Environmental Integrity under Article 6 of the Paris Agreement

Discussion Paper

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Abstract

This discussion paper explores key issues and options to achieve environmental integrity under Article 6 of the Paris Agreement. It proposes that environmental integrity in context of Article 6 means that using international transfers does not result in higher global GHG emissions than if mitigation targets of NDCs had been achieved only through domestic mitigation action. The paper identifies four issues that can affect the global GHG emissions outcome from international transfers: robust accounting for international transfers; the quality of units from mechanisms; the ambition of the NDC target of the transferring country; and presence of incentives and disincentives for further mitigation action. A particular risk is the international transfer of „hot air". Based on global GHG emissions and the communicated NDCs, it is estimated that global mitigation action be undermined by up to 68 % if all hot air in current NDCs would be transferred. The paper identifies and discusses seven options to mitigate environmental integrity risks from international transfers, including principles for international guidance on mechanism design and communication of NDCs, international reporting and review, eligibility criteria, limits on international transfers, exchange or discount rates, green investment schemes, and carbon clubs. Finally, the paper explores for crediting mechanisms how additionality could be demonstrated and how emission baselines could be set under the new framework of the Paris Agreement where nearly all Parties have communicated a mitigation target in their NDC.

Kurzbeschreibung

Das vorliegende Diskussionspapier erörtert wichtige Aspekte und Optionen zur Erreichung von Umweltintegrität unter Artikel 6 des Pariser Klimaabkommens. Es wird vorgeschlagen, Umweltintegrität im Kontext von Artikel 6 so zu definierten, dass der internationale Transfer nicht zu höheren globalen THG-Emissionen führt, als wenn die Reduktionsziele von NDCs nur durch die Umsetzung nationaler Massnahmen erreicht würden. Es werden vier Aspekte identifiziert, die bei einer internationalen Übertragung von Emissionseinheiten die globalen THG-Emissionen beeinflussen: robuste Bilanzierung der internationalen Übertragungen; die Qualität der Emissionseinheiten eines Mechanismus; das Ambitionsniveau der Minderungsziele; und Anreize für weitere Massnahmen zur Emissionsreduktion. Eine besondere Gefahr stellt dabei die Übertragung von „heißer Luft" dar. Basierend auf den globalen THG-Emissionen und den kommunizierten NDCs wird geschätzt, dass die Anstrengungen zur globalen Treibhausgasminderung um bis zu 68 % reduziert werden können, falls die gesamte derzeitige „heiße Luft" international übertragen werden würde. Es werden sieben Optionen identifiziert und diskutiert, wie Risiken für die Umweltintegrität bei internationalen Übertragungen vermindert werden können: Prinzipien für internationale Richtlinien für die Ausgestaltung von Mechanismen und Klimazielen, internationale Berichterstattung und Überprüfung, Auswahlkriterien, Limitierung von internationalen Übertragungen, Wechselkurse oder Diskontsätze, grüne Investitionsmodelle, sowie Kohlenstoffclubs bzw. Carbon Clubs. Schliesslich erörtert das Diskussionspapier, wie unter dem neuen Rahmen des Pariser Klimaabkommens, unter welchem fast alle Länder Ziele zur Emissionsminderung kommuniziert haben, bei Mechanismen mit Emissionsgutschriften die Zusätzlichkeit nachgewiesen und Referenzemissionen berechnet werden können.

Executive summary

Article 6 of the Paris Agreement introduces provisions for using international market mechanisms to fulfil 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 under international oversight.

The Paris Agreement includes several provisions that aim to ensure environmental integrity of international market mechanisms: Article 6.1 and 6.2 explicitly refer to environmental integrity, Article 6.4 establishes several principles relating to environmental integrity, and Article 4.13 requires Parties to promote environmental integrity in accounting for their NDCs.

This discussion paper explores key issues and options to achieve environmental integrity under Article 6 of the Paris Agreement. We understand environmental integrity to mean that the use of international transfers does not result in higher global greenhouse gas (GHG) emissions than if the NDC targets had been achieved only through domestic mitigation action, without international transfers. We identify that environmental integrity of international carbon market mechanisms under Article 6 is influenced by four main aspects:

- **Robust accounting** of international transfers is a key prerequisite for ensuring environmental integrity. If the transfer of mitigation outcomes is not accounted for robustly, e.g. if emission reductions are double counted, global GHG emissions could increase as a result of the transfer. Robust accounting includes, among others, that double claiming is avoided, that the NDC targets are expressed in quantitative terms, and that vintages of NDC targets and emission reductions are appropriately accounted for.
- The **quality of units, as issued by the underlying mechanism**, can impact the emissions level in the transferring country. We define that units have quality if the underlying mechanism ensures that the issuance or transfer of one unit, defined as 1 t CO_2eq, directly leads to an emission reduction of at least 1 t CO_2eq in the transferring country, compared to the situation in the absence of the mechanism.
- The **ambition and scope of the NDC target** of the transferring country can affect the global GHG emissions outcome from international transfers in indirect ways. A country with an ambitious economy-wide NDC target has an incentive to ensure that mechanisms issue units that have quality: if it transfers units that lack quality to another country, it would have to compensate for the transfer in order to still achieve its NDC target, by either further reducing emissions or purchasing international units. By contrast, if a country’s NDC target is less stringent than business-as-usual (BAU) emissions or if some emission sources are not included in the scope of its target, it could transfer units that lack quality without infringing its ability to achieve its target, so there is no direct incentive to ensure unit quality.
- The possibility to participate in international transfers of mitigation outcomes could provide **incentives or disincentives for future mitigation action**. International market mechanisms could lower the cost of mitigation, and thereby enable countries to adopt more ambitious targets. Yet participation in international market mechanisms could also create disincentives to pursue mitigation action in the future. The possibility to participate in international transfers of mitigation outcomes could thus affect global GHG emissions indirectly.

Assuming that robust accounting is applied, we identify that environmental integrity risks from international market mechanisms mainly arise in situations where either:

1. Emission sources are not included within the scope of an NDC target; or
2. The transferring country has an NDC target that is less stringent than BAU (and therefore contains „hot air“).

In both cases, the transfer of units that lack quality would directly increase global GHG emissions. Importantly, in these situations the transferring country does not have a direct incentive to ensure the quality of units. International rules on the implementation of Article 6 may thus be particularly important in these instances.

Based on these findings, we explore the maximum potential impact from a lack of unit quality on global GHG emissions under current NDC targets, by assessing the ambition of NDC targets and which share of global GHG emissions is not included in scope of NDC targets. In aggregate levels, current NDC targets represent a decrease compared to projected worldwide BAU emissions in 2030; yet up to 68 % of the mitigation ambition contained in NDCs that are more stringent than BAU could be undermined if all hot air from NDCs that are less stringent than BAU were to be transferred.

Moreover, approximately 12 to 14 % of global emissions in 2030 are not covered by NDC targets. In total, under a scenario reflecting the lower end of the ambition of current NDC targets, nearly 10 G t CO_2eq in 2030 either represent hot air or are not included in current NDC targets. Under the higher end of the ambition of current NDC targets, the figure still lies above 8 G t CO_2eq. For this to materialize, however, the supply would have to be matched by demand. The current expected demand for international transfers in the 2020-2030 period is limited. Once international market mechanisms and rules under Article 6 are operationalized, however, more countries may intend to make use of them. Another important question is whether and how acquiring countries will prioritize units that have quality.

We identify and discuss several options for achieving environmental integrity. Robust accounting is a key prerequisite for ensuring environmental integrity of international transfers. Assuming robust accounting, we identify three broad approaches for addressing environmental integrity: The first relates to ensuring that market mechanisms generate units that have quality; the second would aim to facilitate that all countries have economy-wide and ambitious mitigation targets; and the third strategy would aim to prevent that mitigation outcomes are transferred from countries with hot air or emission sources not included in NDC targets. These strategies are largely complementary and could be implemented in parallel.

Ensuring that market mechanisms generate units that have quality

If the units issued by the underlying market mechanisms have quality, then their transfer does not lead to higher global GHG emissions, even if the transferring country has an NDC target less stringent than BAU or if the units are generated outside the scope of its NDC target (subject, however, to robust accounting and excluding possible disincentives for future ambition). The factors that affect the unit quality depend on the type of mechanism:

- Under *crediting mechanisms*, the quality of credits is ensured if the emission reductions are additional, not overestimated, and permanent.
- Under *emissions trading schemes* (ETSs), the quality of allowances mainly depends on whether the ETS cap is set below the emissions level that would occur in the absence of the trading system, and whether emissions are monitored appropriately.
- In *other types of transfers*, and where mitigation outcomes from specific mitigation actions are intended to be transferred, the quality of the transferred units hinges on similar criteria as for crediting mechanisms. Where direct bilateral transfers occur without implementing any mitigation action, the transferred units would not have quality.

For crediting mechanisms, demonstrating additionality and establishing baselines are key challenges for environmental integrity. The methodological approaches in current CDM rules for demonstrating additionality and setting baselines have to be revisited to reflect NDC targets. This implies ensuring that credited activities would not be fully or partially implemented under the policy framework to achieve the NDC target and that baselines are set consistent with NDC targets. Our preliminary analysis suggests that additionality demonstration and baseline setting under NDC targets is easier on a sector level than on a project/ programme level. Particular caution is also needed when crediting activities that are not included in the scope of the NDC target or when NDC targets are less stringent than BAU. Crediting periods may have to be limited or the additionality demonstration or baseline setting may have to be updated regularly, to reflect a possible increase in the ambition or scope of NDC targets when they are updated.

Within the context of the Paris Agreement, the quality of units generated by mechanisms could be mainly addressed through the guidance on Article 6.2 and through the rules, modalities and procedures of Article 6.4. Guidance on crediting under Article 6.2 may be particularly important to prevent a situation where countries evade relevant standards under Article 6.4 by establishing crediting schemes that could have less quality than under Article 6.4. Several approaches could be pursued to facilitate unit quality under Article 6:

- **Principles** could help establish **international guidance on mechanism design** that guides Parties in implementing mechanisms under Article 6.2. Principles could also guide the development of rules, modalities and procedures for the Article 6.4 mechanism. Key principles could include a definition of environmental integrity and that international transfers should be underpinned by the use of mechanisms that ensure integrity, implying that transfers without directly linked mitigation actions would not be eligible. The implementation of and use of mechanisms could be subject to reporting and review.

- Building upon principles for mechanisms, **eligibility criteria** for mechanisms could establish minimum requirements for mechanisms to generate units that can be used for the achievement of NDC targets.
- **Exchange rates** do not seem a feasible option to address environmental integrity of international transfers, as they could unintentionally lead to higher levels of global GHG emissions. **Discount rates** could mitigate the risks but face a number of challenges.
- **Green investment schemes**, if designed and implemented appropriately – i.e. ensuring additionality, adequate quantification, a greening ratio of at least 1, and permanence – could underpin direct bilateral transfers from countries with NDC targets that are less stringent than BAU. Under the Kyoto Protocol, however, they did not prove to be effective to address environmental integrity concerns.
- Finally, **carbon clubs** could implement these measures to its membership, for example, by limiting international unit transfers to specific mechanisms or countries.

Facilitating that the transferring country has, or moves to, economy-wide and ambitious mitigation targets

If the transferring country has an economy-wide mitigation target that is more stringent that its BAU emissions, then international transfers of mitigation outcomes do not lead to higher global GHG emissions even if units lack quality (subject to robust accounting and excluding possible disincentives for future ambition). Articles 3 and 4.3 of the Paris Agreement state that countries' successive NDCs „will" represent a progression over time, and NDCs are expected to reflect countries' „highest possible ambition". Yet the Paris paradigm is one of self determination and countries are, ultimately, sovereign to establish their own NDC targets. And while participation in international market mechanisms could contribute to higher ambition (e.g. by reducing costs and increasing awareness), it could also create perverse incentives for countries to set NDC targets less ambitious or to define their scope more narrowly, in order to accrue more benefits from transferring mitigation outcomes.

A number of actions could facilitate that countries enhance the ambition and scope of their NDC targets over time:

- **Principles** could help establish **international guidance on communication of NDCs**, alongside a robust system of **reporting and review**, with the view to facilitate progression of NDC targets in ambition and scope, by increasing transparency on NDC targets and on progress in achieving them. The following principles on communication of NDC targets could be considered: clarity, conservativeness, fairness, and progression.
- **Eligibility criteria** for the participation in international market mechanisms could be based on reference levels that provide incentives for countries to increase the ambition of their NDC targets, so as to benefit from access to international market mechanisms.
- Appropriately defined **limits** on international transfers could have a similar effect as eligibility criteria.
- Similarly, **carbon clubs** requiring a certain level of ambition or carbon price to access the club, could also provide incentives for higher ambition, albeit only within the club.

Preventing that units are transferred from countries with hot air or emission sources not covered by NDC targets

Much like ensuring ambitious mitigation targets, environmental integrity in international carbon markets could be pursued by preventing the transfer of mitigation outcomes from countries with NDC targets that are less stringent than BAU or from emission sources not covered by NDC targets. **Eligibility criteria, limits**, and accession criteria to **carbon clubs**, as mentioned above, could be options to pursue this approach. This approach could partially also address concerns that countries could have perverse incentives to set future NDC targets unambitiously or to define their scope narrowly. If ambitious NDC targets and their progression were a prerequisite for participation in international market mechanisms, a key challenge for safeguarding environmental integrity under Article 6 would be addressed.

All three strategies discussed above have prospects but also face limitations. We recommend that all strategies be further explored. Some of these strategies may be pursued in parallel, to provide a higher assurance of environmental integrity. Countries could also implement tiered approaches that provide more flexibility while still ensuring integrity.

International rules could, for example, establish eligibility criteria or limits in ways that allow countries with ambitious economy-wide NDC targets to transfer units without demonstrating their quality, while international oversight be provided for emission sources outside the scope of NDC targets or for NDC targets less stringent than BAU, such as by limiting transfers in such situations to the Article 6.4 mechanism.

Overall, the environmental integrity risks from Article 6 depend on the extent to which international carbon market mechanisms will be used. The potentially large supply from countries with hot air or emissions sources not included in NDCs is only a risk where it is met with demand. Currently, only few countries have stated an interest in acquiring international units, although demand might increase once mechanisms are in place. If there is political will among acquiring countries to ensure environmental integrity, and if environmental integrity pitfalls are clearly visible – through transparency on the quality of mechanisms and on the ambition and scope of NDCs –, then political commitments might complement rules at international level. Major potential acquiring countries could, for example, agree not to purchase units from certain countries, and to purchase units sourced outside the scope of NDCs only through mechanisms that ensure unit quality. This could for example be done in the form of a political declaration, similar to the one included in Annex II to decision 1/CMP.8. Such declarations would, of course, have to be implemented at national policy level. Another strategy could be based on the consideration of the environmental integrity risks from different types of mechanisms: internationally linked ETSs are likely to pose lower environmental integrity risks than crediting mechanisms or other types of transfers. Groups of countries (or „carbon clubs“) could also agree to refrain using mechanism types that involve higher risks for environmental integrity.

Where resolutions or carbon clubs are important for ensuring the integrity of international market mechanisms it is important to bear in mind that clubs are exclusionary and can only ensure environmental integrity within the club. Moreover, the effectiveness of a club preventing the transfer of units that lack quality relies on the willingness of club members to ensure environmental integrity. A low-ambition carbon club could undermine the abatement effort within the club and provide a competitive advantage to club members compared to other countries (or clubs) with higher mitigation ambition.

Finally, we also identify two important considerations for using international crediting mechanisms under Article 6. First, using crediting mechanisms as international support to countries for achieving their conditional NDC targets poses a dilemma: if the donor uses the credits to achieve its NDC target and if double counting is avoided, the use of international mechanisms does not actually support to the transferring country in achieving its NDC target. If double counting were not avoided, using international market mechanisms would lead to higher aggregated GHG emissions. A possible solution could be using international crediting mechanisms as a tool to deliver results-based climate finance instead of the donor country using the units to achieve its NDC target.

Second, achieving a „higher ambition“, as envisaged under Article 6.1 of the Paris Agreement, or an „overall mitigation in global emissions“, as envisaged under the Article 6.4 mechanism, can be complex. If global GHG emissions should decrease due to a transfer, a part of the mitigation outcome should not be used towards achieving NDC targets – neither by the transferring nor by the acquiring country. Common strategies pursued by crediting mechanisms to achieve net GHG emission reductions – in particular using conservative baselines or discounting of emission reductions – do not necessarily achieve this. If global GHG emissions should be reduced as a result of an international transfer, other approaches could be considered: for example, the acquiring country may only account for part of the transferred units towards achieving its NDC and cancel the remainder.

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Abbreviations

AAU	Assigned amount unit
BAU	Business-as-usual
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFL	Compact fluorescent lamp
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
DNA	Designated National Authority
ERU	Emission reduction unit
ETS	Emission trading scheme
GHG	Greenhouse gas
IAR	International assessment and review
ICA	International consultation and analysis
INDC	Intended nationally determined contribution
IPCC	Intergovernmental Panel on Climate Change
ITMO	Internationally transferred mitigation outcome
JI	Joint Implementation
KP	Kyoto Protocol
LEDS	Low-emission development strategies and plans
MAPS	Mitigation action plans and scenarios
LULUCF	Land use, land use change and forestry
NDC	Nationally determined contribution
QELRO	Quantified emission limitation or reduction objective
t CO_2eq	Tonnes of CO_2 equivalent
UNFCCC	United Nations Framework Convention on Climate Change

1 Introduction

Article 6 of the Paris Agreement introduces provisions for using international market mechanisms to fulfil 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 account those outcomes towards their NDCs.

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 environmental integrity of international market mechanisms. Article 6.1 and 6.2 explicitly refer to environmental integrity. The Article 6.4 mechanism aims to ensure environmental integrity by providing for international oversight and by establishing several principles, such as additionality and third party verification. Article 4.13 also requires Parties to promote environmental integrity in accounting for their NDCs.

This discussion paper explores key issues and options to achieve environmental integrity 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 the mechanisms under the Kyoto Protocol and other market mechanisms, and submission by Parties and non-governmental organizations.

We first explore how environmental integrity could be defined in the context of Article 6 and identify what aspects matter for environmental integrity (section 2). We understand that environmental integrity in international market mechanisms means that the use of international transfers does not result in higher global GHG emissions than if the mitigation targets in NDCs had been achieved only through domestic mitigation action, without international transfers. We identify four factors that can influence environmental integrity in the context of Article 6: robust accounting; the quality of units as issued by the underlying mechanisms; the ambition of the NDC targets of the transferring country; and incentives or disincentives for future mitigation action due to the possibility to participate in international mechanisms. Robust accounting is a key prerequisite for ensuring environmental integrity. In this paper, however, we do not explore options for robust accounting, but rather focus on the other three factors impacting environmental integrity. We assume throughout the paper that robust accounting will be applied, including the avoidance of double counting and the appropriate accounting for the vintage of mitigation outcomes.

Assuming that robust accounting is applied, we find that ensuring environmental integrity is a particular challenge in two situations: if emissions sources are not included in the scope of NDC targets or if NDC targets are less stringent than business-as-usual (BAU) emissions. Based on this finding, we explore in section 3 the maximum potential impact from a lack of unit quality on global GHG emissions under current NDC targets, by assessing whether, and the extent to which, NDC targets are less stringent than BAU and which share of global GHG emissions is not included in scope of NDC targets. In section 4, we identify three broad approaches and several specific options for addressing environmental integrity, focussing on measures that could be pursued at international level, and then turn to the more specific question how additionality could be demonstrated and how emissions baselines could be set for crediting mechanisms in the new context of the Paris Agreement (section 5). Finally, we draw overall conclusions (section 6).

This paper is part of a larger research project exploring different aspects of international rules for Article 6. Previous papers discuss the differences and commonalties between the market mechanisms under the Paris Agreement and the Kyoto Protocol (Schneider et al., 2016b), provide preliminary findings on approaches for robust accounting of international transfers (Schneider et al., 2016a), and evaluate (I)NDCs with regard to features that are critical for robust accounting of international transfers (Graichen et al., 2016). Further papers will be produced during 2017.

When exploring and discussing options for safeguarding environmental integrity, we make several assumptions and use specific terminology. 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. Accordingly, when referring to „mitigation outcomes", this includes both ITMOs generated under Article 6.2 and emission reductions resulting from the Article 6.4 mechanism. We assume that mechanisms would issue units, noting though that our findings also hold if no formal units were issued. For simplicity, we assume that mitigation outcomes and units will be expressed as metric tonnes of CO_2 equivalent (t CO_2eq). 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, when referring to mitigation targets contained in NDCs, we refer to „NDC targets".

2 What matters for environmental integrity of Article 6?

2.1 What is environmental integrity?

The term „environmental integrity" is used several times in the Paris Agreement as well as in decisions under the UNFCCC and the Kyoto Protocol, but has not been clearly defined. The Paris Agreement and decision 1/CP.21 refer five times to environmental integrity:[1]

- Paragraph 92(g) of decision 1/CP.21: The Ad Hoc Working Group on the Paris Agreement, in developing the recommendations for the modalities, procedures and guidelines for the transparency of action and support, to take into account the need to ensure environmental integrity;
- Paragraph 107 of decision 1/CP.21: Parties to report transparently on internationally transferred mitigation outcomes, including outcomes used to meet [pre-2020] international pledges (...) with a view to promoting environmental integrity and avoiding double counting;
- Article 4.13: Parties to promote environmental integrity in accounting for their NDCs;
- Article 6.1: Parties choosing to pursue voluntary cooperation in the implementation of NDCs to promote environmental integrity;
- Article 6.2: Parties to ensure environmental integrity where engaging in cooperative approaches.

Most Parties seem to view environmental integrity in the context of risks of undermining GHG mitigation action, and not related to possible other environmental damages. Some Parties mention environmental integrity risks in the context of additionality or transfers of „hot air" from countries with unambitious mitigation targets. In their submissions under Article 6, none of the Parties have provided a definition for environmental integrity.

In the context of Article 6, we understand that environmental integrity means that the use of international transfers does not result in higher global GHG emissions than if the mitigation targets in NDCs had been achieved only through domestic mitigation action, without international transfers. In other words: environmental integrity is ensured if the transfer of mitigation outcomes leads to the same or to lower aggregated global GHG emissions. We thus define environmental integrity in the context of climate mitigation and GHG emissions, and do not consider other environmental impacts, such as impacts on water, land, or biodiversity.

Whether and how environmental integrity should be addressed under Article 6 is a controversial topic among Parties to the UNFCCC. The Article 6.4 mechanism has a number of provisions that aim to safe-guard environmental integrity. These include requiring that mitigation benefits be real, measurable and long term; that additionality is ensured; that emission reductions be verified and certified by designated operational entities; and that an overall mitigation in global emissions is achieved. These provisions will be further elaborated and operationalized in the rules, modalities and procedures for Article 6.4, relevant decisions by the CMA, and rules by the body supervising the mechanism. There is broad agreement that these international rules will include provisions on environmental integrity.

1 A preambular paragraph notes „the importance of ensuring the integrity of all ecosystems (...)", but refers to „integrity" instead of „environmental integrity".

Article 6.2 is less specific on how to achieve environmental integrity; it requires Parties to „ensure environmental integrity" where engaging in cooperative approaches. Parties have different views whether or to what extent the international guidance on Article 6.2 should address environmental integrity. Some Parties argue that the guidance should be limited to robust accounting; others propose that the guidance should extend to other requirements under Article 6.2, including environmental integrity. It is also unclear how the general principles of Article 6.2 – environmental integrity, transparency, sustainable development and robust accounting – relate to each other. For example, some Parties consider environmental integrity an element of sustainable development. Robust accounting could also be seen as a prerequisite for ensuring environmental integrity.

Parties also still need to define how the provisions under Article 6.2 relate to the accounting provisions of Article 4.13, which includes further principles – next to those under Article 6.2– including that Parties should promote „transparency, accuracy, completeness, comparability and consistency, and ensure the avoidance of double counting".

2.2 What influences environmental integrity?

Parties engaging in international transfers of mitigation outcomes usually intend to achieve, for every transferred mitigation outcome, a 1 t CO_2eq of emission reductions in the transferring country, while allowing the acquiring country to emit 1 t CO_2eq more. In this case, global GHG emissions would remain the same, while the costs of GHG abatement may be reduced. In practice, the impact of international transfers of mitigation outcomes on global GHG emissions is more complex: global GHG emissions could remain the same, increase, or in some instances, decrease, depending on several aspects.

Four main factors can influence the global GHG emissions outcome of international transfers of mitigation outcomes (Schneider et al., 2016c):

1. **Robust accounting** of international transfers is a key prerequisite for ensuring environmental integrity. If the transfer of mitigation outcomes is not accounted for robustly, e.g. if emission reductions are double counted, global GHG emissions could increase as a result of the transfer.
2. The **quality of units, as issued by the underlying mechanism**, can impact the emissions level in the transferring country. We define that units have quality if the underlying mechanism ensures that the issuance or transfer of one unit, defined as 1 t CO_2eq, directly leads to an emission reduction of at least 1 t CO_2eq in the transferring country, compared to the situation in the absence of the mechanism. We thus consider here the direct emissions outcome from the underlying mechanism, independently of other factors, such as the ambition and scope of the NDC target of the transferring country or robust accounting for unit transfers.
3. The **ambition and scope of the NDC target** of the transferring country can affect the global GHG emissions outcome from international transfers in indirect ways. A country with an ambitious economy-wide NDC target has an incentive to ensure that mechanisms issue units that have quality: if it transfers units that lack quality to another country, it would have to compensate for the transfer in order to still achieve its NDC target, by either further reducing emissions or purchasing international units. By contrast, if a country's NDC target is less stringent than BAU emissions or if some emission sources are not included in the scope of its target, it could transfer units that lack quality without infringing its ability to achieve its target, so there is no direct incentive to ensure unit quality.
4. The possibility to participate in international transfers of mitigation outcomes could provide **incentives or disincentives for future mitigation action**. International market mechanisms could lower the cost of mitigation, and thereby enable countries to adopt more ambitious targets. Yet participation in international market mechanisms could also create disincentives to pursue mitigation action in the future. The possibility to participate in international transfers of mitigation outcomes could thus affect global GHG emissions indirectly.

In the sections that follow, we discuss each of these four main factors further.

Other aspects can also impact environmental integrity, but are not the focus of our analysis: Units from mechanisms could be either used by the acquiring country to achieve its NDC target, or they could be acquired for other purposes, such as cancellation in the context of a results-based climate finance programme.

If units were not used to achieve an NDC target, a lack of unit quality would not necessarily lead to higher global GHG emissions. In this paper, however, we only analyse the situation where internationally transferred units are used to achieve NDC targets. Similarly, the global GHG emissions impact depends on whether countries intend to achieve their NDC targets; if a transferring country has no intention to achieve its NDC target, this could also affect the global GHG emissions outcome from transfers. However, we assume in our analysis that countries intend to achieve their NDCs targets.

Finally, transparency could be seen as a cross-cutting prerequisite or means to achieve environmental integrity in the context of Article 6: it is needed to ensure robust accounting, to understand the ambition and scope of NDC targets, and to facilitate that units from mechanisms have quality.

2.2.1 Robust accounting of international transfers

Robust accounting of international transfers is a key prerequisite to ensure the environmental integrity of international transfers of mitigation outcomes. Poor accounting could increase global GHG emissions even if the units generated by the mechanisms have quality and the NDC target of the transferring country is economy-wide and more stringent than BAU.

Key issues that must be addressed to ensure robust accounting of international transfers include avoiding double counting of emission reductions and accounting for the vintage of mitigation outcomes in relation to mitigation targets. Robust accounting also requires expressing NDC targets in quantitative terms and quantifying the mitigation outcomes (Schneider et al., 2016a).

Robust accounting also implies that GHG inventories are transparent, accurate, complete, comparable and consistent. Emission reductions from mitigation actions are usually automatically reflected in GHG inventories (Schneider et al., 2016c). For example, a wind power project 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 power project will be automatically reflected in the GHG inventory. In some instances, however, GHG inventories could be incomplete or 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 some non-CO_2 gases. For example, in the case of a country that uses a simple Tier 1 default emission factor for estimating N_2O emissions from nitric acid production, the emissions impact of a crediting mechanism targeting N_2O emissions from nitric acid production would not show up as a lower emissions level in the GHG inventory. This issue has also been referred to as „visibility" of emission reductions in GHG inventories (Prag et al., 2013). Whether mitigation actions are reflected in the GHG inventory of the transferring country can impact the global GHG emissions outcome from international transfers (see Kollmuss et al. 2015 for a detailed discussion in the context of JI).

For the purpose of this paper, we assume that robust accounting is applied. Here we assume that this includes, in particular, that:

- Double claiming between the transferring and acquiring country is avoided on the basis of corresponding adjustments for both mitigation outcomes under Article 6.2 and emission reductions under Article 6.4;
- Corresponding adjustments are applied by the transferring country only if the emission reductions fall within the scope of the NDC target of the transferring country (otherwise no corresponding adjustment is needed);
- The level of the adjustment corresponds to the amount of units transferred;
- Emission reductions from mitigation actions implemented under mechanisms are reflected in GHG inventories;
- NDC targets are expressed in quantitative terms and GHG metrics and that the same GWP values are used by the transferring and the acquiring country; and
- The transferring and the acquiring country have the same target year or target period and that only mitigation outcomes occurring during that year or period are being transferred.

2.2.2 Quality of units from mechanisms

The quality of units, as issued by the underlying mechanism, strongly depends on the design of the mechanisms. The factors that affect the unit quality depend on the type of mechanism:

- Under **crediting mechanisms**, the quality of credits is ensured if the mitigation action is: (a) additional (that is, if it would not occur in the absence of the incentives from the crediting mechanism); (b) the emission reductions are not overestimated; and (c) the emission reductions are permanent (or provisions are in place to address non-permanence). Crediting mechanisms face particular challenges and limitations in assessing additionality and emissions baselines, inter alia due the information asymmetry between project developers and regulators and uncertainty of assumptions on future developments, such as international fuel prices.
  Ensuring that emission reductions are not overestimated involves several aspects, including that the emission reductions are real, measurable and attributable to the credited activity and that indirect emission effects are appropriately considered.
- Under **ETSs**, the quality of allowances mainly depends on (a) whether the ETS cap is set below the emissions level that would occur in the absence of the trading system, and (b) whether emissions are monitored appropriately. Other design features, such as price collars, allowance reserves, import of credits, and provisions for banking of allowances, also affect the quality of units – mainly by altering the cap. Weak caps have left several ETSs with an oversupply of allowances. If an ETS with a strong cap is linked to one that is overallocated, linking could reduce the overall emissions abatement from the two systems.
- The Paris Agreement could also enable **other types of transfers**, without using a crediting mechanism or linking two ETSs. This relates mainly to direct bilateral government-to-government transfers, which could be akin to transfers of AAUs under Article 17 of the Kyoto Protocol. In some instances, these transfers could be underpinned by mechanisms: under the Kyoto Protocol, for example, countries engaged in Green Investment Schemes (GISs) where revenues from international transfers of AAUs were invested in activities designed to assist climate change mitigation. Where mitigation outcomes from specific mitigation actions are intended to be transferred, the quality of the transferred units hinges on similar criteria as for crediting mechanisms (see section 4.6). Where direct bilateral transfers occur without implementing any mitigation action, the transferred units would not have quality.

2.2.3 Ambition and scope of NDC targets

The ambition and scope of the NDC targets of the transferring country can have considerable impact on the global GHG emissions outcome from international transfers. Countries with ambitious economy-wide targets have an incentive to ensure the quality of transferred units: if the transferring country has an economy-wide NDC target that is more stringent than BAU and transfers units that lack quality to another country, it would have to compensate for transfer in order to still achieve its NDC target, by reducing emissions further or purchasing mitigation outcomes from another country.

Countries with ambitious economy-wide NDC targets have thus incentives to ensure that the quality of the units they transfer – assuming that robust accounting will be applied and that countries will achieve their NDC targets. By contrast, if a country's NDC target is less stringent than its BAU emissions or if some emission sources are not included in the scope of its target, it could transfer units that lack quality without infringing its ability to achieve its target, so there is no direct incentive for the country to ensure the quality of the transferred units.

Under the Kyoto Protocol, transfers of assigned amount units (AAUs) and emission reduction units (ERUs) from Joint Implementation (JI) came mainly from countries with mitigation targets that were less stringent than their BAU emissions. These surplus units were also referred to as „hot air", and the vast majority of units transferred from these countries were assessed to have a poor quality (Kollmuss et al., 2015; Schneider and Kollmuss, 2015). Given that the ambition and scope of NDC targets varies greatly, similar problems could arise under the Paris Agreement if countries with NDC targets that are not economy-wide or less stringent than their BAU emissions transfer mitigation outcomes to other countries. The potential of such transfers is assessed in section 3.

In this context, two important questions are how BAU emissions are defined and how the ambition of mitigation targets could be assessed. First, the concept of BAU emissions can refer to different emission projection scenarios (Rogelj et al., 2016), including scenarios without any mitigation policies or with existing mitigation policies.

For the purpose of assessing the impact on global GHG emissions, it is important whether further mitigation action – beyond existing policies – would be undertaken by the transferring country. We therefore define BAU emissions as an emissions scenario that reflects the continuation of existing policies that were in place before the country adopted its NDC target.

Second, it is important to highlight that BAU emission projections are uncertain and may present a band rather than a single emissions level, as they depend on uncertain variables such as international fuel prices, technology development, economic growth or climatic changes. These variables are, furthermore, particularly vulnerable to shocks (such as natural catastrophes or economic crises), which can unexpectedly increase or decrease emissions and alter emission pathways. Targets set at different levels also matter: a country could have an NDC target that is laxer than domestic commitments, thereby creating a „cushion" or programmed surplus of units at international level. Some countries may set NDC targets not too stringent in order to ensure that they meet their target, while they may strive to reduce emissions further through respective policies. Another prerequisite for understanding the ambition and scope of mitigation targets is transparency, in particular how their scope is defined and how mitigation targets or actions are quantified.

Similar to the definition issues around BAU emissions, there is no agreed definition of „hot air". In this paper, „hot air" is understood as a surplus of units caused by a situation where the likely BAU emissions are below the emissions level of the NDC target, so that the country does not require taking mitigation action beyond existing policies (Boehringer, 2000; Kollmuss et al., 2015)[2]. We respectively refer to „NDC targets that are more stringent than BAU" and „NDC targets that are less stringent than BAU" to differentiate among the ambition of mitigation targets.

2.2.4 Incentives and disincentives for further mitigation action

Article 6.1 of the Paris Agreement requires that using international mechanisms should „allow for higher ambition" of mitigation or adaptation actions. International market mechanisms could enhance ambition in several ways: by reducing the cost of mitigation, they could enable countries to adopt more ambitious targets. Also, implementing mitigation projects under crediting mechanisms could help increase knowledge and awareness of climate issues, which might lead to enhanced mitigation efforts in the future. Market mechanisms could, moreover, accelerate technology diffusion in transferring countries, possibly providing spillover effects.

Yet participation in international market mechanisms can also create disincentives to pursue further mitigation action. Countries could have incentives to set mitigation targets at unambitious levels (e.g. by inflating their BAU emission projections and defining a target as a deviation from BAU), or to define their scope narrowly, in order to accrue more benefits from transferring mitigation outcomes internationally (Carbone et al., 2009). Similarly, international linking of ETSs could create an incentive for each system to make smaller cap reductions over time, since this would reduce the amount of units imported or increase the amount exported.

Under crediting mechanisms, transferring countries could have perverse incentives not to adopt mitigation policies, because they might lower the potential for generating and exporting credits (Spalding-Fecher, 2013). This poses a dilemma: If crediting mechanisms require project developers to consider mitigation policies and regulations in the demonstration of additionality, they may discourage policy-makers from adopting such policies. If they allow project developers to ignore mitigation policies and regulations, they credit activities that are not additional, because they would be implemented anyway due to the policies and regulations. Crediting mechanisms could also create perverse incentives for project developers to pursue a more GHG-intensive course of action, so the baseline from which emission reductions are credited is higher (Schneider and Kollmuss, 2015).

2 Hot air could also be defined against other reference levels. These could include, notably, different perspectives on how to define whether countries' targets are „fair" and „equitable" in keeping to the 2°C (or 1.5°) pathway, considering the principles of responsibility, capacity, needs and equality (Du Robiou Pont et al., 2016; Méjean et al., 2015). One could also argue that „shocks" that reduce emissions do not generate hot air if the target was set in good faith. We do not draw upon these concepts, because this paper intends to assess the GHG emissions impact from international transfers, for which it matters whether mitigation targets are less or more stringent than the likely emissions path with current policies in place.

2.3 How do the different factors influence the global GHG emissions outcome from international transfers?

Above we identified four main factors that can influence the global GHG emissions outcome from international transfers: robust accounting of international transfers; the quality of units as issued by the underlying mechanism; the ambition and scope of the NDC target of the transferring country; and incentives for future mitigation action.

Table 1 illustrates the impact of international transfers on global GHG emissions under different scenarios. In this analysis, we vary two of the four main factors:

1. The quality of the units as issued by the underlying mechanism, including that a unit corresponds to a mitigation effort of less than 1 t CO_2eq, exactly 1 t CO_2eq, or more than 1 t CO_2eq;
2. The scope and ambition of the NDC target of the transferring country, including that the mitigation outcomes fall outside the scope of the NDC target, that they fall within the scope of the NDC target and the NDC target is more stringent than BAU; and that they fall within the scope of the NDC target but the NDC target is less stringent than BAU.

We thus assume that robust accounting is applied and that the possibility to participate in international market mechanisms provides no incentives or disincentives for further mitigation action. We do not consider possible incentives or disincentives for further mitigation action, since it is difficult to assess which of possible effects – incentives or disincentives – would prevail. As pointed out above, we also assume that the transferred mitigation outcomes are used by the acquiring country to fulfil its NDC target and that the transferring and acquiring country intend to achieve their NDC targets. Below we explain the outcome for the scenarios.

Table 1: Impact of international transfers on global GHG emissions

Scope and ambition of the NDC target of the transferring country	Quality of units as issued by the underlying mechanism	Impact on global GHG emissions
No NDC target or the reductions fall outside the scope of the NDC target	▸ › 1 t CO_2eq	Decrease
	▸ = 1 t CO_2eq	Zero
	▸ ‹ 1 t CO_2eq	Increase
NDC target more stringent than BAU	▸ › 1 t CO_2eq	Zero
	▸ = 1 t CO_2eq	Zero
	▸ ‹ 1 t CO_2eq	Zero
NDC target less stringent than BAU	▸ › 1 t CO_2eq	Decrease
	▸ = 1 t CO_2eq	Zero
	▸ ‹ 1 t CO_2eq	Increase

Source: Adapted from Kollmuss et al. (2015). Assumptions: 1) The transferred mitigation outcomes are used by the acquiring country to fulfil its NDC target. 2) The transferring and acquiring country achieve their NDC targets. 3) Robust accounting is applied, in particular double claiming between the transferring and acquiring country is avoided on the basis of corresponding adjustments. 4) The possibility to participate in international market mechanisms provides neither incentives nor disincentives for further mitigation action.

1. **The transferring country does not have an NDC target or the mitigation outcomes fall outside the scope of its NDC target:** In this case, the quality of the units as generated by the mechanism directly impacts global GHG emissions:
   - If the underlying mechanism reduces emissions by exactly 1 t CO_2eq for every transferred unit, the impact in terms of global GHG emissions is zero: exactly 1 t CO_2eq is reduced in the transferring country, whereas the acquiring country can increase its emissions by 1 t CO_2eq above its NDC target.
   - If the underlying mechanism generates more than 1 t CO_2eq of reduction for every transferred unit (say, 1.5 t CO_2eq), then there is a net benefit for the atmosphere: 1.5 t CO_2eq are reduced in the transferring country, whereas the acquiring country can increase its emissions by only 1 t CO_2eq above its NDC target. Global GHG emissions go down by 0.5 t CO_2eq.

- If, however, the underlying mechanism generates less than 1 t CO_2eq of reduction for every transferred unit (say, 0.5 t CO_2eq), then there is a net damage for the atmosphere: only 0.5 t CO_2eq are reduced in the transferring country, whereas the acquiring country can increase its emissions by 1 t CO_2eq above its NDC target. Global emissions go up by 0.5 t CO_2eq.

2. **The transferring country has an NDC target more stringent than BAU and the mitigation outcomes fall within the scope of that target:** In this case, the quality of units has, in principle, no impact on global GHG emissions. Assuming that double counting of emission reductions is avoided, the transferring country would need to apply a corresponding adjustment, e.g. by adding the transferred unit to its reported emissions. This has the following impacts:
   - If the underlying mechanism reduces emissions by exactly 1 t CO_2e for every transferred unit, exactly 1 t CO_2e is reduced in the transferring country, whereas the acquiring country can increase its emissions by 1 t CO_2e above its NDC target. The transferring country applies a corresponding adjustment of 1 t CO_2e. This has no impact on the transferring country, as GHG inventory emissions are reduced by 1 t CO_2e respectively. Global GHG emissions are not affected.
   - If the underlying mechanism generates more than 1 t CO_2e of reduction for every transferred unit (say, 1.5 t CO_2e), 1.5 t CO_2e are reduced in the transferring country, whereas the acquiring country can increase its emissions by only 1 t CO_2e above its target. The transferring country, however, applies a corresponding adjustment of only 1 t CO_2e, while its reported emissions decrease by 1.5 t CO_2e (assuming that the amount of actual emission reductions is reflected in the GHG inventory), leaving a net balance of 0.5 t CO_2e. It can use this net balance to achieve its NDC target, enabling the country to pursue less mitigation efforts elsewhere. If the transferring country does not use the net balance to over-achieve its NDC target, global GHG emissions are not affected.
   - If, however, the underlying mechanism generates less than 1 t CO_2e of reduction for every transferred unit (say, 0.5 t CO_2e), only 0.5 t CO_2e are reduced in the transferring country, where-as the acquiring country can increase its emissions by 1 t CO_2e above its NDC target. The transferring country, however, applies a corresponding adjustment of 1 t CO_2e, while its reported emissions only decrease by 0.5 t CO_2e (assuming that the amount of actual emission reductions is reflected in the GHG inventory), leaving a net deficit of 0.5 t CO_2e, which requires the transferring country, in order to meet its NDC target, to „compensate“ for it by further reducing emissions domestically or purchasing international transfers from other jurisdictions. If the transferring country takes such action to still achieve its NDC target, global GHG emissions are not affected.

3. **The transferring country has an NDC target less stringent than BAU and the mitigation outcomes fall within the scope of that target:** In this case, the impact on global GHG emissions is the same as if the country would not have a target. The transferring country would not need to „compensate“ for transferring units that lack quality, because it would be able to comply with its NDC target (as long as the number of transferred units is smaller than the difference between the NDC target and BAU emissions).

2.4 Which situations are critical for ensuring environmental integrity?

Our analysis showed that the impact of international transfers on global GHG emissions is complex and depends on several factors and assumptions. Table 1 illustrates that a lack of unit quality is critical in two situations: if the emission sources are not included within the scope of an NDC target or if the transferring country has an NDC target less stringent than BAU. In both cases the transferring country could transfer units that lack quality without infringing its ability to achieve its NDC target. For this reason, transferring countries could also have incentives not to enhance the ambition and scope of future NDC targets. We therefore assess in section 3 the potential for transfers in these situations under current NDC targets and explore in section 4 broad approaches to address environmental integrity in these situations.

A further important finding from our analysis is that achieving a „higher ambition“, as envisaged under Article 6.1 of the Paris Agreement, or an „overall mitigation in global emissions“, as envisaged under the Article 6.4 mechanism, can be complex. Table 1 above shows that units generating more than 1 t CO_2eq of emission reductions do not have any impact on global GHG emissions if the transferring country has an NDC target more stringent than BAU.

This means that common strategies pursued by crediting mechanisms to achieve net GHG emission reductions – in particular using conservative baselines or discounting of emission reductions which lead to credits representing more than 1 t CO_2e of emission reductions – may not have any impact on overall global GHG emissions, if it is not ensured that a part of the mitigation outcome is not used by any of the Parties involved in the international transfer towards achieving their NDC targets. If global GHG emissions should be reduced as a result of an international transfer, other approaches could be considered: for example, the acquiring country may only account part of the transferred units towards achieving its NDC and cancel the remainder.

3 Potential impact of lack of unit quality on global GHG emissions

In this section, we explore the maximum potential impact from a lack of unit quality on global GHG emissions under current NDC targets. In the previous section, we identified that a lack of unit quality is critical in two situations: if the emission sources are not included within the scope of the NDC target of the transferring country or if the transferring country has an NDC target less stringent than BAU, i.e. it includes „hot air". In these situations, transferring countries could issue units that lack quality without infringing their ability to achieve their NDC target – even if robust accounting is applied. We focus our assessment on these two situations and assess the maximum potential for such transfers based on current NDC targets and an independent estimate of BAU emission levels for all countries (Meinshausen and Alexander (2016)).

We first compare all NDC targets with the independent BAU emission projections developed by Meinshausen and Alexander (2016),[3] to assess for all countries whether, and the extent to which, their NDC targets will actually deliver an emission reduction by 2030 or include hot air. Based on this comparison, we determine the total amount of „hot air" included in current NDC targets and the total amount of emission reductions pledged by those countries whose NDC targets are more stringent than BAU.

We then estimate what share of global GHG emissions falls within the scope of current NDC targets. How many units could be issued from emission sources not covered under NDC targets is uncertain; it depends on how the units are generated, e.g. what assumptions are made for crediting baselines. Countries establishing crediting baselines could, for example, assume that emissions would increase dramatically in the future. The amount of GHG emissions not included in the scope of NDC targets gives, nevertheless, an indication of the amount of units that could be generated from these sources.

We then compare these estimates. A comparison between the total emission reductions pledged and the amount of hot air allows us to understand the implications if all hot air were internationally transferred, compared to a scenario where all countries would achieve their NDC targets domestically. We also assess whether particular types of NDC targets are more vulnerable to potentially generating hot air. We also consider the implications of generating units that lack quality from emission sources not included in NDCs.

It is important to note that this assessment results in the maximum theoretical impact of the transfer of units that lack quality; as will be discussed further below, the risk from hot air and from emission sources not covered under NDCs depends crucially also on the extent to which Parties would actually transfer such units (or possibly carry over such units to future target periods, should this be enabled under the Paris Agreement).

An estimation of the potential hot air, the emission reductions from NDC targets that are more stringent than BAU, and the quantity of emissions currently not covered by NDC targets in 2030 are provided in Figure 1. Based on our assessment, there is a risk of hot air for both the low and high 2030 NDC targets.[4] Figure 1 shows how NDC targets that are more stringent than BAU would be undermined by NDC targets that are less stringent than BAU if all hot air would be transferred. Importantly, the impact of the NDC targets that are less stringent than BAU varies considerably under the low and high target scenarios:

3 While there are several assessments of individual NDCs, this seems to be the only source that consistently assesses the NDC targets from all countries quantitatively. The NDC & INDC Factsheets are based on the modelling data provided by the PRIMAP Model (PIK, 2016) and the submitted NDCs. The authors had to make assumptions and interpretations in the quantification of the NDCs which are not always clear. In other instances, some gap-filling was necessary, e.g. for countries without a 2030 target to enable a global picture for that year. Another example is the NDC of India which does not specify the coverage of sectors and gases and is therefore interpreted differently in various assessments.

4 Low refers only to unconditional NDC targets and/or the lower end if a range is given, whilst high refers to both conditional and unconditional NDC targets and the upper end of any range.

- In the low target scenario, hot air in 2030 represents 3.5 G t CO_2eq or 66 % of the emission reductions expected in 2030 from countries with NDC targets that are more stringent than BAU;
- In the high target scenario, hot air represents 2.2 G t CO_2eq or 22 % of the emission reductions expected in 2030 from countries with NDC targets that are more stringent than BAU.

The maximum potential supply of hot air thus becomes smaller if the higher range of targets in NDC targets are delivered upon, however the potential is still very significant. Hence, the risks arising from international transfer of hot air are material and should be addressed.

Moreover, about 6.1 G t CO_2e or approx. 12-14 % of global emissions in 2030 are not covered by current NDC targets; this quantity comes mainly from China and India whose contributions only cover a part of their economies. As pointed out above, it is unclear how many units that lack quality could be generated from these emission sources. However, the amount of emissions is considerable.

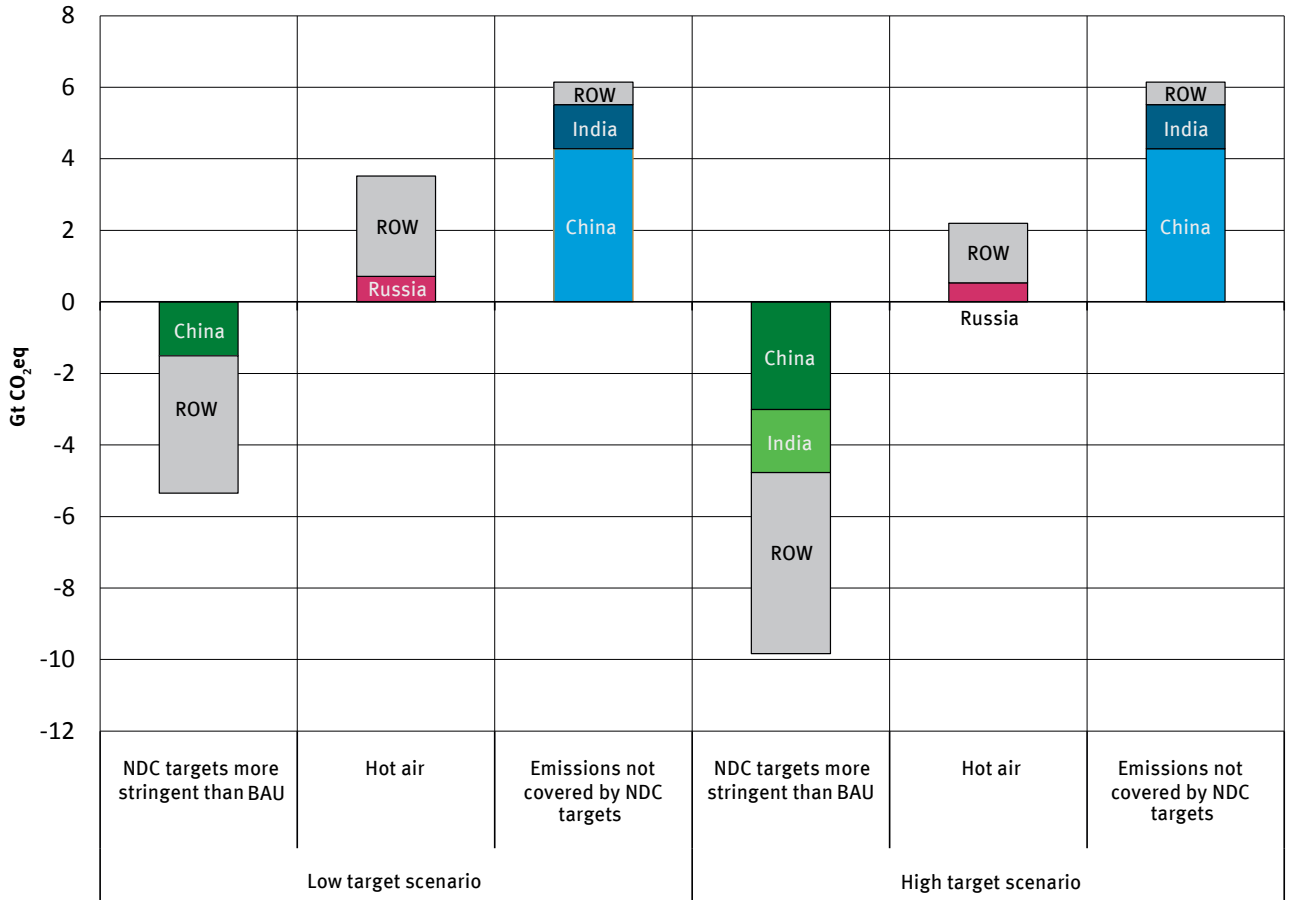

Figure 1: Emission reductions, potential hot air and emissions not covered by NDC targets in 2030

Notes: ROW: Rest of world. See Footnote 3 for more information on the underlying data.
Source: Meinshausen and Alexander (2016); Own calculation

Figure 2 below provides a breakdown of the hot air previously identified under the low target scenario by both country and NDC target type. Interestingly, ten countries (i.e. Russia, Turkey, Paraguay, Vietnam, Nigeria, Bangladesh, Ukraine, Burundi, Kenya, Burkina Faso and the Democratic Republic of Congo) are responsible for 70 % of the total hot air in the low target scenario in 2030.

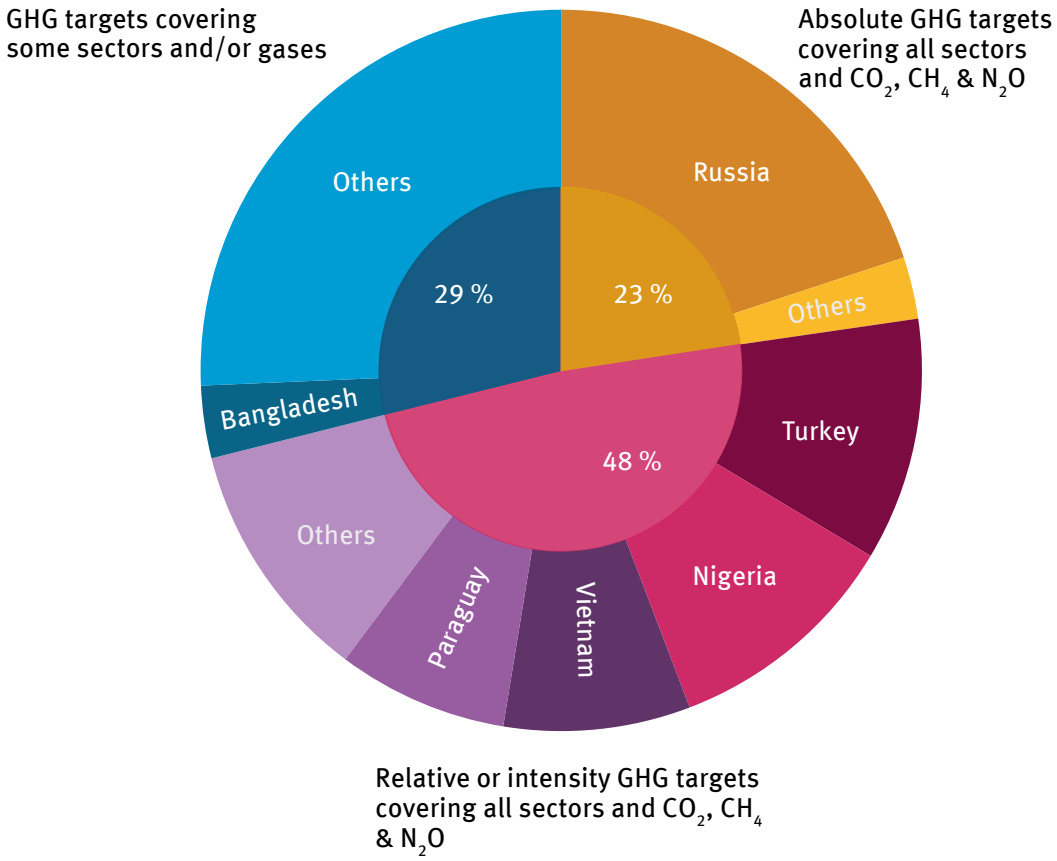

Figure 2: Share of hot air by type of NDC target under the low target scenario

Source: Meinshausen and Alexander (2016); Own calculation

- Russia accounts for 630 M t CO_2eq or approx. 20 % of the potential hot air in 2030. Climate Action Tracker (2016a) expects hot air to exist in the Russian NDC target due to both the selection of the 1990 base year (i.e. before the economic collapse that followed the end of the Soviet Union) and the setting of an unambitious reduction target. Indeed, Russia's GHG emissions in 2014 were 30 % lower than 1990 levels, while its 2030 target actually represents an increase in emissions (Climate Action Tracker, 2016a).
- Approximately half of all hot air is introduced from NDC targets relative to BAU emissions (in the low target scenario). Based on our brief review of NDC submissions, it is evident that some countries estimated their BAU baselines unrealistically high, on the basis of either simple or optimistic assumptions. For example, Turkey accounts for the second largest share of potential hot air in 2030. According to the Climate Action Tracker (2016b), the NDC target submitted by Turkey, excluding land-use, land-use change and forestry (LULUCF) emissions, is equivalent to a 389 % increase on 1990 levels. Turkey expects emissions to increase by 512 % relative to 1990 levels under its BAU scenario.
- Burkina Faso has been identified as a country with a NDC target covering some sectors that may include hot air in 2030. Burkina Faso projects an emission increase of 540 % between 2007 (latest GHG inventory year) and 2030 (Burkina Faso, 2015). However, in contrast, the Meinshausen and Alexander (2016) estimate independently that emissions will only double in the same time period.

The analysis above points towards a large theoretical potential supply of hot air or units from emission sources not covered by NDCs. In total, nearly 10 G t CO_2e in 2030 are either not included in NDC targets or represent hot air under the low target scenario, and more than 8 G t CO_2eq under the high target scenario. If these amounts would be internationally transferred, unit quality would be key to ensure environmental integrity, as the transferring country would not have to compensate for a lack of unit quality.

For this to materialize, however, the supply would have to be matched by demand. An analysis of INDCs (Obergassel and Gornik, 2015) has indicated that countries' forecasted demand for international units in the period up to 2030 is low.

Although many countries state in their INDCs an interest in participating in international carbon markets as sellers, only thirteen countries (Canada, Costa Rica, Japan, Liechtenstein, Mexico, Moldova, Monaco, New Zealand, Norway, San Marino, South Korea, Switzerland, and Turkey) state an interest in acquiring international units in their INDCs. The current expected demand for international transfers in the 2020-2030 period is thus limited.

This represents, however, the current situation and should be regarded with some caution: when submitting their NDCs, it was yet unclear whether carbon market provisions would be included in the Paris Agreement. Once international market mechanisms and rules under Article 6 are operationalized, more countries may intend to make use of them – regardless of what had been stated in their current NDCs.

Finally, an important question is whether and how acquiring countries will prioritize units that have quality. A key prerequisite is understanding the environmental impacts from transferring units, which requires transparency on the quality of mechanisms and on the ambition and scope of NDCs. Purchasing programmes could then restrict unit purchases according to their quality criteria. In addition, political commitments might complement rules at international level. Major potential acquiring countries could, for example, agree not to purchase units from certain countries, mechanisms or activities. This could for example be done in the form of a political declaration, similar to the one included in Annex II to decision 1/CMP.8. Such declarations would, of course, have to be implemented at national policy level.

4 Approaches for addressing environmental integrity

In this section, we explore broad approaches for addressing environmental integrity. We aim to provide an overview of the general approaches Parties could consider to ensure environmental integrity. We highlight potential benefits and caveats but do not assess in detail how they could be operationalized. We focus on approaches that could be pursued at international level but also briefly discuss other approaches. As highlighted further above, robust accounting is a key prerequisite for achieving environmental integrity. As in other parts of the paper, we assume here that robust accounting is applied and focus on other aspects needed to ensure environmental integrity.

In section 2 above we concluded that environmental integrity could be undermined in the following ways, even under a situation where robust accounting is applied:

1. The underlying mechanisms do not ensure the quality of the units they issue *and* the emission sources
   a. are *not* included within the scope of the NDC target of the transferring country, or
   b. are included within the scope of the NDC target of the transferring country, but the target is less stringent than BAU; *and/or*
2. The possibility to participate in international market mechanisms provides no incentives or disincentives for further mitigation action.

This suggests that environmental integrity could be addressed in different ways, or through a combination of approaches. We identify three broad approaches to address environmental integrity, all assuming robust accounting as outlined in section 2.2.1:

- Ensuring that market mechanisms generate units that have quality: If the units issued by the underlying market mechanisms have quality, then their transfer would not lead to higher global GHG emissions (except for possible disincentives for further mitigation action). The scope and ambition of the NDC target of the transferring country would not have an impact on global GHG emissions (see Table 1 in section 2.3).
- Facilitating that the transferring country has, or moves to, economy-wide and ambitious mitigation targets: If the transferring country has an economy-wide mitigation target that is more stringent than BAU, global GHG emissions do not increase (except for possible disincentives for further mitigation action). Any lack of quality of units transferred would need to be „compensated“ by the country through abatement effort or through the purchase of international units (see Table 1 in section 2.3).

- Preventing that units are transferred from countries with hot air or from emission sources not covered by NDC targets: Preventing transfers under these circumstances would also ensure that global GHG emissions not increase; countries would only transfer units from emission sources included in the scope of their NDC and if the NDC target is more stringent than BAU. This approach could partially also address concerns that countries could have perverse incentives to set future NDC targets unambitiously or to define their scope narrowly, in order to sell more units: if transfers were effectively prevented in such situations, these countries would have less benefits from setting targets unambitiously or narrowly.

It is important to note that these approaches are not mutually exclusive, and that combinations can be employed to address different risks. Drawing upon these general approaches, we identify here seven specific options to mitigate environmental integrity risks in international transfers:

- Principles for international guidance on mechanism design and communication of NDCs
- International reporting and review
- Eligibility criteria
- Limits on international transfers
- Exchange or discount rates
- Green Investment Schemes
- Carbon clubs

Below we briefly explore these options. We focus our assessment on international rules to implement these options, noting that many of them could also be pursued bilaterally or by groups of countries, also referred to as „carbon clubs“ (see section 4.6). We do not provide a full evaluation of these options, but point to possible ways of implementing them and provide a brief overview of benefits and draw-backs.

We also do not assess the political feasibility of these options. Clearly, some options may be politically more feasible than others. However, the presented analysis aims to provide an overview of which options could generally be pursued and to explore how they could work and what they could achieve, rather than assessing whether they are likely to be agreeable among Parties.

Section 4.8 provides a brief comparison of the options. It is also useful to note that some of these options could be combined. Finally, some options could also be used to pursue other objectives, such as ensuring robust accounting. However, we limit our assessment of these options to ensuring environmental integrity, without considering matters of robust accounting.

4.1 Principles for international guidance on mechanism design and communication of NDCs

International guidance for mechanism design and communication of NDCs could help achieve environmental integrity. This section discusses principles that could be considered in developing such guidance. They could help on two levels: first, by guiding the implementation of mechanisms, thereby facilitating that the units issued by mechanisms have quality; and second, by guiding the communication of NDC targets, thereby facilitating that NDC targets are set more stringent than BAU and that countries have incentives to move towards more ambitious and economy-wide mitigation targets.

This section focuses on which principles could be considered. We derive possible principles from the text of the Paris Agreement and further specify and complement them with elements that may help achieving environmental integrity. We also provide a few limited examples on how some of the principles could be further operationalized. International guidelines could develop and operationalize these principles further. Internationally agreed principles could be integrated in the various rules, modalities, procedures and guidelines currently under discussion, such as those under Articles 6.2, 6.4, 4.8, or 13.13. We do not discuss here where such principles could be best integrated.

4.1.1 Guiding principles to facilitate quality of units

Article 6 provides for the following three overarching principles to ensure the quality of units as generated from mechanisms:

- **Environmental integrity** is a requirement under Article 6.2, and several elements aiming to safe-guard environmental integrity are also included in Article 6.4. Parties could include a definition of environmental integrity in relevant decisions for the operationalization of the Paris Agreement, stating for example that the transfer of mitigation outcomes must lead to the same or to lower aggregated GHG emissions from the countries involved in the transfer (see section 2.1).
- **Transparency** is a requirement under Article 6.2, also with regard to governance. Transparency of the governance structure can be understood to include transparency with regard to the design and operation of the mechanism. While not explicitly mentioned, transparency can also be implied as a core principle for Article 6.4, as it is under the guidance of the CMA. In addition, transparency is core to the whole treaty, amongst others visible by the inclusion of a transparency framework. Parties could further clarify in relevant decisions how transparency with regard to the design and operation of mechanisms should be achieved.
- **Allowing for higher ambition** is a principle set out in Article 6.1. Allowing for higher ambition could have different meanings, such as that the use of mechanisms should enable countries to adopt more ambitious NDC targets. Article 6.4 also explicitly refers to an „overall mitigation in global emissions".

These overarching or first-level principles could be complemented with second-level principles. Some of them could be applicable to all mechanisms, while others could only apply to specific types of mechanisms, i.e. to international linking of ETSs or crediting mechanisms. The classification between first-level and second-level principles is not intended to reflect prioritization; rather, it reflects the level of detail and specification. Second-level principles on the implementation of mechanisms could include:

- **Appropriate governance arrangements:** *Governance structures and rules of the mechanisms are appropriate and clear information is available.* Appropriate governance arrangements and clear information on rules are imperative for the credibility of any mechanism and to allow for confidence in the quality of its units. In their analysis of the environmental integrity of JI, for example, Kollmuss et al. (2015) highlight the importance of clear procedures and transparent project-level information in ensuring that ERUs do not constitute hot air. This principle could be operationalized by making sure that: rules and procedures for the operation of mechanisms are described clearly and are publicly available; decisions are made transparently and with impartiality; project-level information is made public; projects are required to undergo consultations with affected stakeholders; etc.
- **Conservativeness:** *Conservative assumptions and calculations are applied to generate units.* In the context of ETSs, the principle of conservativeness could be applied to the setting of the ETS cap to ensure that it is more stringent than BAU emission levels for the covered sectors. In the context of crediting mechanisms, the principle could be applied to assumptions made in assessing additionality and the quantification of emission reductions, e.g. by selecting the baseline scenario or emission factors in a conservative manner.
- **Real and measurable abatement:** *Each unit issued represents actual GHG abatement , is directly attributable to the activity, and can be quantified through appropriate monitoring methods.* It is explicitly mentioned in the context of Article 6.4 and would also be important for Article 6.2 to assure that the mechanism results in units that represent real abatement efforts. This principle is key for crediting mechanisms, but also other mechanisms where the emission reductions from specific actions are quantified, such as GISs (see section 4.6). Experience from the CDM shows that requiring to demonstrate that mitigation actions have real and measurable units was key to rule out generation of units from actions with low „signal-to-noise ratios" (Lazarus, 2011).
- **Additionality:** *Emission reductions are additional to what would have occurred in the absence of the crediting mechanism.* Additionality is mentioned in paragraph 37 of Decision 1/CP.21 in the context of Article 6.4 and is a key requirement to ensure the unit quality for all crediting mechanisms. Additionality can be evaluated based on project-specific testing; the CDM tested whether a project exceeds existing legal requirements, is economically attractive, faces significant implementation barriers, and uses technology or practice that is in common use. Another possibility is to evaluate additionality based on performance standards. Additionality demonstration and baseline setting in the context of the Paris Agreement is discussed in section 5.

- **Permanence:** *Emission reductions are permanent, or measures exist to compensate for any non-permanence*[5]. Addressing non-permanence is key for all activities where emission reductions or removals could be of temporary nature, including changes of carbon stocks in the land-use sector, geological capture storage of CO_2, or preventing coal mine fires. The CDM addresses permanence by requiring that units be replaced in the event of a reversal or renewed after a certain period. For CCS projects, a portion of issued credits is also placed into a reserve that compensates for reversals. Addressing non-permanence is mostly an issue where emission sources are not included within the scope of NDC targets. If emission sources are included in the scope of NDC targets and appropriately accounted for, any reversals would be reflected in GHG inventories.
- **Third-party verification:** *There is verification of mitigation outcomes by competent and independent auditors.* Reported emissions (in ETSs) and emission reductions (in crediting mechanisms) should undergo third-party verification to ensure the quality of generated units. While verification and certification of emission reductions are foreseen for Article 6.4, it would also be important for Article 6.2 to verify that real mitigation outcomes have been achieved. In contrast to only a review through the transparency framework (see section 4.2), third-party verification enables onsite verification of compliance with relevant requirements. Robust processes for the accreditation and the accountability of auditors are particularly relevant. It must be kept in mind, however, that verification did not prevent transfers of hot air under the JI track 1 (Kollmuss et al., 2015).

4.1.2 Guiding principles on communication of NDC targets

The following principles relate to facilitating that NDC targets are more stringent than BAU:

- **Clarity:** *The ambition of NDC targets is clear (including through providing understandable and transparent information).* In the Paris Agreement, clarity is required in the context of information that Parties have to provide in their NDCs (Article 4.8). Some of the information that Parties should provide has been identified in paragraph 27 of decision 1/CP.21 and might be integrated in the guidance currently developed by Parties on features of the NDCs. Targets would need to be quantifiable and comparable in order to have clarity on the scope and ambition of NDC targets. It would also be useful to have information on the mitigation measures a Party plans to implement to achieve its NDC target, including clarity on the market mechanisms they intend to use.
- **Conservativeness:** *NDC targets are established on the basis of conservative assumptions and calculation methods.* This could help mitigating the risk that NDC targets are less stringent than BAU. Chapter 3 concluded that nearly half of all hot air in current NDC targets originates from countries with NDC targets relative to BAU emissions. This is often the result of unrealistic BAU emission levels. Critical factors to assure conservativeness of BAU projections include realistic GDP and population projections, consideration of autonomous technological progress and efficiency increase (UNFCCC, 2017). Internationally agreed approaches or best practice methods for calculating BAU emission level could help address this challenge.
- **Fairness:** *NDC targets are fair according to equity criteria.* Article 4.3 establishes that Parties' NDCs will reflect their highest possible ambition, in light of „common but differentiated responsibilities and respective capabilities, in the light of different national circumstances". Based on the more nuanced approach to differentiation embedded in the Paris Agreement and self-differentiation with regard to mitigation, it will have to be left to Parties to explain why they consider their contribution to be fair. In formulating their NDC targets, Parties might make use of different equity approaches, e.g. GDP/capita, emissions/capita, costs per emission reduction, historic emissions or cumulative emissions (see e.g. Climate Action Tracker[6], Climate Equity Reference Calculator[7]) (Du Robiou Pont et al., 2016). International guidance could require Parties to provide information on how they consider that their NDC target is fair and ambitious, in the light of its national circumstances – as currently suggested in paragraph 27 of decision 1/CP.21.[8]

5 Paragraph 37 of decision 1/CP.21 in the context of article 6.4 refers to „long-term benefits related to mitigation of climate change". Yet the term „long-term" has also been used under the CDM and was interpreted there not as an issue of permanence; in CDM discussions, this was mostly seen as not crediting very short-term measures.

6 Climate Action Tracker: http://climateactiontracker.org/methodology/85/Comparability-of-effort.html

7 Climate Equity Reference Calculator: https://www.sei-international.org/equity-calculator

8 Paragraph 27 of decision 1/CP.21 states that information „may" include „how the Party considers that its nationally determined contribution is fair and ambitious, in the light of its national circumstances".

- **Progression:** *NDC targets reflect a progression in ambition and scope of abatement efforts.* According to Article 4.9, each Party shall communicate an NDC every five years and be informed by the outcomes of the global stocktake. In addition, and in accordance with Article 4.3, successive NDCs are expected to reflect a progression beyond the Party's then current NDC. Together, this contributes to a ratcheting mechanism that aims at increasing ambition. Progression could relate not only to the ambition of the NDC target, but also its scope: Article 4.4. encourages developed country Parties to formulate economy-wide absolute emission reduction targets already now and developing country Parties to also move over time towards relative or absolute economy-wide emission reduction or limitation targets. Guidelines could specify which information Parties should provide to justify that their NDC target reflects a progression in ambition and scope.

Principles for international guidelines could contribute to achieving environmental integrity of international transfers by guiding the design of mechanisms and the communication of NDCs. Yet relying on guiding principles only could leave much leeway to Parties and would not, by itself, provide assurance of high quality of units, high ambition and broad scope of NDC targets. This option relies on the operationalization of principles within the guidelines and subsequent implementation by Parties. The effectiveness of this approach also hinges on the provisions for reporting and review (see section 4.2). Therefore, this approach could facilitate environmental integrity, but would not be able to prevent Parties from transferring units of low quality or communicating NDC targets that are less stringent than BAU or exclude emission sources.

4.2 International reporting and review

4.2.1 Transparency framework

Article 13 of the Paris Agreement establishes an enhanced transparency framework for action and support. This framework is the main mechanism to hold states accountable for the implementation of their NDCs. In addition, transparency is a core element to build trust and confidence among Parties and to promote effective implementation. Common modalities, procedures and guidelines for the transparency framework are still to be elaborated (Article 13.13).

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). Understanding the progress by Parties towards achieving their NDCs requires information on their engagement in international transfers of mitigation outcomes under Article 6.

The transparency framework foresees a two-step review process common to all Parties (Articles 13.11 and 13.12): First, there is a technical expert review of the information, checking consistency of the information with modalities, procedures and guidelines of the transparency framework. Second, there is a multilateral consideration of progress. This process arguably builds on the experience with the expert reviews under the Convention and the Kyoto Protocol as well as the two-stage review of international assessment and review (IAR) and international consultation and analysis (ICA). However, it is not a bifurcated system anymore.

If information on the implementation of Article 6 is reported and reviewed under the transparency framework, it will be necessary to have experts with relevant knowledge and experience in the review team that can assess how requirements or principles guiding the implementation of Article 6 are implemented and adhered to. For example, they should be able to assess whether BAU projections have been made conservatively or whether mechanisms have been designed in accordance with international principles. The review process can benefit from experiences made with review teams under the Convention and the Kyoto Protocol: The sound organization of review processes, the capacities of expert team members from a broad range of countries that has been built up, and the adherence to scientific standards and peer reviewing may make them a model process for the future review process. It should be noted that such a process requires modest but sufficient resources for organisation and management (e.g. channelled through UNFCCC) as well as for supporting experts from developing countries with the capacity and resources to participate and contribute to the reviews. The technical expert reviews are explicitly asked to identify areas of improvement for the Party (Article 13.12), which could possibly include issues related to the implementation of Article 6, including environmental integrity.

An uncertainty is, how the „built-in flexibility" of the transparency framework is operationalized. In the formerly bifurcated approach, there were different guidelines on reporting for Annex I and non-Annex I Parties. The explicit reference to „common" modalities, procedures and guidelines in the treaty text (Article 13.13) indicates that there will probably not be separate guidelines on reporting under the Paris Agreement. However, some differentiation could be integrated within the guidelines, because according to the treaty text, the Parties' different capacities are to be taken into account. Thus, there may still be differences in scope and frequency of information of different Parties. The National Communications will continue to have separate guidelines for Annex I and non-Annex I Parties. They have been introduced based on the Convention and have not been addressed by the Paris Agreement. It will need to be clarified, if it is possible to also apply a more nuanced approach of differentiation to those guidelines.

When discussing reporting requirements, it must be kept in mind that the Paris Agreement underlines that the transparency framework is to be implemented in a „facilitative, non-intrusive, non-punitive" manner (Article 13.3). In addition, there is an explicit reference that the implementation should be „respectful of the national sovereignty". It can be expected to be difficult to find a balance between autonomy and oversight, also with regard to environmental integrity.

In order to achieve transparency, it is also important to consider what upfront information is needed (Schneider et al., 2016a). When submitting their NDCs, Parties are required to provide the information necessary for „clarity, transparency and understanding" (Article 4.8). This is important to understand the ambition of mitigation targets and progress towards them. Features of NDCs and information that needs to be provided upfront are still under discussion. The fact that the current wording on information (decision 1/CP.21 para. 27) only provides an indicative list and is the same as in the Lima Call for Action of 2014 (decision 1/CP.20 para. 14) indicates the difficulties of the negotiations on this issue (see also UNFCCC (2016b)). More transparency on the actual ambition of NDC targets might mitigate the risks that countries set their NDC targets less stringent than BAU. It could be helpful to integrate principles discussed in section 4.1 above also in guidance on NDC targets and upfront information.

An ex ante assessment of the information provided by individual Parties is not foreseen in the Paris Agreement. Information on the aggregate effects of NDC targets is identified as a source of input for the global stocktake that will take place every five years (decision 1/CP.21 para. 99(a)(i)). The results of the global stocktake shall inform Parties in updating and enhancing their NDCs. However, it is unclear how the results on aggregate level, e.g. also on the potential hot air that could be or has been transferred, can inform individual NDCs. In any case, updating and enhancing mitigation actions based on the outcome of the global stocktake will explicitly be done in a „nationally determined manner".

4.2.2 Compliance mechanism

Article 15 of the Paris Agreement establishes a compliance mechanism. A compliance mechanism also exists under the Kyoto Protocol, whereas there is no compliance mechanism for the Copenhagen/Cancun pledges. Contrary to the Kyoto Protocol, there is no enforcement foreseen under the Paris Agreement. This fits into a development of recent compliance mechanisms being facilitative rather than punitive in nature (see e.g. Nagoya Protocol, Minamata Convention). Many issues still need to be clarified. From the perspective of achieving environmental integrity under Article 6 the following three issues seem particularly interesting:

First, clarification is needed whether the mechanism only covers the legally binding provisions or all provisions of the Paris Agreement. The mechanism should not only „promote compliance", but also „facilitate implementation", so it would be good to also provide room for discussing the implementation of provisions that are not legally binding (see also Voigt (2016)). Parties have different views on this and some Parties have proposed that the mechanism covers the entirety of the Paris Agreement (UNFCCC, 2016a). The obligation for those Parties engaging in international transfers of mitigation outcomes under Article 6.2 to ensure environmental integrity, transparency, and robust accounting is a binding provision and could arguably be reviewed by the compliance mechanism. And so would be the obligation of Parties to submit NDCs and pursue domestic mitigation measures. However, the mitigation targets, which Parties determine nationally and state in their NDCs, are not legally binding.[9]

9 Article 4.2 of the Paris Agreement states that each Party shall prepare, communicate and maintain successive NDCs that it intends to achieve and that Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions. See also Rajamani (2016); Bodansky (2016), p. 304; Voigt (2016), p. 19-20.

Including the non-legally binding provisions would allow to address challenges of individual Parties in implementing their NDCs and increasing ambition. It would also more clearly allow to address the expectation that each Party's successive NDC represent a progression beyond its previous NDC and reflects its highest possible ambition.[10] Since the facilitative branch of the Kyoto Protocol has largely remained unused, such facilitation of implementation have been done informally and less systematically by expert review teams (Huggins, 2015). It could be useful to have such facilitative discussions on implementation of all legally binding and non-binding provisions conducted systematically within the new compliance mechanism.

Second, triggers of the compliance mechanism need to be identified. One possibility would be that the compliance committee considers issues on the basis of findings of technical expert reviews. The review process shall identify areas of improvement for the Party (Article 13.12). Such areas of improvement could be further discussed in the mechanism in order to provide advice and assistance to Parties (Voigt 2016). In this context, it is important to note that the committee shall pay particular attention to respective national capabilities and circumstances of Parties (Article 15.2).

Finally, possible measures and outputs of the compliance mechanism are also still under discussion. While there was the possibility to suspend the eligibility of a Party to use market mechanisms under the Kyoto Protocol, such a sanction oriented measure is not possible under the purely facilitative mechanism of the Paris Agreement. Possible measures rather seem to be provision of access to capacity-building, e.g. through the Capacity-building Initiative for Transparency, or assistance with the preparation of plans to address implementation problems. Increased capacity would support ambitious Parties in improving their NDCs and reporting, e.g. with regard to the difficult task of setting appropriate BAUs. At the COP in Marrakech, also early warnings and issuing statements of concern and findings of non-compliance have been proposed (UNFCCC, 2016a).

In summary, the elaborations in 4.2.1 and 4.2.2 suggest that the review processes under the Paris Agreement could facilitate achieving environmental integrity of international transfers. However, the transparency framework and compliance mechanism are still under discussion and it is yet unclear whether the elements discussed above will be included in relevant decisions. It seems that especially the enhanced transparency framework may increase transparency on environmental integrity, incentivize respective actions and help to achieve an appropriate design of mechanisms. It is less clear to what extent the compliance mechanism will be able to contribute to additional transparency and apply measures that further incentivise efforts for environmental integrity of international transfers. In conclusion, the option of reporting and review can contribute to, but not ensure, environmental integrity.

4.3 Eligibility criteria

Participation by countries in international transfers of mitigation outcomes could be subject to eligibility criteria.

Under the Kyoto Protocol, access to flexibility mechanisms is subject to eligibility criteria. Both non-Annex I countries and Annex I countries must have nominated a designated national authority (DNA) responsible for authorizing projects to participate in the CDM. Annex I countries wishing to acquire or transfer Kyoto units must have calculated their assigned amount in accordance with CMP rules; have inventory and registry systems in place; and annually submit relevant information on GHG emissions and accounting of units.[11] None of these criteria address risks from international transfers of units that lack quality, and relate largely to robust accounting of transfers. However, the authorization of participation by countries and that the CDM is the only eligible mechanism for non-Annex I countries could be regarded as eligibility criteria aiming at safeguarding environmental integrity.

Eligibility criteria could also be established under the Paris Agreement. They could, in principle, not only be established to ensure robust accounting but also to mitigate other environmental integrity risks. They could relate to the quality of the units from mechanisms, as well as to the ambition and scope of NDC targets. These two approaches could complement or substitute each other. Hybrid approaches are briefly discussed in section 4.3.3 below.

10 Article 4.3 of the Paris Agreement states that each Party's successive NDC „will" (and not „shall") represent a progression beyond the Party's then current NDC and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

11 A less strict scope of requirements applies to the issuance and transfer of ERUs under JI track 2.

4.3.1 Eligibility criteria relating to the quality of units

Eligibility criteria could be applied to mechanisms so as to ensure the quality of units generated. Eligibility criteria may be particularly relevant for units generated under Article 6.2, which is generally understood to allow for transfers from mechanisms operated under the oversight of Parties. Eligibility criteria, referred to as „emission unit criteria", are also used by the International Civil Aviation Organization for the operationalization of its Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) (ICAO, 2016).

The criteria could vary according to the type of mechanism, and could elaborate on the rules and principles for mechanisms outlined in section 4.1 above. For example, crediting mechanisms could be required to ensure that units generated represent real, permanent, additional and verified emission reductions. ETSs could be required to ensure that the ETS cap is set more stringent than a conservatively calculated BAU emissions level, and that emissions reported by entities are quantified conservatively and verified by competent and independent auditors. In the case of direct bilateral transfers, countries could be required to demonstrate that they have systems in place to quantify the emission reductions achieved through the transfers, in similar ways as for crediting mechanisms.

The criteria could be established at different levels, including at the level of mechanisms, where eligibility is granted for a mechanism as a whole, or at the level of specific types of mitigation actions, e.g. where all activities within a certain category are deemed acceptable. The adherence to the eligibility criteria could also be reassessed periodically (e.g. following NDC cycles).

The implementation of this approach would require a governance structure (e.g. the transparency regime or a separate governance structure) that would be tasked with assessing mechanisms or types of mitigation actions against the criteria, monitoring compliance and addressing deviations. A smooth functioning of this process would require clear and robust criteria, as well as institutional and procedural requirements (Sépibus et al., 2012).

In principle, a well-designed set of eligibility criteria, alongside a system that ensures their adherence to all transfers, could mitigate the risk of transferring units that lack quality. However, assessing the quality of units from mechanisms operated by Parties could be both technically and politically challenging. Eligibility criteria are not explicitly foreseen under Article 6.2 of the Paris Agreement; as discussed in section 2.1 above, Article 6.2 could be interpreted to be under the prerogative of Parties and the use of eligibility criteria could thus be seen by some Parties to depart from the intent of Article 6.2.

4.3.2 Eligibility criteria relating to NDC targets

Eligibility criteria relating to the ambition of NDC targets

Eligibility criteria relating to the ambition of NDC targets could aim to prevent that mitigation outcomes be transferred from countries with NDC targets that are less stringent than the BAU emissions. This approach could be operationalized by comparing the NDC target of a country against a reference level which could, for example, be based on a likely BAU emissions projection, or on trends of historic GHG emissions. Units originating from countries whose NDC targets are above the reference level would be barred from use towards NDC achievement. Such criteria could be applied at the point of issuance, transfer or use of units. Independently of the point of application of the criteria, the determination of the reference level would always be based on the context of the transferring country.

In principle, robust criteria and reference levels could ensure that only countries with targets more stringent than BAU are allowed to participate in international transfers, thereby preventing transfers of hot air ex ante. The calculation of the reference level is thus critical for the effectiveness of this approach. In practice, a number of challenges arise:

- *Projections of BAU emissions* are uncertain and change according to many factors and assumptions, such as on projected economic and population growth, international fuel prices, and technology development. A further challenge is how to respond to changes in circumstances or assumptions that affect projected emission pathways, such as economic crises and other extreme events. A key question is thus which methods are used to prepare BAU emission projections and who prepares them. If countries were to prepare BAU emission projections, they could have incentives to exaggerate relevant assumptions (e.g. on economic growth), inflating their projected BAU emissions, in order to meet the eligibility criteria. Establishing or using international bodies to prepare BAU emission projections or to review the projections prepared by countries could mitigate this risk but could be politically challenging.
- Anchoring reference levels on *historic emissions* could be simpler and reduce the risk of exaggerating BAU emissions. An example is the approach of Article 3.7ter of the Doha Amendment to the Kyoto Protocol, which establishes historical emissions as a reference level. Yet this approach would be ill-suited for the case of fast growing developing countries, whose emissions are rising. Moreover, for countries whose GHG emissions are decreasing over time, the use of historical emissions would have to capture the overall decreasing trend, so as to avoid establishing an inflated reference level. A trend-adjustment of historic emissions might be considered to address these concerns.

Eligibility criteria relating to the ambition of NDCs could face a number of political barriers for implementation. As mentioned in 4.3.1 above, the use of eligibility criteria for activities under Article 6.2 could go against the interpretation of some Parties that activities under this article lie primarily under the responsibility of individual countries. Moreover, failure of a country to pass the „test" could be interpreted as a lack of ambition of the NDC. Agreeing on a robust reference level could therefore be very contentious; this difficulty would reflect the reluctance of some countries to adopt ambitious targets, as well as the many diverging perspectives about equity and responsibility in global mitigation action. Less stringent reference levels could help reduce the risk of hot air, yet would not prevent it.

Moreover, UNFCCC-level eligibility rules for the use of international units could be a challenge for the establishment of international linkages across domestic market mechanisms – as this would add a layer of supranational approval to decisions to link domestic schemes, raising questions of sovereignty and autonomy in establishing linkages. For example, countries with established ETSs or domestic crediting schemes could see this as an important restriction on national interests.

Eligibility criteria relating to the scope of NDC targets

Eligibility criteria could also be set so as to prevent that mitigation outcomes be transferred from outside the scope of the country's NDC target. Such eligibility criteria would set strong incentives for countries to include emission sources within the scope of subsequent NDC targets and move towards economy-wide targets. They would, however, particularly limit the possibility to participate in international transfers for less developed countries many of which included only some sectors or specific actions in their NDCs.

4.3.3 Hybrid approaches

Parties could also pursue a hybrid approach, where countries that do not meet the eligibility criteria related to NDC targets may establish the eligibility relating to the quality of units from mechanism instead. This could allow all countries (irrespective of the scope and level of ambition of their NDC) to cooperate through Articles 6.2 and 6.4, while mitigating the environmental integrity risks from international transfers. As outlined in 4.3.1 above, this option would require that some type of mechanism underpin direct bilateral transfers from countries with NDC targets less stringent than BAU.

A limited version of this option is to apply eligibility criteria only to those types of mechanisms that are at a higher risk of involving units with a poor quality. While existing in all cases, the risk of a lack of unit quality could be seen to be lowest in ETSs: this is because international linkages across ETSs are expected to occur among partners with similar levels of ambition. The risk, however, is higher for crediting mechanisms for which uncertainty and information asymmetry are major challenges (Kollmuss et al., 2015). The risk is arguably even higher for direct bilateral transfers if the NDC is less stringent than BAU.

4.4 Limits on international transfers

The international transfer of mitigation outcomes could be made subject to quantitative limits, with the view to mitigating environmental integrity risks. Limits could either be generally applicable or specifically aim to avoid the transfer of hot air.

4.4.1 General limits

These are approaches that *generally* limit the amount of units that can be issued, transferred and/or used – thereby limiting also the implications of units that lack quality. Examples of general limits include:

- A contribution period reserve, analogous to the commitment period reserve of the Kyoto Protocol, requiring that each Party maintain a reserve of units covering a minimum fixed percentage of the Party's NDC budget;
- A principle of supplementarity requiring countries that make use of international units to carry out an important part of the abatement required to achieve its NDC within national borders.[12] This could be operationalized through internationally agreed thresholds.

These approaches do not aim to address specific risks for environmental integrity, such as the presence of hot air or units generated from emissions sources not included in the scope of NDC targets. They would *reduce* the amount of units transferred and thereby limit detrimental effects from such transfers generally, but not *prevent* transfers that undermine environmental integrity. Stringent limits could thus reduce the transfer of units that lack quality, but could also limit the ability of a country to participate in international transfers even if the transferred units would have quality.

4.4.2 Limits related to ambition of NDC targets

These approaches attempt to limit the volume of units that could be issued, transferred or used according to the ambition of NDC targets. They could target specifically those situations where hot air could be transferred, while allowing countries with NDC targets more stringent than BAU to transfer units without limitations. An example is the proposal by Brazil that „the amount of units eligible for trading [under Article 6.2] should be limited to the difference between current emissions and the average of the last three inventories" (Brazil, 2016).

Limits could vary within several design considerations, including:

- *Country applicability*, i.e. applicable to all countries, or applicable only to countries that fall under certain criteria.
- *Mechanism/unit applicability*, e.g. applicable to all units issued/transferred/used under Article 6; only to units pertaining to Article 6.2; only to units from mechanisms that do not comply with certain criteria; or only to transfers that are not underpinned by a mechanism.
- *Reference variable*, meaning the indicator against which the limit is set. Limits could be set against NDC targets, reported GHG emissions, BAU emissions or other indicators, such as the carbon efficiency rate of the economy or of certain sectors. Once the indicator is chosen, the actual limit could be set in different ways (percentages versus absolute numbers, based on average data versus trends, etc.).
- *Timing*, i.e. limits that are determined ex ante and fixed for a period, such as a set amount per contribution term, or those that are determined or updated ex-post, such as a rolling yearly average.
- *Point of application*, i.e. at issuance, transfer or use of units.

Options vary widely in their design, and could be implemented in different ways. Accordingly, their complexity and effectiveness could also vary. The Brazilian proposal, for example, would allow for transfers from countries whose emissions are decreasing (mainly developed countries), but would entirely prevent countries whose emissions are increasing (mainly developing countries) from transferring units. Moreover, by using the *average* of recent reported emissions, this option would disregard decreasing emission *trends*, such that countries with decreasing BAU emissions would be allowed to transfer hot air. Adjustments to the Brazilian proposal could address some of these concerns. Other types of limits (e.g. the difference between BAU and the NDC target, where the NDC target is more stringent than BAU emissions; or making use of trend-adjusted GHG emissions) could be more effective in reflecting emission trends and changing circumstances.

12 Article 4.2 of the Paris Agreement requires Parties to pursue domestic mitigation. The formulation could be interpreted as a principle similar to supplementarity under the Kyoto Protocol, requiring Parties to achieve at least part of their NDC through domestic actions.

Stringent limits could prevent transfers of hot air, but could limit the ability of a country to participate in international transfers even if the transferred units would have quality. More loose limits might ensure that a country can transfer units, but may enable some units that lack quality to be transferred.

4.4.3 Combined approaches

Limits could be combined with other approaches, in particular with measures that aim to ensure the quality of units. Similar to the hybrid approach for eligibility criteria, countries could be allowed to transfer units without international oversight on the quality of units, as long as the number of units transferred is within the established limits. If they would want to transfer units beyond the limits, such transfers could be subject to (stronger) international oversight, with the view to ensuring the quality of the units transferred.

4.5 Exchange or discount rates

Exchange or discount rates have both been proposed as a means to mitigate the risks from using units that lack quality, while facilitating international linkage of carbon markets.

Exchange rates are currently being discussed in the context of international linking of ETSs. In order to facilitate trading between ETSs with different levels of stringency, the World Bank's Networked Carbon Markets Initiative proposes the notion of „mitigation values" of transferred units, which may be lower than one for units of lower (environmental) quality (Macinante, 2016; Marcu, 2016). In this context, the use of exchange rates has been proposed as an option to facilitate restricted linking between heterogeneous ETSs. If two ETSs agree on an exchange rate, then units from one ETS can be used for compliance in another, but their value is adjusted by a conversion factor, the exchange rate. The rate is symmetric, e.g. if one unit from ETS A has a compliance value of 0.8 in ETS B, then a unit from ETS B has the compliance value of 1/0.8= 1.25 in ETS A; i.e. each ton transferred from ETS B counts for 1.25 tons in ETS A.

Discount rates have been discussed both in the context of linking of ETSs and crediting mechanisms. In the context of ETSs, discount rates are similar to exchange rates, but are not symmetrical and lead only to a reduction in compliance values. For example, a unit from ETS A could have a compliance value of 0.8 in ETS B, whereas a unit from ETS B could have a compliance value of one in ETS A (or lower). Discounting in the context of ETSs is currently being implemented in China, where allowances from the existing provincial ETSs can be carried over to the new national ETS by applying a discount factor, depending on the amount of over-allocation in the provincial ETS. In the context of crediting mechanisms, discount rates reduce the amount of emissions credited or used towards compliance obligations. They were extensively discussed in the literature and proposed or applied in some instances. The proposed American Clean Energy and Security Act of 2009, which was never adopted, stated that for every ton of an entity's compliance obligation covered by an offset it would need to turn in 1.25 tons of offsets, effectively a 20 % discount. Similarly, France introduced a general 10 % discount on domestic JI projects (only 90 % of the emission reductions being issued as ERUs).

Whether exchange and discount rates could mitigate the environmental integrity risks from international transfers is complex and depends on several factors. We discuss here the GHG emissions implications and feasibility for international linking of ETSs.

Linking of ETSs can undermine environmental integrity if one of the two systems is over-allocated. Lazarus et al. (2015) demonstrate that depending on how exchange rates are defined, they may lead to both higher or lower total abatement (in both ETS together). Ensuring that the exchange rate is set at a range where total abatement increases is difficult. Doing so requires that those who set exchange rates have good information, as well as foresight, for each jurisdiction, on BAU emissions and on the abatement potential and costs. Yet, BAU emissions and abatement potential and costs may face major uncertainties. Furthermore, there may be information asymmetries between regulators and the regulated entities with respect to abatement opportunities and costs. Because of these uncertainties and information asymmetries, a regulator might set an exchange rate ex ante that, based on best available information at the time, appears to be effective, but turns out to increase the emissions from the two ETS (Lazarus et al., 2015).

In contrast, discount rates do not lead to a lower total abatement and are therefore more adequate for achieving environmental integrity, though they do not provide the same benefits in terms of increased liquidity than linking through exchange rates. While discount rates could increase total abatement in situations where ETSs are not over-allocated, they may not effectively address the transfer of hot air from an over-allocated ETS. This is illustrated with the following example: Assume a country A with an economy-wide NDC which has an ETS A with a cap of 100 M t CO_2, whereas the BAU emissions of the ETS are 90 M t CO_2, i.e. there is an over-allocation of 10 M t CO_2. The ETS A is linked with ETS B which is not over-allocated. Following a simplistic approach, one might argue that the „mitigation value" of units from ETS A is 90/100 = 0.9 and that the units can thus be transferred to ETS B based on a discount factor of 0.9.

Assume now that 5 million units from ETS A would be transferred to ETS B and used for compliance with the cap of ETS B. Due to the over-allocation of 10 million units in ETS A, the regulated entities in ETS A could transfer 5 million units without pursuing any mitigation action. Hence, emissions in ETS A could remain unaffected. In ETS B, the regulated entities receive 90 %*5 = 4.5 million allowances and can increase their emissions by that amount. Overall, the transfer leads to an increase in total emissions by 4.5 M t CO_2 compared to a situation without transfer. When transferring units without discounting, total emissions would increase by 5 M t CO_2. In this example, discounting mitigated the impact of transferring hot air only marginally, by the rate of discounting, i.e. by 10 %.

The effectiveness of a discount rate thus not only depends on the amount of over-allocation but also on the number of units actually transferred. Transferred units only start to represent real mitigation action once the transferred amount exceeds the over-allocation in ETS A (10 million units). For example:

- A transfer of 15 million units from ETS A to ETS B would require a discount rate of (15 – 10)/15 = 33 %, in order to fully mitigate the transfer of hot air due to over-allocation in ETS A. In this case, the total amount of allowances available to entities in ETS A would amount to 85 million units; hence, they would need to reduce emissions by 5 M t CO_2 below the BAU emissions level of 90 M t CO_2. Entities in ETS B could use 33 %*15 = 5 million units for compliance and hence increase their emissions respectively. Total emissions from both ETSs would remain unaffected by the transfer.
- Respectively, a transfer of 20 million units from ETS A to ETS B would require a discount factor of (20 – 10)/20 = 50 %, in order to fully mitigate the transfer of hot air.
- If less than 10 million units are transferred from ETS A to ETS B, discounting would only reduce the impact of transferring hot air, but could not fully compensate it, whatsoever the discount rate.

These examples illustrate the limitations of discount rates in mitigating the risks from hot air. Discounting can only address hot air if the amount of transferred units is larger than the over-allocation or hot air in the transferring system and if the discount rate is set sufficiently low: only the share of transferred units that represents actual emission reductions below BAU (discounted share) may be counted towards compliance in the acquiring ETS in order to ensure environmental integrity.

However, to link two ETSs with a discount rate, the rate would need to be set ex ante. To set the discount rate at a level that effectively mitigates for the over-allocation in ETS A, it would be necessary to estimate ex ante the amount of units that will be transferred. This faces the same difficulties as described above for setting the exchange rate level. This is an important restriction in the practical feasibility of the approach. Another constraint could be that countries may not easily accept that their units have no or a lower mitigation value than the units of other countries. Finally, a further practical challenge is that the use of exchange or discount rates would need to be reflected when implementing corresponding adjustments, in order to ensure that the discounting is effective when accounting for NDCs (Lazarus et al., 2015).

A further variation could be the application of discounting in direct bilateral transfers between two countries that both have ETSs. In this case, the two ETSs would not be directly linked and entities in the two ETSs could not directly transfer units. Here, the authority of the acquiring ETS B could agree with the authorities of ETS A to buy and transfer a defined amount of units (e.g. 15 million units in the above example). To fulfil its contract, the authority of ETS A might purchase the considered amount (15 million units) from individual entities in the market of ETS A. These units would then be transferred to ETS B while applying a discount of 33 %, resulting in 5 million units entering ETS B. The authority of ETS B might then bring the units into the market of its ETS, e.g. by auctioning or free allocation.

The authorities of the two ETSs would function as „gate keepers“ of their respective ETSs. This approach could theoretically effectively address the risk from transfers of hot air. Its practical feasibility would require further analysis.

4.6 Green Investment Schemes

Green investment schemes (GISs) were developed by some countries under the Kyoto Protocol with the aim of addressing environmental integrity concerns over the trade of hot air AAUs. While no precise definition exists, GISs typically aimed at investing revenues from sales of AAUs in activities designed to assist climate change mitigation. Typically, a sale of AAUs was combined with a programme to invest in activities assisting climate change mitigation – thereby compensating the transfer of hot air AAUs by reducing emissions in the transferring country. No international rules for GIS exist, and the conditions of the investment were agreed by the transferring and the acquiring countries on a case-by-case basis.

GISs could also be established for international transfers under the Paris Agreement, with the view to mitigate the risks from transferring hot air. Drawing on the considerations on the quality of units in chapter 2 above, GIS would ensure the quality of transferred units if:

a) the additionality of the mitigation actions was ensured;
b) the emission reductions were quantified appropriately;
c) the emission reductions corresponded to at least the same amount as the number of units transferred (i.e. a „greening ratio“[13] of at least 1); and
d) where applicable, permanence is ensured or measures are in place to address non-permanence.

Under these conditions, GIS could, theoretically, address environmental integrity concerns over direct bilateral transfers originating in countries with NDC targets less stringent than BAU. Such GIS would, notably, be very similar to a well-designed crediting mechanism, with the main difference being the timing of unit transfers and availability of finance (ex ante for GIS, ex-post for regular crediting schemes).

The experience with GISs under the Kyoto Protocol suggests that the quality of the transferred units was questionable. In a review of the AAU market between 2008 and 2012, Tuerk et al. (2013) note that although GISs provided insights into how to tap mitigation opportunities not easily addressed by crediting mechanisms such as JI or CDM, several concerns also remained. They emphasize that the experiences with GISs showed that a market without international oversight and a lack of transparency may promote least cost options regardless of environmental integrity.

Two main factors have undermined the environmental integrity of GISs under the first commitment period of the Kyoto Protocol:

1. **Additionality:** While several countries avoided overlap between GIS funds and existing national support programmes in order to guarantee additionality, Tuerk et al. (2013) highlight that additionality criteria under GIS schemes were typically less stringent than under CDM or JI, and that in market conditions of low AAU prices the additionality of GIS investments seemed unlikely (as GIS revenues often cover only a small fraction of the total investment costs).
2. **Quantification:** Challenges with the quantification of emission reductions related to two main aspects:
   - **Type of greening[14]:** Tuerk et al. (2013) observe that in the first years of GISs, investments focused on easy to calculate and direct emission reductions (hard greening, such as renewable energy and energy efficiency projects), yet that over time, activities aimed at more indirect and long-term effects (softer greening, such as capacity building and technology development). The quantifiability of emission reductions lost prominence over time, giving way to other, less quantifiable criteria such as the replication potential and early implementation of low carbon technologies.

13 The greening ratio describes the relation between the amount of AAUs sold to the emission reduction achieved. If activities funded with the revenues of 10 AAUs lead to an emission reduction of 5 tons CO_2eq, then the greening ratio is 0.5.

14 *Hard greening* refers to activities in which the scheme delivers direct measurable and quantifiable emission reductions, such as investments in renewable energy and retrofitting of buildings. *Soft greening* occurs if the corresponding activities have non-quantifiable and non-measurable emission reductions such as environmental education, and subsidy reform.

- **Monitoring, reporting and verification:** Although countries typically proposed credible mechanisms to implement, monitor and verify AAU revenue flows and resulting emission reductions, Tuerk et al. (2013) highlight that in practice this was not always the case. In fact, for some transactions there was no assurance of investment of revenues, let alone any monitoring of results. Countries also differed in their approach to timing: some calculated emission reductions within the relevant commitment period of the Kyoto Protocol, whereas others employed longer timeframes.

3. **Greening ratio:** Tuerk et al. (2013) note that attempts to ensure a high greening ratio lost prominence for acquiring countries over time, and that the market saw deals with low prices and high volumes where only small amounts of reductions were foreseen. Tuerk et al. (2013) observe a continuum from AAU trades with significant emissions reductions to deals with marginal direct reductions: the absence of an internationally agreed definition of „greening" made it difficult to draw a clear boundary between actual emission reductions and transfer of hot air. It is thus very likely that aggregate AAU transfers backed by GISs produced an overall greening ratio of far below 1.

These experiences suggest that the effectiveness of GISs in mitigating the risks from transfer of hot air hinges on two main aspects. The first aspect is one of mechanism design: new approaches could be necessary to assess the additionality of investments and to quantify emission reductions. It would also be necessary to put in place systems that can ensure that activities funded ex ante are implemented and deliver the expected results. Robust international standards would be helpful in ensuring quality over time and some level of international oversight would be necessary to ensure that host countries have clear incentives to safeguard environmental integrity of their schemes (Kollmuss et al., 2015)

The second aspect relates to the scope of application. If GISs under the Kyoto Protocol provide a relevant precedent, then the use of GIS-like mechanism(s) under the Paris Agreement would mainly be driven by „environmentally conscious" acquiring countries who wish to ensure that units transferred from countries with NDC targets that are less stringent than BAU have quality. This would require that acquiring countries be able to identify which countries have hot air, and be in a strong negotiating position to ensure that GIS activities be implemented adequately by the transferring country. This could be a challenge in the face of countries whose portion of hot air is not prominent or transparent.

4.7 Carbon clubs

Carbon (or „climate") clubs are a form of climate policy coalition among a group of countries proposed by Victor (2015)and Nordhaus (2015), among others. The underlying hypothesis is that achieving ambitious agreements in small groups can be easier than doing so in large ones. In the context of this paper, carbon clubs are understood as groups of countries with common principles or standards. Although carbon clubs are expected to evolve in the context of the design of market mechanisms, in particular for linking of ETSs, they can also involve other forms of cooperation on climate policy or international trade agreements.

Well-designed and ambitious carbon clubs could complement internationally agreed rules under Article 6 by further elaborating and strengthening these rules for their own use. Carbon clubs could target all four dimensions of environmental integrity:

- Quality of units as generated by the underlying mechanisms, e.g. by adopting common principles for the use of mechanisms or by establishing joint high-quality mechanisms within the group;
- Ambition of NDCs, by defining accession criteria for the club, e.g. with respect to the ambition level of the NDC target and/or a carbon price range;
- Robust accounting, e.g. by further refining rules for the formulation of mitigation targets and the accounting of international transfers of mitigation outcomes;
- Avoiding perverse incentives, e.g. by requiring economy-wide mitigation targets as prerequisite for participating in international transfers.

Carbon clubs could, in theory, implement some or all the approaches elaborated in sections 4.1 to 4.6 above, albeit applicable only to members of the club. Approaches successfully road-tested by carbon clubs could help disseminate best practices and provide blueprints for subsequent implementation at UNFCCC level.

Strict accession criteria could incentivize countries to increase their scope and level of ambition in order to join the club; and strict monitoring and compliance measures, such as mutual peer reviewing of whether club members meet agreed criteria or principles, could reduce the risks that some members benefit from participation in the club but do not implement its standards and principles (Keohane et al., 2015). Generally, carbon clubs could help ensure a level playing field among the club members, thereby reducing the risk of free riding, and removing obstacles to wider and more ambitious mitigation commitments. Yet despite its advantages, clubs are not a panacea.

The most important limitation is that climate clubs are by definition exclusionary, and can only address environmental integrity concerns within the club. Moreover, even if positive incentives (e.g. payments from climate funds) and instruments of coercion (e.g. trade sanctions) are put in place to encourage expansion of membership and increase climate ambition over time (as suggested by Victor (2015)), there is no guarantee that said expansion will actually take place (Das, 2015). Similarly, there is no assurance that best-practice principles or guidance developed by the carbon club be taken up by other countries.

Furthermore, having a club provides no assurance of environmental integrity within the club. The effectiveness of a club in ensuring environmental integrity relies on the willingness of club members. A low-ambition carbon club (e.g. one which allows for transfers of units that lack quality among its members) could undermine the abatement effort within the club (compared to a situation of no trade) and provide a competitive advantage to club members compared to other countries (or clubs) with higher mitigation ambition.

4.8 Summary of options

The sections above cover different options to mitigate the environmental integrity risk from international transfers of units, with different advantages and challenges.

Principles for international guidelines could contribute to achieving environmental integrity of international transfers by guiding the design of mechanisms and the communication of NDCs. Principles on mechanisms could facilitate that units have quality. Principles on communication of NDC targets could contribute to increasing ambition. Clarity, for example, makes it easier to understand and compare ambition as well as to assess the aggregated efforts towards achieving the objectives of the Paris Agreement. Yet relying on guiding principles only could leave much leeway to Parties and would not, by itself, provide assurance of high quality of units, and a high ambition and broad scope of NDC targets. This option relies on the operationalization of principles within the guidance under Article 6.2 and the rules, modalities and procedures under Article 6.4, and subsequent implementation by Parties. This approach could facilitate environmental integrity, but would not be able to prevent Parties from transferring units of low quality or communicating NDC targets that are less stringent than BAU or exclude emission sources.

At the heart of the **international reporting and review** processes is the much-recognized need for transparency. Requiring countries to report through the transparency framework on the use and implementation of mechanisms could allow the international community to scrutinize how Parties are implementing international guidance related to mechanisms, thereby providing transparency on environmental integrity and incentivizing that mechanisms are designed appropriately from the start or improved as a result of review findings. This approach would require, among others, sufficient and clear information; competent and independent reviewers; and appropriate guidance for the review. The Paris Agreement has also established a compliance mechanism that could be applicable to all provisions of the Agreement, including Articles 6.2 and 6.4. However, it is not clear yet to what extent the compliance mechanism will be able to contribute to additional transparency and apply measures that further incentivise efforts for environmental integrity. In summary, the option of reporting and review provides transparency and incentives for achieving environmental integrity, but it cannot ensure environmental integrity.

Eligibility criteria for the participation of countries in international transfers could relate to the quality of the units as issued by the underlying mechanisms or to the ambition and scope of NDC targets – combined approaches are also possible. Well designed criteria, alongside a governance system that ensures their adherence, could mitigate environmental integrity risks ex ante, in different ways: by facilitating that the units issued by underlying mechanisms have quality, by ensuring that only countries with NDC targets more stringent than BAU are allowed to transfer mitigation outcomes, and/or by ensuring that only units from emission sources that are included within the scope of NDC targets can be transferred.

Yet eligibility criteria represent a more centralized approach that could be regarded by some Parties as incompatible with the interpretation that Article 6.2 lies primarily under the prerogative of Parties.

Limits on international transfers could be designed in a number of ways. General limits, such as contribution period reserves and a supplementarity principle, could reduce the amount of units transferred and would thereby limit any detrimental effects due to lack of quality, but would not fully prevent such transfers. Limits could also be implemented to reflect the level of ambition of the NDC target and aim to address situations where hot air could be transferred, while allowing countries with NDC targets more stringent than BAU to transfer without limitations. Such limits could be designed according to a number of variables, such as country applicability, mechanism applicability, reference variable, timing and others. A key challenge is establishing meaningful reference levels against which limits are determined.

It is difficult to design **exchange rates** that ensure total abatement increases. Because of uncertainties and information asymmetries, exchange rates could unintentionally lead to higher emissions; this approach is thus not considered a feasible option to address environmental integrity risks under Article 6. **Discounting** would address environmental integrity risks if the amount of transferred units is larger than the amount of over-crediting, over-allocation or hot air in the transferring system and if the discount rate is set at a sufficiently stringent level. In practice, estimating ex ante the amount of units that lack quality and will be transferred is difficult and uncertain. Another difficulty is that Parties might perceive exchange or discount rates as valuing the ambition of their NDCs or mechanisms.

The effectiveness of **Green Investment Schemes** in mitigating the risks from transfer of hot air hinges on two main aspects. The first is design of such schemes, in particular ensuring that the activities are actually implemented, ensuring additionality, and quantifying emission reductions. The second aspect is the scope of application: GIS are likely to be mainly implemented by „environmentally conscious“ acquiring countries and would thus only mitigate the risks from transfer of hot air for these acquiring countries.

Carbon clubs could implement some or all the approaches above, assisting in road-testing and dissemination of best practices. Accession criteria and enforcement mechanisms could also incentivise countries to increase the scope and level of ambition of NDC targets. Yet clubs are by definition exclusionary, and can only address environmental integrity concerns within the club: there would be no assurance that best-practices developed by the carbon club be taken up by other countries. Moreover, the effectiveness of a club in ensuring environmental integrity relies on the willingness of club members. A low-ambition carbon club could undermine the abatement effort within the club and provide a competitive advantage to club members compared to other countries (or clubs) with higher mitigation ambition.

Our brief analysis suggests that the effectiveness of all options strongly hinges on how they would be implemented. Each option could help mitigate some of the environmental integrity risks, but also face practical or political implementation challenges. Compromises may lead to options that reduce the risk of undermining environmental integrity rather than preventing it. We therefore recommend that combinations of options be considered. Further research could identify and assess different ways of implementing these options.

5 A new world: Additionality demonstration and baseline setting under NDCs

5.1 The new context of NDCs and the Paris Agreement

The quality of units, as generated from crediting mechanisms, strongly depends on how additionality is demonstrated and how baselines are set (see e.g. Schneider (2007)). Specifically, the quality of units is only ensured if the emission reductions would not have occurred without the incentive created by the crediting scheme (i.e., they are „additional“), and if they are quantified against a baseline that credibly represents the emissions that would have occurred in the absence of the incentive.

Under the Kyoto Protocol, non-Annex-I countries do not have quantified emission limitation or reduction objectives (QELROs), and CERs transferred under the CDM are not accounted for by non-Annex I host countries.

Among other things, this meant that non-Annex I countries had no direct incentive to ensure that CDM projects are additional or that they do not inflate baseline emissions. Under JI, countries with ambitious mitigation targets had incentives to ensure the quality of ERUs, whereas most ERUs from countries with hot air had mostly questionable quality and their international transfer increased overall emissions (Kollmuss et al., 2015).

With the submission of 163 NDCs representing 190 countries under the Paris Agreement, the situation changes, since nearly all countries have committed themselves to specific mitigation actions as defined in their NDC. The Paris Agreement and decision 1/CP.21 requires countries to avoid double counting when transferring units internationally. This means that countries with NDC targets that are more stringent than BAU have an incentive to ensure the quality of units transferred to other countries. They have incentives not to allow crediting of non-additional activities, or to overestimate emission reductions, as doing so could endanger compliance with their own NDC target (see also Randall Spalding-Fecher et al. (2017)).

Under the CDM and other offsetting standards, various approaches have been developed to assess additionality and set baselines, without considering the impact of mitigation targets. Under JI, some experience was gained with demonstrating additionality and setting baselines under mitigation targets. In the new context of the Paris Agreement, it is important to explore further how additionality demonstration and baseline setting could be implemented under NDC targets, drawing on the existing mechanisms. As pointed out above, it is important to consider in this context the ambition of the mitigation targets.

Another important and new context is the considerable diversity of NDC targets. NDCs include different types of mitigation targets, including absolute or intensity targets, or targets relative to BAU. Some targets are economy-wide, other covers only some sectors or GHGs. Some countries have targets not related to GHG emissions but e.g. to renewables or energy efficiency. Some targets are contingent on international support (Graichen et al., 2016). This heterogeneity poses considerable challenges for robust accounting (Schneider et al., 2016a). Moreover, some mitigation targets are not fully clear, for example, with regard to their scope.

Below we first explore how additionality could be demonstrated and how baselines could be set in the situation that the transferring country has a NDC target that is more stringent than BAU (section 5.2). We then briefly discuss the particular situation of conditional NDC targets (section 5.3), the situation that emission sources are not covered by the NDC target or are less stringent than BAU (section 5.4). We finally touch upon the market impacts of different ambition levels of NDC targets (section 5.5) and the impacts of the ratcheting up provisions under the Paris Agreement (section 5.6).

5.2 Additionality demonstration and baseline setting under NDC targets that are more stringent than BAU

In this section, we explore key issues for additionality demonstration and baseline setting in the situation of a transferring country with an NDC target that is more stringent than BAU emissions and where the credited activities fall within the scope of that target. As pointed out above, in this situation, transferring countries have incentives to ensure that they only credit activities that are additional and that emission reductions are not over-estimated. If countries would credit other activities, they would have to compensate for the transfer, by reducing elsewhere or purchasing international units – as long as robust accounting, including the avoidance of double counting, is applied. Countries would thus have incentives to ensure that crediting reduces their emissions beyond their NDC target.

An important consequence of this situation is that countries have incentives to consider their domestic policy framework when assessing additionality and setting baselines. If the current policy framework is needed to achieve their NDC, credited activities would have to go beyond existing policies. Countries may need to plan for which sectors or activities they can engage in international transfers of credits, without infringing their ability to meet their NDC. In order to assure the consistency of crediting with reaching the transferring country's NDC target, additionality must be assessed and crediting baselines must be defined in such a way that they represent an emission trajectory that leads to emission reductions beyond its NDC target (Fuessler et al., 2014). This principle is illustrated in Figure 3. The credited mitigation would not occur in the absence of the NDC and the crediting baseline would need to correspond to an emissions level that would occur if the NDC is implemented through domestic action.

Implementing this approach can be challenging in practice. It may also require different approaches, depending what type of mitigation actions are credited and at which level crediting occurs (i.e. for projects, programmes, at sectoral level, or for individual policies).

First, in order to define additionality and set crediting baselines consistent with NDC targets, transferring countries need a clear and quantitative NDC (see discussion in Schneider et al. (2016a)). Second, they may need an explicit national mitigation strategy, plan or policy, that specifics how they achieve their NDC target. This may include a disaggregation of the NDC target into sector level and sub-sector level targets (e.g. for the power sector, for specific industrial sectors such as cement productions, transport, LULUCF etc.), as well as specifying which policies and actions are planned to reach the targets in each (sub-)sector. Many countries have created such a national mitigation framework, for example, in the form of Low-Emission Development Strategies and Plans (LEDS), Mitigation Action Plans and Scenarios (MAPS) and other mitigation related action plans on national, regional or sector level, including frameworks for fostering renewable energy generation, energy efficiency, and targeting specific sectors such as industry, residential, transport, waste and LULUCF.

Ideally, a mitigation framework details the quantitative contribution of each (sub-)sector, policy and measure to reaching the NDC target. The quantification of the national mitigation efforts can be guided through a top-down modelling exercise (e.g. based on general equilibrium models of the main parts of the economy and their interactions) or build on bottom-up approach, that sum up the mitigation contributions in different sectors, estimate sector level impacts, such as based on partial economic models with an adequate representation of the relevant sub-sectors. Such a national mitigation framework, its modelling results, and its definition of (sub-) sector targets could provide the basis for defining additionality and setting baselines for crediting mechanisms.

Below we discuss this approach further, distinguishing between mitigation actions on a sector level and actions at the level of individual projects or programmes and underline the importance of domestic planning of achieving the NDC target.

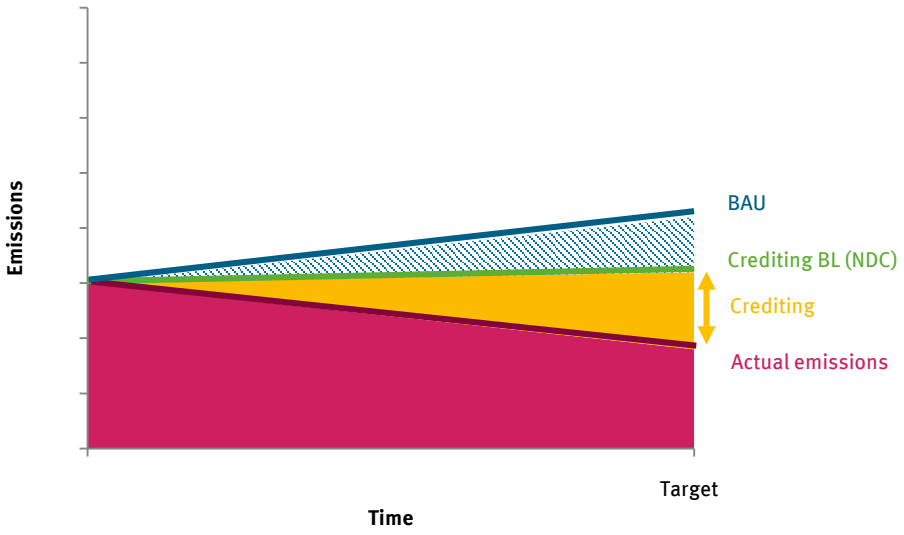

Figure 3: BAU emissions, NDC target, crediting baseline and actual emissions under NDCs

Source: Adapted from Füssler 2014

Note: The BAU describes the counterfactual emissions related to the considered mitigation action in absence of the NDC target. Due to domestic policies, some mitigation action may be implemented to achieve the NDC target. This level corresponds to the crediting baseline. The crediting mechanism triggers further emission reductions. The difference between crediting baseline and actual emissions can be credited without infringing the ability of the country to achieve its NDC pledge due to the crediting.

5.2.1 Defining additionality and crediting baselines on a sector level

In the case of sector level crediting mechanisms, typically sectoral emissions are credited against a sectoral baseline. The set of measures may be implemented by policy makers or a third party entity with the view to providing incentives for entities in the sector to reduce emissions. In this case, the additionality of individual measures is usually not assessed, but policy makers aim to select the sectoral baseline in a way that only emission reductions are credited that go beyond measures that would be implemented in the absence of the mechanism.

In some cases of sector level crediting, the crediting baseline could be derived directly from the quantification (modelling) of the national mitigation framework for a specific NDC target as discussed above. For instance, a country's mitigation framework might allocate the cement sector a reduction of -10 % in emissions compared to BAU, as its contribution towards achieving the NDC target. In this situation, a crediting mechanism in the cement industry might use a sectoral crediting baseline corresponding to the 10 % reduction compared to BAU. Further mitigation action by the sector beyond this level would be eligible for crediting and international transfers of the credits.

5.2.2 Defining additionality and crediting baselines on a project or programme level

For crediting mechanisms at a project or programme level, such as the CDM and JI, defining additionality and establishing crediting baselines under ambitious NDCs tends to be more difficult. The national mitigation frameworks, as discussed in the previous section, usually specify at sectoral or sub-sectoral level, or for specific policies, whether they are used to achieve the NDC target; however, they often do not specify the contribution of specific projects or programmes.

A first important question is how mitigation policies should be considered in assessing additionality and setting baselines. The CDM Executive Board adopted rules that allow E- policies – i.e. policies that lower GHG emissions – to be excluded when determining the baseline emissions, but the applicability of these rules is rather unclear, in particular whether they are also applicable to the demonstration of additionality.[15] The CDM rules aimed to avoid perverse incentives for policy makers not to adopt mitigation policies in order to accrue more benefits from the CDM (Schneider et al., 2014).

The situation is rather different under mitigation targets that are more stringent than BAU emissions. In this case, transferring countries would have incentives to ensure that credited activities are not implemented due to the national policy framework, but that they reduce emissions beyond that framework. In this regard, countries may rather wish to ensure that mitigation policies are fully considered in the assessment of additionality and setting of emission baselines. Indeed, JI countries with ambitious mitigation targets implemented such approaches. For example, EU member states either banned measures which reduce emissions in the EU ETS from crediting or have set aside an allowance reserve to enable the issuance of ERUs. In Germany, the regulatory authority required nitric acid plant operators to adopt an N_2O emissions benchmark which corresponds to the level of abatement required by relevant national and EU regulations (Kollmuss et al., 2015). Following several law suits, Germany also banned the eligibility of renewable energy projects that are promoted under national feed-in tariffs.

In order to elaborate this further, we consider in the following some of the key methodological approaches to baseline setting and additionality determination in current offsetting programmes (as described in Schneider et al. 2014) and discuss their applicability on a project or programme level in sectors that are covered by ambitious NDC targets. It is important to note that this is only a preliminary analysis, but points to key issues that need further elaboration and research in order to operationalize the Article 6 mechanisms on the ground.

A common challenge in using the current approaches for baseline setting under ambitious NDC targets remains that it is often not possible to break national or sector level NDC targets down to the implementation of individual project/ programmes. For some project types, it may be possible to define sectoral baselines. Here, the translation of national level NDC targets into domestic policies and measures including tangible subsidy schemes, regulation, taxes, etc. based on a (dynamic) domestic planning of how to achieve the NDC target plays a key role. For other project types, it may not be possible to use meaningful sectoral baselines.

15 Under the CDM, national and/or sectoral policies or regulations that reduce emissions (defined as "E-" polices and regulations) and that have been implemented since the adoption by the COP of the CDM M&Ps (decision 17/CP.7, 11 November 2001) need not be taken into account in developing a baseline scenario, i.e. the baseline scenario could refer to a hypothetical situation without the national and/or sectoral policies or regulations being in place (paragraph 64 of version 1.0 of the „CDM project standard for project activities"). However, baselines shall be in compliance with all mandatory applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution (paragraph 18 of version 6.0 of the „Combined tool to identify the baseline scenario and demonstrate additionality").

Table 2: Applicability of current approaches to baseline setting under ambitious NDC targets

Baseline approach	Use under ambitious pledge?	Illustrative example(s) and remarks
Use of historical data from the installations included in the mechanism	Typically applicable to activity data. Only applicable to performance data if still consistent with policy framework to implement the NDC target.	An NDC includes the introduction of fuel efficiency standards for cars. In parallel, a public transport subsidy scheme for crediting is to be introduced. Here, baseline car emission factors may not build on historic values but need to take fuel efficiency standards into account. For parameters that are not impacted by the policy framework to implement the NDC target, e.g. trip length per person, use of historical data may be adequate.
Identification of a reference technology, market penetration or performance data (e.g. BAT)	Not applicable in general. Only applicable if consistent with the policy framework to implement the NDC target.	An NDC includes a reduction of emissions from iron & steel plants by -20 %. The country provides a subsidy scheme for the implementation of related energy efficiency refurbishments. In parallel, a crediting scheme is introduced. Its reference performance level is defined at -20 % of the historic emissions of the plant. All improvements beyond that level are credited. With this, the sector NDC target is not automatically met with crediting: In any case, some plants may not participate in the domestic scheme and underachieve the -20 % target. In absence of crediting, this would need to be compensated by plants overachieving the target. If overachieving plants have these overachievements credited, then the NDC target is not met anymore. A potential approach to meet the NDC target also with crediting, a reference level above the average required reduction might be proposed, e.g. -25 %, for the crediting projects. However, high reference levels increase costs of units and may decrease the participation of potentially overachieving plants, reducing their contribution to compensate underachieving plants. This example highlights the complexity of performance level approaches under NDC targets and merits further research.
Use of peer group data (use benchmark from peer group or sampling from control group)	Could be applicable if it is assured that emissions of the peer group are consistent with the policy framework to implement the NDC target, i.e. that the peer group fully complies with relevant policies and regulations.	An NDC includes an energy efficiency target for the building sector. The country implements an awareness raising campaign to promote use of compact fluorescent lamps (CFLs) instead of incandescent light bulbs to meet that target. In parallel, a crediting scheme distributing subsidized CFLs is introduced. For the crediting scheme, the baseline is based on regular sampling of a control group (that has no access to the crediting scheme). With this, only emission reductions beyond the impact of the domestic awareness raising campaign are credited. Collection of up-to-date and robust peer group data tends to be very costly. If government policies to implement the NDC target fail to have the desired mitigation impact in the considered peer group, then the crediting scheme extends this failure also to the credited emission sources. Use of benchmarks is restricted to industries producing very homogenous goods (e.g. cement clinker, EAF carbon steel).

Baseline approach	Use under ambitious pledge?	Illustrative example(s) and remarks
Modelling (e.g. top-down economic models or bottom-up sector models)	Applicable in general with modifications. Modelling of baseline scenario needs to be consistent with the policy framework to implement the NDC target.	An NDC includes an emissions target for the power sector. A crediting scheme for renewable power generation is implemented. For the modelling of the baseline emission factor it is not sufficient to merely consider the built and operating margin grid emission factors, as currently used under the CDM and other crediting mechanisms, but the baseline emissions should be based on a comprehensive modelling of the development of the power sector and the merit order for the crediting period. This needs also to take into account all domestic policies and measures to meet the NDC sector target as well as the number and amount of plants that are built under crediting schemes. Comprehensive modelling may in many cases be the only way to derive baselines on a project level that are in line with meeting the NDC on an aggregated level. There may be a need to revise the modelling in regular intervals to take into account the progress in the implementation of domestic mitigation action and the increasing role of crediting plants.

Source: Own preliminary analysis. The approaches to baseline setting are analysed in Schneider et al. (2014).

Table 3: Applicability of current approaches for additionality demonstration under ambitious NDC targets

Additionality approach	Use under ambitious pledge?	Illustrative example(s) and remarks
Investment analysis: Demonstration that a project is economically not attractive without credit revenues (Investment comparison analysis, benchmark analysis, simple cost analysis)	Applicable in general with modifications. For all three approaches of the investment analysis, it has to be demonstrated that the proposed project and the alternative scenarios are in line with the legislative policy framework for implementing the NDC.	An NDC includes a massive reduction of methane emissions from the waste sector. The country will issue a new law in 2020 that requires mandatory landfill gas recovery from 2025. In this situation, continued venting of land fill gas is not a valid alternative scenario for investment comparison, but a scenario that foresees the implementation of landfill gas recovery in 2025 (including related investments and subsidies if applicable) should be considered instead for additionality demonstration. Key to this approach is how fast the country translates its NDC target into policies and regulations. There is a danger that early implementation of crediting projects could lock in mitigation potential that at a later point would be implemented as a result of the legislative policy framework for implementing the NDC.
Barrier analysis: Project types which are economically attractive but commonly not implemented due to other barriers, e.g. energy efficiency measures	Applicable in cases where there is no policy or regulation mitigating the considered barrier. This may be difficult to assess in practice.	An NDC includes a building energy efficiency target. The country implements an awareness raising campaign to promote use of compact fluorescent lamps (CFLs) instead of incandescent light bulbs. With this, the barrier analysis is not applicable for a CFL crediting project anymore. Objective assessment of barriers is notoriously difficult. Assessing the impact of policies and regulations on these barriers may be even more difficult.
Positive lists, negative lists, eligibility criteria and decision trees: Definition of technologies / project types that are likely to be additional or not additional	Applicable in general with modifications. Such positive lists may not contain technologies/ project types that are supported, promoted or subsidized by the policy framework to implement the NDC target.	An NDC includes target to reduce emissions from use of non-sustainably harvested wood in households and country puts incentive scheme for efficient woodstoves in place. Efficient woodstoves may then not be put on a positive list for crediting.

Additionality approach	Use under ambitious pledge?	Illustrative example(s) and remarks
Common practice: Demonstration that the project type has a low market penetration and is thus not common practice	Not applicable in general. The currently observed common practice does not (yet) reflect the NDC target. In areas/ markets where no policies and regulations exist, the common practice analysis may be suitable.	An NDC includes the increase of fuel efficiency standards for cars. Here, current practice with regards to the efficiency of new car purchases is not a valid basis claiming additionality of buying more efficient cars.

Source: Own preliminary analysis. The selected approaches to additionality determination are described and analysed (including their specific issues) in Schneider et al. (2014).

Similarly to baseline setting, our preliminary analysis of current additionality approaches in Table 3 illustrates the challenges in translating national level NDC targets into approaches for additionality demonstration of individual projects or programmes. While baselines could be set in a conservative manner to build in buffers to mitigate risks of not meeting the NDC target on a sectoral level, the „bivalent" nature of additionality (a project being either additional or not) makes it often very challenging to assess whether an individual project would or would not be implemented under the (future) policy framework implement the NDC target.

5.2.3 Need for domestic planning for achieving the NDC target, oversight on crediting, and regular review

The examples in the previous section indicate that, particularly for crediting of projects or programmes, rules for demonstrating additionality and establishing crediting baselines alone may not be sufficient to rule out the risk of not meeting the NDC target, as a result of the crediting. To ensure robust crediting, countries may have to carefully plan which activities they credit and how many projects they are ready to approve in order not to jeopardize the meeting of the NDC target. Crediting could be integrated in the national planning process to achieve the NDC by clearly defining „crediting windows". National authorities could, for example, limit ex ante the total capacity of projects that can be approved in a particular sector, so as to limit the annual amount of credits generated from that sector.

An example could be the auctioning of crediting project slots. A number of countries use auctions where bids are made, e.g. for feed-in tariffs for new renewable power generation capacity. A country could auction feed-in tariffs using domestic funding sources for the amount of capacity that is needed to achieve its sectoral NDC target, and allow crediting for plants that do not participate in such national auctions. A country could also auction crediting permits for measures that are not required to meet its national mitigation targets. Such approaches could ensure that crediting is only used to achieve reductions beyond the NDC target.

A fundamental characteristic of such approaches is a regular review by the national authorities, in order to assess whether emissions in all sectors are on track towards achieving the NDC target, taking into account the activities that have been credited. If the NDC target is in danger of not being achieved, further approval of new crediting projects could be postponed or stopped. The regular review could be conducted whenever the mitigation targets are revisited, e.g. every five years when new NDCs have to be communicated.

Ultimately, if emissions develop different than projected, a country may have to increase its domestic mitigation efforts to compensate for the activities already participating in international crediting mechanisms. A regular review of national and sectoral emission levels with regards to the likelihood of meeting the mitigation target and the related steering of mitigation actions may also be an essential part of the management of NDC compliance[16] and not only needed in the context of crediting mechanisms.

16 An current example for such a national system of regular review and steering of mitigation action is the Swiss CO_2 Act (Swiss Federation, 2011, Article 29, paragraph 2). It mandates the Federal Council to review national CO_2 emission levels from stationary fuel use regularly and compare them to the predefined interim target values that are consistent with meeting the 2020 target. If the interim target is not met, the Federal Council increases the Swiss CO_2 levy on stationary fuel use. In practice, the CO_2 levy has been increased because of this process since 2008 in several steps to the current level of CHF 84 (ca. EUR 80) per tonne of CO_2.

5.3 Crediting under conditional NDC targets

Many countries have communicated NDC targets that are subject to support from other countries. Some countries include also less ambitious unconditional targets, while many countries communicated only conditional targets (Graichen et al., 2016). NDCs with conditional mitigation targets refer to support through climate finance, technology transfer and capacity building, as well as from access to crediting or other international market mechanisms as conditions. Conditional mitigation targets pose several challenges including for robust accounting, additionality determination and baseline setting (Randall Spalding-Fecher et al., 2017).

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. Specifically, if countries agree to internationally transfer mitigation outcomes that are within the scope of a conditional mitigation target, then the same mitigation outcome may be counted towards meeting the conditional pledge of the transferring country and at the same time towards meeting the pledge of the acquiring country. In a strict interpretation, this would lead to double claiming. Article 6.5, for example, clarifies that emission reductions generated under the Article 6.4 mechanism „shall not be used to demonstrate achievement of the host Party's nationally determined contribution if used by another Party to demonstrate achievement of its nationally determined contribution". Similarly, paragraph 36 of decision 1/CP.21 requires countries to apply „corresponding adjustments" with the view to avoid double counting. If the conditional targets are interpreted as being part of the NDC, such double counting would have to be avoided.

If such double counting would not be avoided, using international market mechanisms to achieve a conditional mitigation targets could imply higher aggregated GHG emissions than if the same targets were achieved through climate finance. This is illustrated through the following example: Assume a country A with an unconditional NDC target corresponding to an emissions level of 120 M t CO_2eq and a conditional NDC target corresponding to 100 M t CO_2eq. The country participates in an international crediting mechanism to achieve its conditional target. The crediting mechanism reduces emissions in country A by 20 M t CO_2eq. The credits are transferred to country B which has an NDC target corresponding to an emissions level of 200 M t CO_2eq and uses the credits to achieve its NDC target, enabling the country to increase its emissions to 220 M t CO_2eq. The aggregated emissions from both countries depend on whether and what form of international support is provided and whether double counting is avoided for the conditional NDC target:

- **Scenario 1:** In the absence of any international support or crediting, country A would only meet its unconditional mitigation target. The emissions from both countries would correspond to 320 M t CO_2eq (120 M t CO_2eq from country A and 200 M t CO_2eq from country B).
- **Scenario 2:** If international transfers were used by country A to move from the unconditional target to the conditional target, without avoiding double counting of emission reductions, global GHG emissions would not be reduced compared to a scenario 1: Country A would reduce its emissions to 100 M t CO_2eq, whereas country B would increase its emissions to 220 MtCO2eq. Aggregated GHG emissions would correspond to 320 M t CO_2eq – the same level as in scenario 1.
- **Scenario 3:** If international transfers were used by country A to move from the unconditional target to the conditional target, but double counting between country A and B would be avoided, global GHG emissions would be reduced compared to scenarios 1 and 2, but the use of international market mechanisms would not help country A to achieve its NDC target. The international mechanism would still reduce emissions in country A by 20 M t CO_2eq, but the country would have to adjust its reported emissions correspondingly by 20 M t CO_2eq, and would consequently have to over-achieve its conditional target by 20 M t CO_2eq. Global GHG emissions would correspond 300 M t CO_2eq (80 M t CO_2e from country A and 220 M t CO_2eq from country B).
- **Scenario 4:** If international climate finance – without using international transfers of mitigation outcomes towards achieving the NDC target of country B – is provided to country A in order to move from its unconditional to its conditional mitigation target, aggregated GHG emissions from the two countries would decrease compared to scenarios 1 and 2: country A would reduce its emissions to 100 M t CO_2eq, while country B would emit 200 M t CO_2eq. Aggregated GHG emissions would correspond to 300 M t CO_2eq. Other than in scenario 3, the climate finance would help country A to achieve its conditional mitigation target.

These scenarios illustrate that, if double counting of the conditional NDC pledge is not avoided, using international market mechanisms to achieve conditional mitigation targets leads to higher aggregated GHG emissions than providing support through climate finance. If such double counting is avoided, global GHG emissions would remain unaffected (assuming robust accounting and that the units have quality), but using international market mechanisms does not actually provide international support to the transferring country for achieving its NDC target. This poses a dilemma and questions whether and how international market mechanisms should be used to support countries in achieving their conditional NCs targets. A possible solution could be using international market mechanisms as a tool to deliver results-based climate finance. In this case, the donor would not use the units to achieve its NDC target.

5.4 Additionality demonstration and baseline setting for emission sources not covered by NDC targets or under NDC targets that are less stringent than BAU

While sections 5.2 and 5.3 describe the situation of crediting under NDC targets that are more stringent than BAU, the analysis in section 3 shows that many NDC targets are prone to hot air and/or do not cover all relevant emission sources. In the following, we provide a short analysis of these two cases.

Crediting for emissions sources not covered by NDC targets: Transferring countries could pursue crediting in (sub-)sectors or for gases that are not covered by the NDC target (Fuessler et al., 2014). Here, the transfer of units does not impact the ability of the country to meet the NDC targets in the covered sectors. However, several considerations have to be made that are not reflected in rules of current offsetting standards:

- In this situation, baseline setting and additionality demonstration could generally follow the rules of current offsetting standards. However, the need for regular update of NDCs and increase in coverage could impact the period of validity of the baseline and additionality determination. When approving crediting, countries would need to take into account that the coverage of the NDC could be expanded when updated to cover also the considered sector, at which point the baseline setting and additionality determination would need to be based on the policy framework used to achieve the NDC target, as described in section 5.2. In practice, the crediting periods or the validity of baselines or additionality assessments may need to be synchronized with the international 5 year cycles for submission of NDCs (see section 5.6).
- Another key aspect is that standards to calculate emission reductions would have to reflect that part of the emission sources of the economy are included in the NDC target. Crediting mechanisms often credit emission reductions from emission sources that are located upstream or downstream from the mitigation activity. If emission sources affected by the mitigation fall partially within and partially outside the scope of the NDC target, appropriately accounting for the emission reductions, in particular avoiding double counting, can be rather challenging. This is illustrated through the following example: An NDC target could be limited to the power sector. If the country would credit the reduction of electricity demand in other sectors, the same emission reductions could be counted both towards the NDC target and issued as credits.

Crediting for emissions sources under NDC targets that are less stringent than BAU: In case of NDC targets that are less stringent than BAU, transferring countries have no direct incentive to restrict crediting to units with high quality as generated from the mechanism. Ensuring unit quality is thus key in these instances. Again, in this situation special considerations have to be made that are not reflected in current rules of current offsetting standards:

- Also in this situation baseline setting and additionality demonstration could generally follow the rules of current offsetting standards. However, the need for regular updates of NDCs and increase in its ambition level could impact again the validity of the baselines and additionality determination or the crediting period. In practice, they would need to be synchronized with the international 5-year cycle for the submission of NDCs (see section 5.6). Baseline methodologies could also automatically reflect the NDC adjustments and define the baseline emission level as a function of the sectoral NDC target.
- Once the increase in ambition level leads to NDC target level that is more stringent than BAU, the considerations in section 5.2 would apply for baseline setting and additionality determination.

In summary, in both situations the environmental integrity of international transfers is not assured by ambitious targets (as in section 5.2) but requires the assurance of the unit quality based on, inter alia, robust baseline setting and additionality testing, considering future updates of NDC targets and cross-effects with emission sources covered by NDC targets. Crediting may have to be restricted to crediting periods that allow adjustments to account for updates of NDCs.

5.5 Consideration of market impacts of different ambition levels

In section 5.2 we explained how transferring countries with NDC targets that are more stringent than BAU have incentives to reflect their policies and measures for reaching their NDC target when determining additionality and setting baselines. All other things remaining equal, this leads to transferring countries with ambitious NDC targets having a lower potential for crediting and higher mitigation costs than countries with NDC targets that are less stringent than BAU. The latter can sell their „low hanging fruits“ at potentially lower prices and in larger volumes on the international carbon markets.

With this, countries with unambitious NDC targets could have a systematic comparative advantage over countries with more ambitious targets. In an international market, they could crowd out countries with more ambitious NDC targets. Acquiring units from countries with unambitious NDC targets may reward these countries for not committing to an ambitious NDC target. It could also set disincentives for countries to increase ambition in subsequent NDCs.

These concerns might be addressed through different means. For example, eligibility criteria or limits, as discussed in sections 4.3 and 4.4 above, could prevent the transfer of units from countries with rather unambitious NDC targets. Alternatively, or in addition, groups of countries (carbon clubs) could agree on minimum requirements regarding the ambition or coverage of NDC targets in order to participate in a common carbon market (see section 4.7). This would create a level playing field for countries participating in that market. Such options could help prevent that countries are rewarded for setting their NDC targets at unambitious levels.

5.6 Ratcheting up – increasing the scope and ambition of NDC targets over time

The cumulative mitigation impact of current NDC targets under the Paris Agreement are far from sufficient to assure the aims of the agreement, keeping global temperature rise since industrialization *well below* 2°C and achieving *net zero emissions* in the second half of the century. Therefore, the Paris Agreement provides for an ambition mechanism; countries have to submit NDCs on a regular 5-year basis and subsequent NDCs have to represent a *progression* over previous NDCs (Article 4.3).

With developing countries being encouraged to move over time towards economy-wide emission targets, an increase in coverage of subsequent NDCs may be expected. Transferring countries that started crediting actions in emission sources not yet covered by their first NDC target but covered by their subsequent NDC will need to adjust the eligibility of sectors for crediting: mitigation action that has been considered additional initially, may no longer be additional or become part of the baselines, once the emission sources are covered by the subsequent NDC target. Similarly, if subsequent NDC targets increase in ambition, the additionality and crediting baselines may need adjustment (section 5.4).

Therefore, with each update of an NDC target, an update of the national mitigation framework becomes necessary, and with this a recalculation of the contributions by (sub-)sectors or policies. In terms of additionality demonstration, this may, for example, require an update of positive and negative lists and the crediting baselines. As a result, the length of crediting periods may have to be aligned with the NDC submission cycle and the target time frames communicated in NDCs. On the other hand, short crediting periods may increase uncertainties for long term investments. This could lead to favouring mitigation actions that lead to short-term emission reductions rather than long-term investments. It could also make crediting less attractive than climate finance.

6 Conclusions

This discussion paper has explored key issues and options to achieve environmental integrity under Article 6 of the Paris Agreement. The term „environmental integrity" has been used in the Paris Agreement as well as in decisions under the UNFCCC and the Kyoto Protocol, but has not been clearly defined. Within the context of international market mechanisms, we understand environmental integrity to mean that the use of international transfers does not result in higher global GHG emissions than if the NDC targets had been achieved only through domestic mitigation action, without international transfers.

The environmental integrity of international carbon market mechanisms under Article 6 is influenced by four key aspects: robust accounting of international transfers; the quality of units as issued by the underlying mechanism; the ambition of the NDC target of the transferring country; and the presence of incentives and disincentives for future mitigation action. Assuming that robust accounting is applied, we identify that the risks to the environmental integrity of international market mechanisms mainly stem from situations where either (a) emission sources are not included within the scope of an NDC target, or (b) the transferring country has an NDC target that is less stringent than BAU. In both cases, the transfer of units that lack quality would directly increase global GHG emissions. Importantly, in these situations the transferring country does not have a direct incentive to ensure the quality of units. International rules on the implementation of Article 6 may thus be particularly important in these instances.

In aggregate levels, current NDC targets represent a decrease compared to projected worldwide BAU emissions in 2030; yet up to 68 % of the mitigation ambition contained in NDCs that are more stringent than BAU could be undermined if all hot air from NDCs that are less stringent than BAU were to be transferred. Moreover, approximately 12 to 14 % of global emissions in 2030 are not covered by NDC targets. In total, under the low-target scenario nearly 10 G t CO_2eq in 2030 either represent hot air or are not included in current NDC targets. In the high-target scenario, the figure still lies above 8 G t CO_2eq.

Robust accounting is a key prerequisite for ensuring environmental integrity of international transfers. Assuming robust accounting, we identify in this paper three broad approaches that could be pursued to ensure the environmental integrity of international market mechanisms. The first relates to ensuring that market mechanisms generate units that have quality. The second would aim to facilitate that all countries have economy-wide and ambitious mitigation targets. And the third strategy would aim to prevent that mitigation outcomes are transferred from countries with hot air or emission sources not included in NDC targets. These strategies are largely complementary and could be implemented in parallel.

Ensuring that market mechanisms generate units that have quality

If the units issued by the underlying market mechanisms have quality, then their transfer does not lead to higher global GHG emissions, even if the transferring country has an NDC target less stringent than BAU or if the units are generated outside the scope of its NDC target (subject, however, to robust accounting and excluding possible disincentives for future ambition). Under *crediting mechanisms*, the quality of credits is ensured if the emission reductions are additional, not overestimated, and permanent. Under *ETSs*, the quality of allowances mainly depends on whether the ETS cap is set below the emissions level that would occur in the absence of the trading system, and whether emissions are monitored appropriately. In *other types of transfers*, and where mitigation outcomes from specific mitigation actions are intended to be transferred, the quality of the transferred units hinges on similar criteria as for crediting mechanisms. Where direct bilateral transfers occur without implementing any mitigation action, the transferred units would not have quality.

For crediting mechanisms, demonstrating additionality and establishing baselines are key challenges for environmental integrity. The methodological approaches in current CDM rules for demonstrating additionality and setting baselines have to be revisited to reflect NDC targets. This implies ensuring that crediting activities would not be fully or partially implemented under the policy framework to achieve the NDC target and that baselines are set consistent with NDC targets. Our preliminary analysis suggests that additionality demonstration and baseline setting under NDC targets is easier on a sector level than on a project/ programme level. Particular caution is also needed when crediting activities that are not included in the scope of the NDC target or when NDC targets are less stringent than BAU. Crediting periods may have to be limited or the additionality demonstration or baseline setting may have to be updated regularly, to reflect a possible increase in the ambition or scope of NDC targets when they are updated.

Within the context of the Paris Agreement, the quality of units generated by mechanisms could be mainly addressed through the guidance on Article 6.2 and through the rules, modalities and procedures of Article 6.4. Guidance on crediting under Article 6.2 may be particularly important to prevent a situation where countries evade relevant standards under Article 6.4 by establishing crediting schemes that could have less quality than under Article 6.4. Several approaches could be pursued to facilitate unit quality under Article 6:

- **Principles** could help establish **international guidance on mechanism design** that guides Parties in implementing mechanisms under Article 6.2. Principles could also guide the development of rules, modalities and procedures for the Article 6.4 mechanism. Key principles could include a definition of environmental integrity and that international transfers should be underpinned by the use of mechanisms that ensure integrity, implying that transfers without directly linked mitigation actions would not be eligible. The implementation of and use of mechanisms could be subject to reporting and review.
- Building upon principles for mechanisms, **eligibility criteria** for mechanisms could establish minimum requirements for mechanisms to generate units that can be used for the achievement of NDC targets.
- **Exchange rates** do not seem a feasible option to address environmental integrity of international transfers, as they could unintentionally lead to higher levels of global GHG emissions. **Discount rates** could mitigate the risks but face a number of challenges.
- **Green investment schemes**, if designed and implemented appropriately – i.e. ensuring additionality, adequate quantification, a greening ratio of at least 1, and permanence – could underpin direct bilateral transfers from countries with NDC targets that are less stringent than BAU. Under the Kyoto Protocol, however, they did not prove to be effective to address environmental integrity concerns.
- Finally, **carbon clubs** could implement these measures to its membership, for example, by limiting international unit transfers to specific mechanisms or countries.

Facilitating that the transferring country has, or moves to, economy-wide and ambitious mitigation targets

If the transferring country has an economy-wide mitigation target that is more stringent that its BAU emissions, then international transfers of mitigation outcomes do not lead to higher global GHG emissions even if units lack quality (subject to robust accounting and excluding possible disincentives for future ambition).

Articles 3 and 4.3 of the Paris Agreement state that countries' successive NDCs „will" represent a progression over time, and NDCs are expected to reflect countries' „highest possible ambition". Yet the Paris paradigm is one of self determination and countries are, ultimately, sovereign to establish their own NDC targets. And while participation in international market mechanisms could contribute to higher ambition (e.g. by reducing costs and increasing awareness), it could also create perverse incentives for countries to set NDC targets less ambitious or to define their scope more narrowly, in order to accrue more benefits from transferring mitigation outcomes.

A number of actions could facilitate that countries enhance the ambition and scope of their NDC targets over time:

- **Principles** could help establish **international guidance on communication of NDCs**, alongside a robust system of **reporting and review**, with the view to facilitate progression of NDC targets in ambition and scope, by increasing transparency on NDC targets and on progress in achieving them. The following principles on communication of NDC targets could be considered: clarity, conservativeness, fairness, and progression.
- **Eligibility criteria** for the participation in international market mechanisms could be based on reference levels that provide incentives for countries to increase the ambition of their NDC targets, so as to benefit from access to international market mechanisms.
- Appropriately defined **limits** on international transfers could have a similar effect as eligibility criteria.
- Similarly, **carbon clubs** requiring a certain level of ambition or carbon price in order to access the club, could also provide incentives for higher ambition, albeit only within the club.

Preventing that units are transferred from countries with hot air or emission sources not covered by NDC targets

Much like ensuring ambitious mitigation targets, environmental integrity in international carbon markets could be pursued by preventing the transfer of mitigation outcomes from countries with NDC targets that are less stringent than BAU or from emission sources not covered by NDC targets. **Eligibility criteria, limits**, and accession criteria to **carbon clubs**, as mentioned above, could be options to pursue this approach.

This approach could partially also address concerns that countries could have perverse incentives to set future NDC targets unambitiously or to define their scope narrowly. If ambitious NDC targets and their progression were a prerequisite for participation in international market mechanisms, a key challenge for safeguarding environmental integrity under Article 6 would be addressed.

All three strategies discussed above have prospects but also face limitations. We recommend that all strategies be further explored. Some of these strategies may be pursued in parallel, to provide a higher assurance of environmental integrity. Countries could also implement tiered approaches that provide more flexibility while still ensuring integrity. International rules could, for example, establish eligibility criteria or limits in ways that allow countries with ambitious economy-wide NDC targets to transfer units without demonstrating their quality, while international oversight be provided for emission sources outside the scope of NDC targets or for NDC targets less stringent than BAU, such as by limiting transfers in such situations to the Article 6.4 mechanism.

Overall, the environmental integrity risks from Article 6 depend on the extent to which international carbon market mechanisms will be used. The potentially large supply from countries with hot air or emissions sources not included in NDCs is only a risk where it is met with demand. Currently, only few countries have stated an interest in acquiring international units, although demand might increase once mechanisms are in place. If there is political will among acquiring countries to ensure environmental integrity, and if environmental integrity pitfalls are clearly visible – through transparency on the quality of mechanisms and on the ambition and scope of NDCs –, then political commitments might complement rules at international level. Major potential acquiring countries could, for example, agree not to purchase units from certain countries, and to purchase units sourced outside the scope of NDCs only through mechanisms that ensure unit quality. This could for example be done in the form of a political declaration, similar to the one included in Annex II to decision 1/CMP.8. Such declarations would, of course, have to be implemented at national policy level. Another strategy could be based on the consideration of the environmental integrity risks from different types of mechanisms: internationally linked ETSs are likely to pose lower environmental integrity risks than crediting mechanisms or other types of transfers. Groups of countries (or „carbon clubs“) could also agree to refrain using mechanism types that involve higher risks for environmental integrity.

Where resolutions or carbon clubs are important for ensuring the integrity of international market mechanisms, it is important to bear in mind that clubs are exclusionary and can only ensure environmental integrity within the club. Moreover, the effectiveness of a club preventing the transfer of units that lack quality relies on the willingness of club members to ensure environmental integrity. A low-ambition carbon club could undermine the abatement effort within the club and provide a competitive advantage to club members compared to other countries (or clubs) with higher mitigation ambition.

Finally, we also identify two important considerations for using international crediting mechanisms under Article 6. First, using crediting mechanisms as international support to countries for achieving their conditional NDC targets poses a dilemma: if the donor uses the credits to achieve its NDC target and if double counting is avoided, the use of international mechanisms does not actually support to the transferring country in achieving its NDC target. If double counting were not avoided, using international market mechanisms would lead to higher aggregated GHG emissions. A possible solution could be using international crediting mechanisms as a tool to deliver results-based climate finance instead of the donor country using the units to achieve its NDC target.

Second, achieving a „higher ambition“, as envisaged under Article 6.1 of the Paris Agreement, or an „overall mitigation in global emissions“, as envisaged under the Article 6.4 mechanism, can be complex. If global GHG emissions should decrease due to a transfer, a part of the mitigation outcome should not be used towards achieving NDC targets – neither by the transferring nor by the acquiring country. Common strategies pursued by crediting mechanisms to achieve net GHG emission reductions – in particular using conservative baselines or discounting of emission reductions – do not necessarily achieve this. If global GHG emissions should be reduced as a result of an international transfer, other approaches could be considered: for example, the acquiring country may only account part of the transferred units towards achieving its NDC and cancel the remainder.

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