of the approach*, such as the practical feasibility of tracking and accounting for ITMO transfers; and
8. *Political feasibility*, i.e. the feasibility of a certain approach gaining acceptance, being adopted and implemented under the UNFCCC.

The four approaches involve different possible time frames of mitigation targets. Article 4.10 of the Paris Agreement envisages „common time frames for NDCs“. However, such common time frames still have to be agreed upon and are only applicable to future NDCs. Depending on when ITMO transfers take place, international rules for accounting of transfers could either require the updating of first NDCs with the aim of aligning the NDC with the internationally agreed common time frames, or specifically establish rules for ITMO transfers under first NDCs. As long as international agreement has not yet been reached on common time frames of NDCs, alignment of time frames could also be pursued by a group of countries that wish to engage in a common carbon market. For example, the NDCs of the EU, Switzerland and Norway all indicate that their single-year 2030 target would be converted into a continuous target period of 2021 to 2030. This facilitates international transfers between these countries, in particular for the purpose of international accounting for transfers of ETS allowances.

Under **approach A**, countries could internationally agree on common continuous, multi-year periods for future NDC targets (e.g. from 2026 to 2030, from 2031 to 2035, etc.). Once such an agreement has been reached, future NDCs could then specify target levels for the agreed multi-year target periods. This approach has been implemented under the Kyoto Protocol and in other international carbon market mechanisms, such as international linking of ETSs. Alternatively, two or more countries engaging in a common international market mechanism, such as linking of ETSs, could agree on common multi-year periods for their NDCs, in order to facilitate international accounting for unit transfers towards NDCs targets.

The approach greatly facilitates accounting for international transfers of mitigation outcomes. It provides a high assurance that aggregated cumulative GHG emissions do not increase as a result of the transfer during the target period. Moreover, the risk of countries engaging in higher emissions pathways in pre-target years would be rather limited if the first contribution period already starts in 2021 and if ITMOs are only generated for emission reductions occurring within the target period. This is because many of the countries that expressed interest in purchasing ITMOs already have mitigation targets in the period up to 2020.

The approach is also compatible with market mechanisms. All established ETSs have continuous multi-year target periods. International multi-year targets allow aligning domestic ETSs with international mitigation targets and facilitate international linking of ETSs, though policy makers may have to address situations in which the internationally agreed time periods diverge from target periods of internationally linked ETSs or if banking of allowances is possible. Crediting mechanisms usually also issue credits for continuous emission reductions over time. The practical implementation of this approach could draw upon the experience with the Kyoto Protocol and ETSs, in particular with regard to tracking unit transfers.

A challenge of this approach is that it is not compatible with current NDCs where most countries have single-year targets and varying time frames. To engage in international transfers under this approach, countries would thus have to update their NDCs and align the time frame of their targets. However, updating an NDC can involve a politically lengthy process in some countries. Hence, alternative approaches could be considered for current NDCs (OECD/IEA 2017).

Under **approach B**, countries could internationally agree on common single target years for future NDCs (e.g. 2030, 2035, etc.). Second and subsequent NDCs would then specify target levels for the agreed single target years. ITMOs are only generated and used in target years, and an ITMO has to be generated and used in the same target year. Alternatively, this approach could be applied bilaterally or by a group of countries that have the same single target years.

This approach is reflected in Figure 6 in section 6.3.1. As discussed above, the aggregated cumulative GHG emissions outcome is less certain, and depends on as of when and to which degree countries engage in higher or lower GHG emissions in other years as a result of the transfer. There is a risk that this approach could provide economic incentives to pursue one-off measures in target years only. For example, if a credit purchase program were only to acquire credits for reductions in 2030, some projects may only reduce emissions in that year. This could apply in particular to project types that only have incentives to continue GHG abatement if they have ongoing revenues, such as landfill gas flaring or N₂O abatement from nitric acid production.

Approach B does not align well with carbon market mechanisms. It could be difficult to align the transfer and accounting of ITMOs towards NDC targets with the transfer of allowances between internationally linked ETSs, which have multi-year target periods. The allowance transfer in internationally linked ETSs is driven by private sector entities regulated by the ETSs. Depending on economic, technical and environmental conditions, the amount of transfers will vary over time, and could be larger or smaller in the single-target year than in the ETS compliance period. This could lead to a situation in which one of the countries could not achieve its NDC target, although the ambition of the ETS and other climate policies is consistent with its NDC target. For crediting mechanisms, demand could be distorted, as buyers may only wish to acquire emission reductions occurring in the target years. This could lead not only to one-off measures but also to economically less efficient outcomes.

A practical challenge of approach B is identifying when the mitigation outcomes occur. While ETS allowances are typically issued annually and have an identifier for the year for which they are issued, the international transfer of an allowance does not necessarily entail that the emission reductions are triggered in the same year, as they can usually be banked within, or even between, target periods. Accounting for the unit transfers, rather than the actual emission reductions, towards achieving a single-year NDC target could imply that one country under-achieves its NDC target, whereas the other would over-achieve it. Current crediting mechanisms also do not necessarily allow to identify when precisely the emission reductions occur.

With regards to political feasibility, an international agreement on approach B may face similar challenges as approach A, as it could only apply to second and subsequent NDCs. Moreover, it may face resistance from countries that intend to internationally link ETSs and for which accounting transfers only in single years would involve the risk of not achieving their NDC targets.

Approach C aims to enable countries with various – and possibly differing – target time frames to account for international transfers. The accounting for ITMOs is made more representative for the cumulative ITMO generation and use over a defined period of time, rather than considering only ITMO activity in a single target year. Two different approaches have been considered (Howard et al. 2017; Lazarus et al. 2014; OECD/IEA 2017):

- ▶ **Linearizing ITMO activity**, assuming for accounting purposes a linear increase in ITMO activity over time, to reflect increasing ambition of NDCs over time. For accounting purposes, all ITMOs transferred or acquired over a defined period would be summed up, and then „re-allocated“ according to a linearly increasing or decreasing path over time. Figure 9 illustrates this for the same acquiring country B as in the examples further above, with a single-year target for 2030. For simplicity, we assume that the transferring country A has a multi-year target for the period of 2021 to 2030 and that it generates ITMOs only within that period. If the acquiring country B purchased, for example, a total of 55 ITMOs over the period of 2021 to 2030, it would be assumed – for accounting purposes – that one ITMO had been acquired in the year 2021, two in 2022, three in 2023, and so forth, with 10 units being used in 2030. Country B would account for the ITMO transfers only in 2030 (dark green area), applying a corresponding adjustment equal to 10. But it has to acquire a larger amount of ITMOs to do so (light green area). In this example, the acquiring country would have to acquire 55 ITMOs to count 10 ITMOs towards its single-year target in 2030. If the country were to engage in a linear emissions pathway from 2021 to 2030 to achieve its target, as shown in Figure 9, this approach would have the same GHG emissions outcome as when the country had a multi-year target: the amount of ITMOs acquired corresponds to the amount that the country would have to acquire under a multi-year target.
- ▶ **Averaging ITMO activity** could be regarded as a variation of linearizing ITMO activity, only that the starting point of the assumed emissions path is higher (see example in Figure 10). Under this approach, the average ITMO use is calculated over the defined period and accounted for in any target years during the period. For example, the total number of ITMOs used by a country over the ten-year period from 2021 to 2030 could be divided by ten, giving an average value for the ITMO use over the period. If the country has a single-year target for 2030, this average value could be accounted for in 2030, applying a corresponding adjustment equal to the average value. For example, the acquiring country would have to acquire 100 ITMOs to count 10 ITMOs towards its single-year target in 2030 (see Figure 10). This approach may be more representative if international units were already used in previous periods, as shown in Figure 10, because in this case the country would already have deviated from its reference scenario in previous years, leading to a higher „starting point“ in 2021. If the country were to engage in a constant emissions level over the period of 2021 to 2030, this approach would have the same outcome as when the country had a multi-year target.

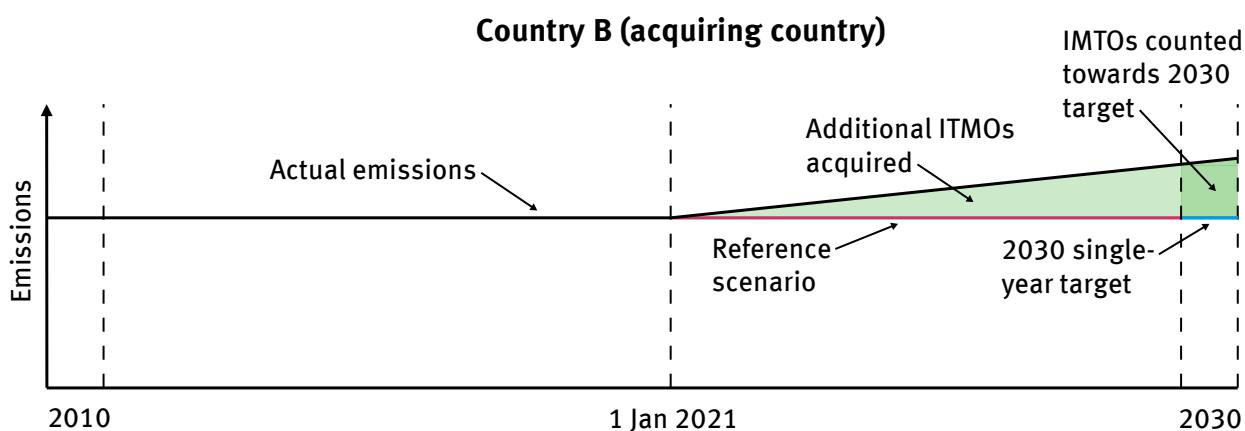


Figure 9: Linearizing ITMO activity

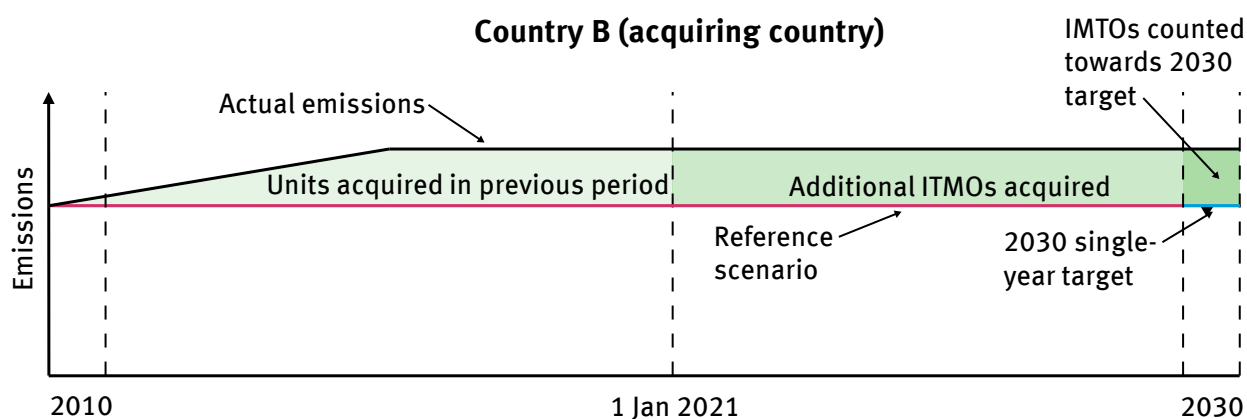


Figure 10: Averaging ITMO activity over time

Hence, theoretically, both approaches could have the same GHG emissions outcome as multi-year targets or when not engaging in international transfers. In practice, the environmental effectiveness depends on a number of parameters. First, it depends on when and how countries deviate from the emissions path without international unit transfer. Second, it depends on whether countries have already used ITMOs in previous periods, as this would impact the „starting point“ of emissions in the contribution period (i.e. in 2021 in the figures above). And third, it depends on a number of design parameters, e.g. over which period averaging or linearizing is conducted or what starting point is used for linearizing.

A critical challenge of this approach is that the aggregated cumulative GHG emissions outcome strongly hinges on whether the emissions level in 2030 is representative for other years. Under both approaches – linearizing and averaging ITMO activity – the total number of ITMOs a country has to acquire to achieve its target depends on the difference between its emissions and its target in 2030. If the emissions are lower in 2030 than in other years during the period, the country would have to acquire fewer ITMOs for the entire period, compared to the situation of a multi-year target. By contrast, if the emissions are higher in the year 2030, the country may have to acquire more ITMOs than under a multi-year target.

The aggregated GHG emissions outcome of the approaches thus hinges strongly on whether the emissions level in 2030 is representative for other years. While the approach aims to reflect ITMO activity in a more representative manner, the amount of ITMOs that a country has to acquire to achieve its NDC target may not be representative of its mitigation gap, because the amount depends strongly on the GHG emissions level observed in one particular year. In many countries, emissions can vary significantly from year to year, e.g. due to precipitation and the availability of hydro power. The approach thus perpetuates the challenges of accounting for ITMOs in single-year targets only, and does not address them.

The overall GHG emissions outcome is thus also rather uncertain and may significantly deviate from a situation in which the countries would not engage in international transfers or have multi-year target periods. Hence, a drawback of this approach is that its „representativeness“ hinges on the representativeness of the GHG emissions level in the target year, which could be unrepresentative due to particular economic or environmental conditions in that year.

The approach could also exacerbate engagement in international carbon market mechanisms and faces several practical constraints. The approach would enable countries to understand only ex-post – after the single-year target – how many units they can transfer or have to acquire to achieve their target. A transferring country may be reluctant to endorse the transfer of ITMOs, if its ability to then achieve its NDC target in 2030 would strongly depend on the particular (weather) conditions in that year. Under multi-year targets, countries would have more certainty on the number of ITMOs they can transfer or have to acquire. The approach is also not compatible with international linking of ETSs in which the transfer of allowances is driven by regulated entities and countries would need certainty that accounting at the level of NDC targets can match accounting of allowance transfers.

These constraints and considerations could be less prominent if countries introduced accounting provisions that address the risk of non-representative circumstances in the single year target. For example, if countries compared the average emissions over the three years (e.g. from 2029 to 2031) to the target (e.g. in 2030), then the risk of emission variations over time and the repercussions for the amount of ITMOs would be reduced.

An advantage of the approach is that it could potentially allow transfers between countries with different target periods or years. However, given the considerable uncertainties with regard to the amount of ITMO transfers that are possible for the transferring country, or required by acquiring country, in order to achieve their targets, the uncertain environmental outcome, and its incompatibility with international linking of emissions trading systems, it is unlikely to be easily agreeable.

Approach D aims to ensure that accounting for ITMOs is conducted in a way that is consistent with a multi-year trajectory. For ITMO accounting purposes, all countries – or the two countries involved in an international transfer – could establish a multi-year emissions trajectory for the same period that is consistent with their NDC target. A country wishing to acquire or transfer ITMOs would account for the transfers over the full period against the emissions trajectory, i.e. corresponding adjustments would have to be applied in each year. The multi-year emissions trajectory could be established by countries or simply determined by linear interpolation between internationally communicated single-year targets (Howard et al. 2017; OECD/IEA 2017).

If fully implemented by countries for a common period, including an accounting balance for all ITMO transfers over that period, the implications could practically be the same as for multi-year targets. At the same time, this approach might be politically more acceptable to countries, as it would avoid the submission of a new NDC. A possible shortcoming is the legal status of the trajectory if not included in the formal NDC submission. If a country still has legally a single-year target, it is unclear how any over-or under-achievement of the target in the single-year due to international transfers would be communicated and assessed. For example, a country could be in a situation in which it has acquired sufficient ITMOs to achieve its multi-year trajectory, but does not achieve its single-year target.

7 Tracking international transfers of mitigation outcomes

To assure that information reported by countries is accurate and consistent, tracking and reconciling international transfer of mitigation outcomes (ITMOs) requires rules and governance arrangements in the following three areas (adapted from Prag, Hood, Barata 2013):

- ▶ *Creation of ITMOs*, inter alia, to avoid double issuance.
- ▶ *Tracking of ITMO transactions*, inter alia, to avoid double use of ITMOs.
- ▶ *Accounting for ITMOs towards NDCs through corresponding adjustments*, inter alia, to avoid double claiming of emission reductions (see also section 5.1).

International rules and governance arrangements will depend in particular on how ITMOs are defined and how much international oversight is to be provided. A key open question for the international regime is whether (a) tracking and reconciling ITMOs occurs on the basis of units that are *issued to* national registries and then transferred within or between them, or whether (b) tracking only involves reporting of ITMOs by countries (e.g. through standard reporting formats) and not the issuance of units for international transfer (see also section 4.2). Some Parties favour a system of international units – similar to the Kyoto Protocol – whereas some Parties favour more decentralized approaches. Some countries envisage a higher degree of international oversight – e.g. with a body overseeing international transfers – whereas others favour a regime that focuses on reporting by countries and transparency of information. A key challenge is how consistency and alignment of reporting by different countries can be achieved within decentralized approaches.

In this section, we first compare the centralized unit issuance, tracking, and accounting approach of the Kyoto Protocol with more decentralized approaches that may be pursued under the Paris Agreement (section 7.1). We then explore how centralized and decentralized approaches could assure consistency and alignment of information on international transfers (sections 7.2 and 7.3). Finally, we explore how the provision of comprehensive information on international transfers may help to strengthen environmental integrity (section 7.4), and how the processes for reporting, review and compliance under the Paris Agreement could support transparent information on international transfers (section 7.5).

7.1 Centralized versus decentralized approaches

The Kyoto Protocol provides comprehensive rules and regulations for the issuance, transfer, use for compliance or cancelling of international units. Countries must establish national registry systems that are linked through an International Transaction Log (ITL). In contrast, the Paris Agreement includes neither provisions for issuing international units nor centralized oversight on transfers of ITMOs. Article 6.2 simply requires countries to “ensure environmental integrity and transparency”, to apply “robust accounting”, and to “authorize” transfers (Articles 6.2 and 6.3).

Some Parties propose to establish a common international system with international units under the Paris Agreement, whereas many see the tracking of international transfers mostly under the authority of the countries involved in the transfers. It is thus possible that more decentralized and more heterogeneous systems for tracking ITMO transfers will emerge. This poses a key challenge: in decentralized systems, the information reported by countries could be inconsistent – the transferring country may provide different information on a specific transfer than the acquiring country, e.g. because the two countries use different approaches and rules to account for international transfers.

To address this risk, countries will have to create and agree on a certain level of consistency in the rules and systems for transfers between different national systems. This may require inter alia establishing common technological interfaces, datasets and parameters to be exchanged. This creates a need for related capacities and resources in the countries as well as the ability to agree on a certain level of harmonization of systems.

Table 5 summarizes the two approaches for the tracking of units in electronic registries.

Table 5: Approaches for international governance for the tracking of units in electronic registries

Options	Example
UN centralized governance for issuance, transfer and use of international units A centralized UNFCCC body oversees the issuance, transfer and use of units, e.g. through a centralized transaction log, and provides participating countries with relevant information (e.g. on compliance). See Section 7.2	Kyoto Protocol
Decentralized governance with reporting on net flows of units Issuance, transfer and use of units are under the sole authority of the participating countries. Parties establish means to track international transfers and ensure consistency, e.g. by establishing a bilateral transaction log that provides relevant information to participating countries/jurisdictions. This information can be used by Parties to report on the net flow of units as ITMOs to the UNFCCC. See Section 7.3	California and Quebec, using their own and the Western Climate Initiative common transaction log

Source: Authors

In the following, we explore these two approaches further in the context of tracking international transfers.

7.2 UN centralized governance for issuance, transfer and use of units

Tracking of units

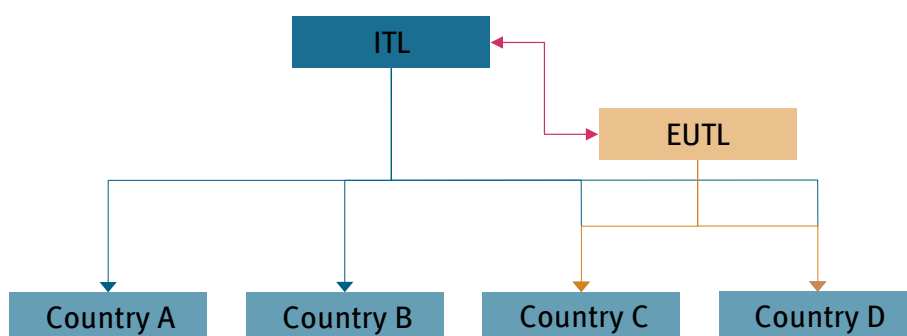
Article 7 of the Kyoto Protocol established centralized governance arrangements for the issuance, transfer and use of units, including an international standard that automatically assures consistent transfers between national registries (“double bookkeeping”) and the uniqueness and (to a certain extent) the traceability of individual units, as well as a centralized tracking infrastructure. The UNFCCC’s International Transaction Log (ITL) ensures that transactions between national registries and the CDM registry are consistent with internationally agreed rules for the transfer of Kyoto units, checking transactions proposed by national registries and supporting the review and compliance process of the Protocol (Figure 11).

These comprehensive international rules and the checking through the ITL also facilitate the establishment of accounting balances by Annex-I countries. Each country has to report annually an accounting balance in a standardized electronic format.

The standard electronic format for reporting of information on Kyoto Protocol units (“SEF” tables) lists the total quantities of Kyoto units held in the accounts of its national registry at the beginning of the reported year, the net internal flows between accounts, the net external (international) transactions, and the resulting total quantities of Kyoto units held in accounts at the end of the reported year. The ITL allows this aggregated information of volumes in the SEF tables to be efficiently validated, which contributes to determining compliance.

In principle, a centralized transaction log could also be used for both Article 6 mechanisms, even though the text of the Paris Agreement does not foresee this. Also, a centralized transaction log does not rule out the existence of parallel transaction logs for “clubs” of countries, such as the European Union Transaction Log (EUTL, Figure 11).

In such a centralized approach, the aggregated data of national balances of units that countries report is automatically scrutinized, because the national registry systems have to comply with international rules on accounting and the tracking infrastructure of the ITL assures that unit transfers comply with these rules, including that double counting is avoided.



Source: Authors

Figure 11: Example of centralized tracking of unit flows between national registries by an International Transaction Log (ITL) with a link to the European Union Transaction Log (EUTL) covering EU countries

The role of centralized standards for unit quality

In a centralized system, such as under the Kyoto Protocol, the quality of transferred units may be governed by a centralized standard setting function, such as the CDM Executive Board and the JI Supervisory Committee under the supervision of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, e.g. with regard to additionality determination and baseline setting. In these cases, there is international oversight of the quality of units.

However, other transfers under the Kyoto Protocol are not subject to assessing the quality of units. This holds for transfers of assigned amount units (AAUs), removal units (RMUs) or emission reduction units (ERUs) issued under national governance arrangements for JI.

7.3 Decentralized governance with reporting on net flows of units

This section explores systems for international transfers that do not build on the issuance of international units, but only on countries reporting on ITMOs and corresponding adjustments – the basic information that transferring and acquiring countries would need to provide to apply robust accounting for ITMOs (see also section 4.2 on the difference between issuing and transferring international units versus exchange of information and reporting amounts).

In the absence of centralized rules and systems, countries have to agree on common formats to document international transfers and work together in one or several electronic tracking systems. Countries have several options for assuring consistency in information on international transfers of ITMOs under decentralized governance:

- A. The country joins one or several **international transaction log(s)**;
- B. If a country uses linked or joint emission trading schemes (ETSs) for international transfers, it may use the **ETS’ own registry** for consistent tracking;
- C. If a country uses crediting mechanism for international transfers, it may use the **crediting mechanism’s own registry**;
- D. A **hybrid approach** – countries use a combination of A, B and C.

A. Using international transaction logs

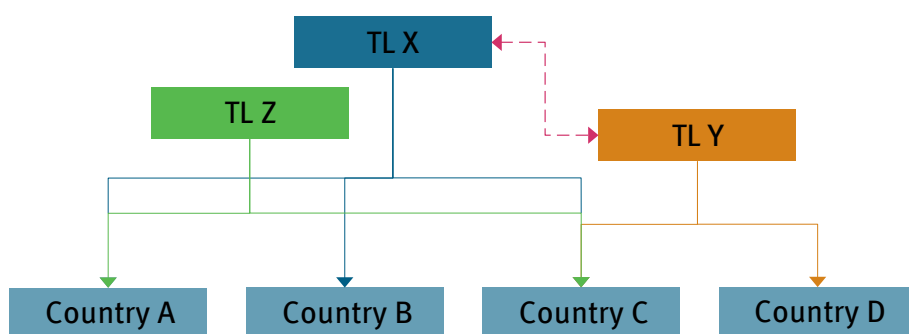
In this option, international tracking is used for assuring consistency in information on international transfers of ITMOs in a similar way to the tracking in a UN system with centralized governance. A club of countries may agree bottom-up on common formats to document international transfers of ITMOs and work together on one or several centralized transaction logs. This does not require the existence of international units, issued under international governance as described in section 7.2. Such international transaction logs may also be implemented and operated by third parties (e.g. a foundation or private company).

Under this approach, multiple bilateral or international transaction logs may emerge. Participating countries could report all transfers as logged in national registries and transaction log systems as ITMOs (Figure 12). For each transaction that the national registry reports, the transaction log may carry out checking procedures which scrutinize the consistency of this information with the related information from the country on the other side of the transaction. If errors or inconsistencies occur, both sides are informed by the transaction log.

In the absence of international governance, either domestic rules, bilateral rules between the countries, or rules agreed between all participants of a specific transaction log (a transaction log “club”) are required to define how to harmonize and correct entries in the national registries based on the results of the checking. If transaction logs and their related rules are designed and operated well, countries participating in such a voluntary transaction log system benefit through increased consistency and credibility of accounting for international transfers and in particular gain the ability to efficiently avoiding double issuance and double claiming. Another benefit consists in the checking on an ongoing basis, providing countries with up-to-date and trusted data on transactions in the national registries at any point in time. In the development of common transaction logs by a group of participating countries, technical compatibility, data formats and e.g. a sufficient degree of synchronicity in the reporting of transactions are to be ensured in order to enable a robust functioning and performance of tracking systems.

In the case of countries working with several transaction logs in parallel without a centralized set of rules for their governance, additional challenges may arise (Figure 12). Differing rules within each of the systems may lead to inconsistencies between transaction logs. E.g. countries reporting a specific international transaction to two transaction logs in parallel may receive two different responses from two transaction logs, as one may clear the transaction data while the other may flag an error because the system does not match the reports from both ends of the transaction as one.

The example of the EUTL working in parallel to the ITL (Figure 11) demonstrates that transaction logs can work in parallel, if the rules for both are designed in a consistent way. Such consistent systems of rules can also lead to fully compatible transaction logs working in parallel in a decentralized environment within a club of participating countries.



Source: Authors

Figure 12: Illustration of countries participating in one or several transaction logs (TL)

B. Using registry systems of ETSs

Countries may link their ETSs and account for the net flow of allowances as ITMOs. ETSs have a registry that is used to ensure that the issuance, holding, transfer, cancellation and surrender of allowances are accurately recorded. These ETS registries may be used to track the international transfer of allowances within the ETS, and no additional tracking system may be required.

With the linking of ETSs, similar issues as with joining international transaction logs (approach A) may emerge; countries need to align their rules, technical formats and standards as well as the (electronic) infrastructure of ETS registries as a precondition for linking.

C. Using registry systems of crediting mechanisms

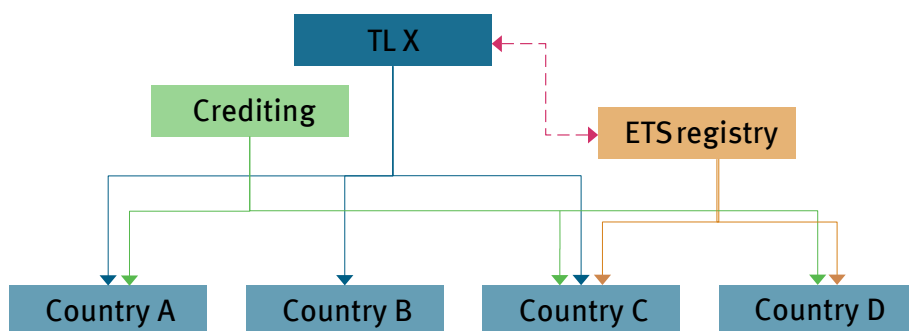
If a country uses a crediting mechanism for international transfers such as the CDM, the Verified Carbon Standard (VCS), or the Gold Standard, it may use the crediting mechanism's own registry system (e.g. the CDM registry, VCS registry, Markit registry of Gold Standard) for consistent tracking of transfers.

A country could also engage in several crediting mechanisms for international transfers. As a specific mitigation action should always be covered by only one crediting mechanism in order to prevent double issuance, potential inconsistencies between different crediting mechanisms may be less an issue than in the case of countries working in parallel with different transaction logs that may cover the same mitigation action (approach A).

D. Hybrid approaches

In practice, a country may use several of the above approaches in parallel (Figure 13): some sectors may be covered by an ETS that is linked to another country's ETS (approach B), the country may purchase credits under crediting mechanism (approach C) and also participate in an international transaction log (approach A).

In such a situation, similar challenges as described under approach A arise with regard to achieving consistent and harmonized tracking under multiple systems. For instance, a clear delineation of system boundaries is necessary, e.g. if mitigation actions under an ETS and under a crediting scheme are taking place in the same industrial installation. To avoid these kinds of issues and potential inconsistencies in hybrid approaches, checks may have to be established to identify and address any conflicts or inconsistencies (red arrow in Figure 13).



Source: Authors' own

Figure 13: Illustration of a hybrid system: countries using transaction logs (TL), ETS registries, and registries of crediting mechanism in parallel to track international transfers of mitigation outcomes

7.4 How can information on international transfers contribute to achieving environmental integrity?

Robust accounting and consistent tracking of international transfers is a key prerequisite for achieving environmental integrity. However, transparent information on international transfers can also facilitate achieving environmental integrity in indirect ways, because transparency allows any potential risks to be identified, such as from a lack of unit quality or countries falling short in achieving their mitigation targets.

Up-to-date and trusted information helps mitigation planning and achieving NDC targets

Both centralized approaches (as in section 7.2) and decentralized approaches (section 7.3) can allow for consistent tracking of international transfer of mitigation outcomes. They could also provide real-time information on transfers and further information on the type of transactions, which would provide countries and other stakeholders at any point in time with an overview of the number of units that they hold that is trusted and checked for international consistency. For instance, acquiring countries can monitor whether they will have enough units transferred to fill any potential gap in meeting their target.

Providing comprehensive information on ITMOs may support environmental integrity of transfers

Under the CDM, each CER is identified by a unique serial number that allows the project that generated the unit, the relevant commitment period etc. to be tracked. The UNFCCC website provides comprehensive information on each CDM project, including project design documents, monitoring reports, validation reports, as well as relevant regulatory documents, such as related methodologies. This wealth of available information and transparency allows countries and stakeholders to scrutinize the quality of units. In the context of Article 6 mechanisms, the degree of information provided by countries to the public on ITMOs may vary.

Option: *minimum information for tracking ITMOs*

For accounting purposes, it may be sufficient to provide only the minimum information as listed in Table 6. This information is sufficient to report on net transfers of ITMOs, but may not allow identification of the root-cause for any inconsistencies in the reporting of two countries involved in transfers of ITMOs.

Table 6: Minimum information required for accounting purposes

Information item with ITMO	Example	Remark
Country of origin	Peru	
Mitigation from inside/ outside the scope of the NDC target	Mitigation action is outside of Peruvian NDC	This information may be important to assess the relevance of corresponding adjustments
Vintage of mitigation outcomes	Mitigation outcomes generated in the period of 1.1.2022-31.12.2022	

Source: Authors' own

Option: *Providing comprehensive information on ITMOs*

Under this option, countries provide further information relating to international transfers that may not only facilitate identification of any inconsistencies in reporting on ITMOs by countries but also assure the quality of any underlying units.

Programme standards, mechanisms and ETS rules may differ considerably among countries. The provision of further information on international transfers could help address this potential heterogeneity. Further information could include not only information on the characteristics of the mitigation action but also on the applied programme standards or ETSs, as well as the NDC context of the transferring country. In order to be able to identify different levels of unit quality, in decentralized systems countries may want to include some information on how unit quality is assured.

Table 7 provides an indicative list of information items that might be provided in relation to international transfers under Article 6. Please note that this information may be partially attached to units in electronic registries and partially be provided through reporting by countries or websites that that can be publicly accessed. This would require the implementation of a comprehensive electronic tracking and documentation systems, similarly to the existing systems e.g. of the CDM registry or the Gold Standard Market registry. The availability of a comprehensive set of information may also support acquiring countries who would like to restrict international transfers to ITMOs that comply with certain criteria, e.g. that originate from certain mitigation activity types or from countries that have certain characteristics (see also section on eligibility criteria in Schneider et al. 2017).

Table 7: Example of comprehensive information that may be provided on international transfers (indicative list)

Information item	Illustrative examples	Remark
Information related to mitigation action		
Country of origin	Peru	In some cases, also jurisdictions (California, Quebec) could be mentioned
Type of ITMO	JCM unit Emission allowance under Swiss ETS	ITMOs may be differentiated according to the applied programme standard or market mechanism
Mitigation sector or project type	Landfill gas flaring	Not applicable in case of ETS
Mitigation action that generated the ITMO	Mitigation action “National programme for clean municipal solid waste”	One-to-one correspondence between name of mitigation action and action on the ground is crucial to avoid double issuance Not applicable in case of ETS
Mitigation from inside/ outside the scope of the NDC target	Mitigation action is inside the scope of the NDC	Allows to assess if baseline/ additionality needs to be informed by NDC and if corresponding adjustments are necessary
Serial number	Unique serial number for each ITMO (similar to CERs)	
Other information on mitigation action, programme standards, etc.	ITMO created under the bilateral agreement between country A and country B and the programme standard Z Unit issued by national authority of country A Validation by auditor X Verification by auditor Y	
Physical unit of ITMO	Metric tonnes of CO ₂ equivalent based on GWP of IPCC 2006	
Permanence of ITMO	Yes. Methane destruction is permanent.	For AFOLU measures, ITMOs may have an expiration date
Vintage of mitigation outcomes	Mitigation outcomes generated in the period 1.1.2022-31.12.2022	
Process on how international transfer will contribute to higher ambition	International transfer from this mitigation action is restricted to 2020-2027. From 2028, the government will finance its operation and include all its emissions reductions from the waste sector in its NDC.	Opportunity to demonstrate how the provision of “higher ambition” under Article 6.1 is achieved
Contribution to sustainable development	ITMO achieves label Z Validation by DOE 1 Verification by DOE 2	
General information		
Registry of issuance	National registry of country X	
Other information on host country NDC, stringency etc.	Description of NDC	
International tracking system	Transaction log A and transaction log B both hold records of this transaction	

Information item	Illustrative examples	Remark
Process for corresponding adjustment	Documentation on if and how corresponding adjustment for this ITMO is to be carried out	Only if corresponding adjustments are necessary
Adjustments / discounts	A 95 % discount has been applied at issuance.	E.g. for an emission reduction that in the domestic system would generate 100 tonnes, only 95 tonnes are transferred internationally
Process on how international transfer will contribute to an "overall mitigation in global emissions"	The transferring country applies a corresponding adjustment for 100 % of the emission reductions, whereas the acquiring country cancels X % of these reductions and uses only part of them towards achieving its NDC target	
Standard used to measure contribution of action to sustainable development	Label X is applied	Opportunity for transferring country to demonstrate how the provision of "promotion of sustainable development" in Article 6.1 is achieved
Other technical data	Data related to information safety and security, checking of data, consolidation in case of inconsistencies between national registries, timestamp, etc.	

Source: Authors' own compilation

7.5 Transparency on international transfers: reporting, review and compliance

In the architecture of the Paris Agreement, transparency is a key element. Tracking international transfers of mitigation outcomes contributes to transparency in the Paris Agreement. Transparency generally refers to the reporting of information as well as the subsequent review of (some of) this information, including review of compliance. Furthermore, transparency builds mutual trust and confidence and allows progress to be tracked.

In the Paris Agreement, the enhanced transparency framework for action and support (Article 13) as well as several other provisions require or contribute to transparency. In the following, the relevant treaty provisions on reporting, review and compliance, based on which the necessary transparency may be achieved, will be discussed. Transparency may be easier to provide with a centralized governance of issuance, tracking and use of units. The focus in the following elaborations will be on a system with decentralized governance without issuance of international units (as described in section 7.3).

7.5.1 Transparency framework of the Paris Agreement

The transparency framework for action and support provides a common framework applicable to all Parties. A 'built-in flexibility' takes into account Parties' different capacities (Article 13.1). Modalities, procedures and guidelines are currently developed that are 'common' for all Parties (Article 13.13). The information provided by Parties undergoes, in a first step, a technical expert review (Article 13.11), which includes a review of the consistency of the information with the modalities, procedures and guidelines (Article 13.12). In a second step, there is a multilateral consideration of progress (Article 13.11). The aim of the framework is, amongst other things, to provide a clear understanding of climate change action, including clarity and tracking of progress towards achieving Parties' NDC targets (Article 13.5).

With regard to mitigation, Parties have to provide their national inventory reports as well as information necessary to track progress made in implementing and achieving their NDCs (Article 13.7) and account for their NDCs (Article 4.13). This also requires information on their engagement in international transfers of mitigation outcomes under Article 6. Thus, when elaborating the common guidelines for the transparency framework, Parties could clarify what information Parties that choose to engage in cooperative approaches have to provide.

Systematic tracking of international transfers may lead to more consistency and also transparency of information reported by countries.

The Paris Agreement introduces a global stocktake (Article 14) to assess collective progress towards long-term goals every five years. The outcome shall help Parties in updating and enhancing their NDCs. The transparency framework informs the global stocktake (Article 13.5) and the Parties' reports are discussed as possible sources (APA 2017a, pp. 9-10). Consequently, the information on international transfer of mitigation outcomes could be integrated in the information considered in the global stocktake. Finally, the Paris Agreement also foresees a mechanism for compliance review (Article 15). The modalities and procedures, including the scope and what information will be reviewed, are currently under consideration. Nevertheless, the discussions include the possibility that Parties' reports and accounting information are a trigger for the committee to become active (APA 2017b).

7.5.2 Reporting transparent information

As established in section 7.4, information on the number of units transferred or acquired, country of origin or destination, the vintage of the mitigation outcomes, and the scope in relation to the NDC target are the basic information that the transferring country and acquiring country would need to provide for robust accounting for ITMOs. The Parties could be required to report, in a similar way to the SEF tables, the total quantities of ITMOs held at the beginning of the reported year, the net international flows between accounts, the net transactions and the resulting total quantities of ITMOs at the end of the reported years.

The information could be reported under Article 13.7, in addition to the GHG inventories that Parties are required to submit. It should be kept in mind that there are different time schedules for the submission of this information. Generally, it is required that all Parties submit the information on a biennial basis (para. 90). Those Parties that are currently submitting their inventories on an annual basis shall maintain this higher frequency (para. 92(e)). In addition, LDCs and SIDS may submit the information at their discretion (para. 90).

The information by Parties would then be submitted to the technical expert review. The reviews are foreseen to take place on a regular basis (para. 91), but the year of the first and subsequent reviews are still to be defined and there are very different views on the frequency (UNFCCC 2017, p. 28). If only the minimum information specified above is provided, it would be difficult for the expert review teams to fulfil their task. Additional information (as suggested in section 7.4) would be helpful to check that corresponding adjustments have been made or to consider the impact of ITMOs on the implementation and achievement of a Party's NDC.

A summary of the net flows would allow an overview, on an aggregated level, of the transfer of mitigation outcomes. A regularly updated summary could be useful for the technical expert reviews. It could also be helpful for the technical expert reviews to have access to a platform similar to the current web-based platform of the UNFCCC secretariat on countries' reporting under the Convention and the Kyoto Protocol. Particularly if only the minimum information is provided by Parties, it would enable a better check of the consistency of information. In any case, and as mentioned above, there are different frequencies for Parties to submit information under Article 13.7, with the result that such a platform would not necessarily guarantee timely information.

The transparency framework's purpose would also be better fulfilled with information beyond the minimum requirements identified above. Information on, for example, unit quality or mitigation sector and project type would contribute to a clearer understanding of climate action, including clarity and tracking of progress (Article 13.5). Since the transparency framework also informs the global stocktake, more elaborate information would also be interesting for an analysis on aggregate level, e.g. on the sectors involved and contribution of international transfers to the overall mitigation of global emissions. In turn, such an analysis could provide valuable information for the Parties when formulating their successive NDCs based on the global stocktake (Article 4.9), especially for the formulation of their targets and for an indication of the extent to which they plan to use cooperative approaches.

7.5.3 Transparency in governance

Article 6.2 requires Parties engaging in cooperative approaches to ensure transparency also in governance. There seem to be two elements to this: on the one hand, a governance structure that is clear, sensible and effective, and on the other hand, the provision of relevant information for third parties to understand the governance structure. Governance not only refers to the national process for issuing units, including ensuring their quality, but also to the cooperative approach for the transfer of mitigation outcomes. Countries engaging in cooperative approaches should therefore be required to provide relevant information on the governance structure to track the issuance, transfer and use of units. This information could be provided together with the information that they are submitting on a regular basis under Article 13.7 (inventory and information necessary to track progress).

From the transferring country, information could be required on how the quality of units is ensured, the double issuance is avoided and the issuance of units is approved (see also section 7.4). If the country makes use of crediting mechanisms operated by third parties, instead of establishing a dedicated national process, it could limit the information by referring to the standards. Both Parties could then be required to provide information on the governance structure of the cooperative approach, including on how the ownership of units is tracked.

In order to assure comparability of the information, the reporting format should be clarified in the international guidance on Article 6.2. As a minimum, the Parties could be required to attach their bilateral agreement, Memorandum of Understanding or a common letter providing the relevant governance related information, such as the existence of an executive board. Instead, Parties could also be required to fill in a common form. Such a common form would help to clarify and standardize the information needed for transparency. Additionally, Parties could be required to declare ex-ante a transfer on this form and then have it signed by the focal points with regard to the corresponding adjustments.

The transparency of the governance structure could further be increased through a repository in the form of, for example, an online platform, possibly managed by the UNFCCC secretariat. Parties involved in cooperative approaches could be required to provide all relevant information and to ensure that all actors have continuous access to the information. For example, Parties could be required to provide the bilateral agreement, MoU or common form on corresponding adjustments as well as information on their national processes or standards that ensure the quality of units.

8 Conclusions

This discussion paper explored key aspects of robust accounting for international transfers under Article 6 of the Paris Agreement. A key feature of the Paris Agreement is the national self-determination of contributions. As a consequence, current NDCs show a large diversity in several aspects, including how mitigation targets are expressed, which sectors and gases they cover, which time frames they are applicable to, and which methods and metrics they employ. This diversity of current NDC targets makes accounting for international transfers more complex, compared to the framework of the Kyoto Protocol under which mitigation targets were expressed as economy-wide absolute emission budgets for defined time periods and a defined basket of GHGs.

In developing international rules on robust accounting of international transfers under Article 6, the diversity of NDCs could be addressed in two generic ways:

- ▶ by developing rules that aim to reflect the diversity of NDCs and enable international transfers between different types of NDCs; or
- ▶ by agreeing internationally, among groups of countries, or bilaterally on common elements that make NDCs more compatible for international transfers.

These approaches can be combined and Parties may have to carefully balance when to pursue which approach. On the one hand, common elements should not infringe on the self-determination of NDCs. On the other hand, the more diverse the NDCs are, the more complex and prone to errors may robust accounting become. This paper identified a number of options for both approaches.

The Paris Agreement provides for some elements that may, over time, moderate the current diversity of NDCs and make accounting for international transfers under future NDCs less complex. Article 4.10 requests Parties to consider common time frames for NDCs. Article 4.4 requires economy-wide absolute emission reduction targets for developed countries and encourages developing countries to move over time towards economy-wide emission reduction or limitation targets in the light of different national circumstances. Paragraph 31(a) of decision 1/CP.21 suggests that the guidance under Article 4.13 should ensure that Parties account for emissions and removals in accordance with common metrics by the IPCC. If mitigation targets are applicable to common time frames, economy-wide, and expressed in common GHG metrics, accounting for international transfers would be already greatly facilitated compared to the current diversity of NDCs.

Finally, an important question is how the general accounting provisions under the Paris Agreement relate to the specific provisions for international transfers under Article 6. We recommend exploring a tiered or modular approach, with general accounting provisions being applicable to all countries for the purpose of accounting for their NDCs, and specific provisions required for robust accounting of international transfers being applicable to those countries wishing to engage in international transfers.

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