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Robust Transfers of Mitigation Outcomes

Understanding Environmental Integrity Challenges

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Summary

With the adoption of the Paris Agreement in December 2015, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) also agreed on new forms of using market mechanisms at the international level: Article 6.2 of the Paris Agreement allows Parties to transfer internationally transferred mitigation outcomes (ITMOS) by using bi- or multilateral forms of cooperation (so called *cooperative approaches*), while Article 6.4 establishes a mechanism governed by the UNFCCC that is to contribute to the mitigation of greenhouse gas emissions and support sustainable development (by many called *Sustainable Development Mechanism - SDM*). Both approaches allow for the transfer of mitigation outcomes that can be used for achieving the individual climate change mitigation goals of Parties under the Paris Agreement, the so called nationally determined contributions (NDCs).

Against the backdrop of these new forms of market-based cooperation that are to take place under the novel climate regime established with the Paris Agreement, this policy paper explores the risks to environmental integrity associated to the transfers of mitigation outcomes in the context of crediting mechanisms and provides an overview on approaches and tools that could be used for addressing these risks under the Paris Agreement.

The analysis shows that some of the environmental integrity risks can be addressed mainly at the technical level. This relates, inter alia, to the risks of mitigation outcomes being unreal or non-permanent as well as to carbon leakage and rebound effects. Here, robust MRV provisions should be established. Another set of risks that can be addressed with technical provisions are those related to double counting. Robust and uniform accounting rules applicable to all countries combined with clear reporting provisions and registries (for mitigation activities and outcomes) are substantial elements for addressing these risks. For the elaboration of most of these technical provisions, the experiences made under the Kyoto Protocol as well as the instruments at jurisdictional level and on the voluntary markets can provide valuable input.

However, the new regime that has been introduced with the Paris Agreement requires thinking about innovative solutions that go beyond existing recipes, as some environmental integrity risks will be difficult to address without sacrificing at least part of the new and open structure of the Paris Agreement. This relates in particular to the risk of activities not being additional: The uncertainty intrinsically linked to the counter-factual nature of the concept of additionality together with the fact that additionality will in the future most likely have to be demonstrated at the level of the individual mitigation activity as well as against the national climate policy, makes it particularly challenging to develop a set of provisions that provides the correct incentives for countries to design truly additional activities while at the same time raising the ambition of their NDCs.

Another set of risks that will be difficult to address are those related to accounting among countries with diverse NDCs. Transferring mitigation outcomes internationally and using these for pledge attainment requires a certain level of comparability that cannot be provided with highly diverse types of NDCs. In this context, the issue of single-year targets seems particularly problematic.

The process of establishing provisions to address these issues can be expected to be politically controversial, potentially significantly re-

ducing the attractiveness of using baseline and credit approaches. Therefore, an open and dynamic process is needed, which allows to take into account the political realities of the ongoing climate negotiations, while being guided by the ultimate goal of safeguarding the environmental integrity of the Paris Agreement.

1 Introduction

The adoption of the Paris Agreement at the 21st Conference of the Parties (COP) to the UNFCCC (United Nations Framework Convention on Climate Change) has been celebrated as a major success of global environmental governance. Art. 6 of the Paris Agreement, which provides the basis for Parties to use market-based approaches in achieving their individual mitigation goals, was a particular surprise, given the lack of progress in the negotiations on carbon markets in the run-up to the Paris conference.

Now that the initial euphoria has settled, it is time to take a step back and analyse carefully what these initial regulations mean and how they should be developed further. What are the potentials and where do the main risks lie?

By setting the focus on the latter, this policy paper explores the risks to environmental integrity associated to the transfers of mitigation outcomes and provides an overview on approaches and tools that can be used to address these risks under the Paris Agreement. In doing so, we focus on transfers taking place in the context of crediting, while risks associated to other types of transfers, such as through linking emissions trading schemes, will not be assessed.

But what is **environmental integrity** and how can it be defined? In this paper, we will use the term "environmental integrity" to describe a situation where the individual elements or mechanisms of an overarching instrument do not undermine the (environmental) goals of this instrument. In the case of climate change mitigation, the overarching environmental goal is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic interference with the climate system." (UNFCCC, Art. 2). With the Paris Agreement, this goal has been operationalized by stating that the increase in the global average temperature is to be kept to "well below 2 °C above pre-industrial levels" (Art. 2).[1] Hence, in order to preserve environmental integrity, any mechanism installed under the UNFCCC and its related legal instruments, such as the Paris Agreement, must not undermine this overarching goal of climate change mitigation. This also relates to the possibility to use market-based approaches by transferring mitigation outcomes – the results of mitigation activities – across national borders.

Against this backdrop, we will first look at the environment in which these transfers are to take place: the Paris Agreement, its basic structure and some of the provisions relevant for transferring mitigation outcomes.

In a second step, we take a conceptual approach by presenting the ideal type of a **transfer process** with its various stages from the development of the mitigation activity to the final use of the mitigation outcome. On that basis, the various environmental **integrity risks** associated to the different stages of such a transfer process will be highlighted.

The insights gained are then used as a basis for a practical analysis in the succeeding section. Here, the authors present **approaches and tools** for addressing the environmental integrity risks identified and highlight the already existing principles and provisions of the Paris Agreement and its Art. 6, where relevant.

[1] Unless specified otherwise, the term "Art." in this paper does always refer to an article of the Paris Agreement.

Given the early stage of the debate, the complexity of many of the integrity risks and their interconnectedness to other, yet unclear, design variables, this paper cannot and does not intend to provide readily applicable solutions. Therefore, the authors rather aim at stimulating the debate on the key environmental integrity risks associated to the international transfer of mitigation outcomes and shed some light on how these could be addressed.

2 The Paris Agreement

As stated above, the Paris Agreement does allow for the international transfer of mitigation outcomes under its Article 6. Art. 6, which is embedded in a broader set of rulings and provisions. Notably, the Paris Agreement establishes a climate regime with a novel governance architecture. This architecture is fundamentally different from the clear-cut top-down approach known from the Kyoto Protocol: The future climate regime is characterized by a bottom-up nature that gives Parties more leeway in defining their individual contributions. Instead of relying on legally binding commitments, the Paris Agreement builds on political bindingness combined with innovative tools for transparency and ambition rising. This novel structure paved the way for a truly global participation while at the same time resulting in increased complexity. This section gives a brief overview on main elements of the agreement, which provide the basis for any future transfers of mitigation outcomes at the international level.

2.1 Parties' NDCs: The foundation of the Paris Agreement

Parties' nationally determined contributions (NDCs) represent the very foundation on which the Paris Agreement is built. Despite their key relevance, there is no universally agreed formula for the **design of NDCs** but they are to be developed in a bottom-up manner. As a result of this open structure, the intended NDCs (INDCs) Parties have communicated in advance of the Paris conference are very diverse in terms of their sectoral scope (economy-wide vs. some sectors only), timeframe (single-year target vs. multi-year targets) and type (intensity goals vs. absolute goals) inter alia (Obergassel / Gornik 2015).

However, Parties agreed to develop a guidance on the features of NDCs for consideration and adoption by the Conference of Parties serving as the meeting of the Parties to the Paris Agreement (CMA) at its first session (Decision 1/CP.21 para 26). In addition, the Paris Agreement states that "developed country Parties should continue taking the lead by undertaking economy-wide absolute emission reduction targets [while developing countries] are encouraged to move over time towards economy-wide emission reduction or limitation targets …" (Art. 4.4). With regard to the timeframe of the contributions, the Paris Agreement states that the CMA "shall consider common time frames" at its first session (Art. 4.10). It therefore still remains to be seen what the outcome of these considerations will be and how they will actually influence the design of future NDCs.

Another aspect that is new to global climate policy relates to the legal status of the NDCs. While under the Kyoto Protocol, the targets adopted by Parties listed in Annex I of the UNFCCC were legally binding commitments, the *contributions* adopted by the Parties under the Paris Agreement are **not legally-binding**.

While Parties are required to pursue domestic actions (Art. 4.2), they are not obliged to achieve their contributions. Hence, Parties' contributions as such are not legally-binding and there are no sanctions in case of Parties falling short of achieving them. Instead of relying on legal bindingness, the Paris Agreement builds on political bindingness: it creates a reputational risk for Parties by establishing a dedicated transparency and review structure that al-

lows for "naming and shaming" (Obergassel et al. 2016).

2.2 Raising ambition: the ratchet mechanism

To ensure compliance and allow for enhanced ambition, the Paris Agreement requires Parties to revise and communicate their NDCs every five years (Art. 4.9). Each revised NDC must be more ambitious than the previous one and reflect the Party's highest possible ambition (Art. 4.3). With this so called **ratchet mechanism**, Parties are required to raise the ambition of their individual contributions. The revision of NDCs is further informed by the outcome of the **global stocktake**, a process in which the collective progress towards achieving the long-term goals is made (Art 14).

2.3 Market-based approaches: Art. 6. 2 and 6.4

Market based-approaches have been included in the Paris Agreement as a means for Parties to raise the ambition of their climate actions (Art. 6.1), allowing Parties to cooperate in the implementation of their NDCs. Parties to the Paris Agreement can use the outcomes or results of mitigation activities implemented abroad and use these outcomes for achieving their individual targets.

The first possibility to transfer such mitigation outcomes is contained in **Art. 6.2**., which allows Parties to engage in so called "**cooperative approaches**" and exchange "internationally transferred mitigation outcomes" (ITMOs). A second possibility to transfer mitigation outcomes is contained in Art. **6.4**, which establishes a "mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development" (in the following called: **Sustainable Development Mechanism (SDM**). While similar to the Kyoto Protocol's Clean Development Mechanism (CDM) in that it is to foster sustainable development while allowing for the participation of private and public entities, the new mechanism is to deliver an overall net mitigation effect, thereby going beyond pure offsetting (Art. 6.4 (d)). Fundamentally different to the cooperative approaches contained in Art. 6.2, the SDM will be supervised by an international body and governed by rules, modalities and procedures to be adopted at the first session of the CMA.

The Paris Agreements does not specify **further requirements or eligibility criteria** that guide the participation of Parties in using the SDM. These could however be included under the rules, modalities and procedures of the new mechanism, which are to be adopted by the CMA at its first session (Art. 6.7).

2.4 The transparency framework

One key instrument of the Paris Agreement is the **transparency framework** (Art. 13), which contains provisions relevant in terms of measurement, reporting and verification (MRV) and accounting. It requires Parties to submit a national inventory report of GHG emissions using methodologies agreed by the CMA. Parties must further provide the information needed to understand the climate action undertaken and to track progress towards individual NDCs. The information provided by Parties is then reviewed by technical experts and subject to a facilitative, multilateral consideration of progress. The review is to identify areas of improvement for the Party and check the consistency of the information with the agreed rules.

3 Transferring Mitigation Outcomes

The transfer of mitigation outcomes across national borders is a process with various stages, from the very first idea of designing a climate change mitigation activity to the final use of the mitigation outcomes resulting from this activity. In the following, the different stages of this process will be briefly presented. This allows for structuring the risks that are associated to each of these steps in the next section.

3.1 Design of the mitigation activity

The transfer of mitigation outcomes begins with the activity that provides the very basis for the transfer: the climate change mitigation activity. This activity can be a project, a programme as well as a sectoral or economy-wide policy, depending on the design of the international policy intervention that triggers the development and implementation of the activity. The policy intervention can be a mechanism or framework under which individual mitigation activities take place.

Under the Kyoto Protocol, for instance, one international policy intervention is the Clean Development Mechanism (CDM), which triggered climate change mitigation projects and programmes in developing countries. With the Paris Agreement, a new international framework for climate change mitigation actions has been created. This framework requires all Parties to act on climate change and provides them with different possibilities to cooperate internationally by making use of its Article 6. Once operational, the mechanisms established under Art. 6 may become the policy intervention that triggers the development of the mitigation activity.

3.2 Implementation of the mitigation activity

The implementation phase is where mitigation outcomes are "generated" on the ground by reducing GHG emissions or sequestering these gases from the atmosphere. What the actual mitigation activity is, depends on the design of the overarching policy intervention. Hence, the mitigation activity could be established at the project level and for instance consist in the construction and operation of a wind farm, which reduces the share of energy based on fossil fuels. However, it could also be a policy, such as a renewable energy feed-in tariff, which triggers the construction of the wind farm. While in the former case, the implementation phase begins with the wind farm becoming operational, in the latter it is the entry into force of the policy.

3.3 Determination of the mitigation results

Before mitigation results can be transferred internationally, the actual GHG reductions of the mitigation activity have to be quantified. Ultimately, the emission reductions usually materialize in the host country's GHG inventory. However, it may be difficult to isolate the mitigation effect of the activity from other GHG emission drivers including other potentially overlapping

mitigation activities. At the project-level this is usually achieved by calculating emission reductions as the difference between actual emissions of a project and a hypothetical scenario describing what would have happened in the absence of the project. For other types of mitigation activities, it may be not as straight forward to quantify mitigation results, particularly if activities aim for very long-term impacts, causal chains between the mitigation activities and the actual emission reductions are relatively long, and/or emission reductions are multi-causal, i.e. several necessary or sufficient conditions have to be met in order to trigger emission reductions.

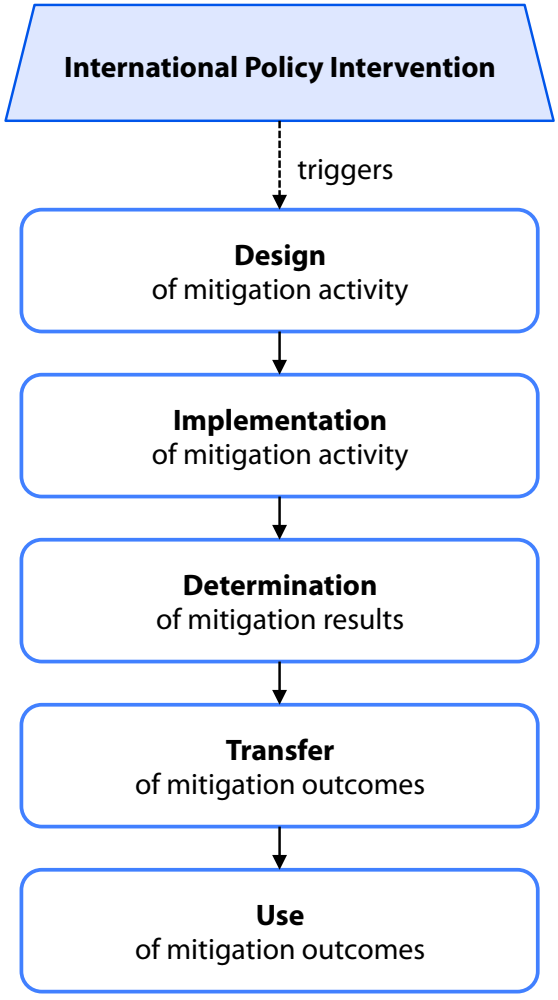

Figure 1: Stages of the process of transferring mitigation outcomes. *Source: Wuppertal Institut.*

3.4 Transfer of the mitigation outcome

The transfer of the mitigation outcomes usually takes place after the mitigation activity has been implemented and mitigation results have been determined.[2] These results are then transferred from the activities' host country to another country. Usually, this exchange takes place on the basis of trading and mitigation outcomes are transferred in exchange of financial means.

3.5 Use of the mitigation outcome

There are in principle two possible ways of how mitigation results can be used: Usually, countries that have imported mitigation outcomes from another country will use these results for meeting their climate pledge. A second possibility consists in the cancellation of the mitigation results. Hence, they would not be accounted against the national climate goal but used to reduce emissions on a voluntary basis. Following the rather broad definition of environmental integrity applied in this paper, the environmental integrity risks described below are relevant for both ways of using mitigation outcomes: If mitigation outcomes that lack environmental integrity are used for pledge attainment these risks can directly threaten the environmental integrity of the entire system. In cases when mitigation results lacking environmental integrity are transferred and voluntarily cancelled, however, there is a rather indirect effect, as they could undermine efforts to reduce emissions.

[2] In practice and depending on the design of the scheme, (parts) of the mitigation outcomes could also be transferred before the mitigation impact is fully achieved and determined.

4 Risks to Environmental Integrity

In the following, the potential risks to environmental integrity at the different stages of the transfer process will be discussed. Figure 2 provides an overview of the different risks.

4.1 Design stage

4.1.1 Non-additionality of mitigation activities

First of all, the general circumstances under which a mitigation activity is being developed are relevant in terms of environmental integrity, as they can influence the so-called "additionality" of the activity.

Additionality is a concept that describes the relationship between the mitigation activity and the policy intervention that is to trigger the mitigation activity. Such a mitigation activity would only be deemed additional if it would not have been implemented in the absence of the overarching policy intervention.

The concept of additionality originated outside the context of climate change policy, with one of the first applications under 1977 Clean Air Act in the United States. In the climate change context, the debate on additionality began immediately after the establishment of the UNFCCC in 1992 and the concept became increasingly relevant with the establishment of the Clean Development Mechanism (CDM) and Joint Implementation (JI) under the Kyoto Protocol (Gillenwater 2012).

Lack of additionality can negatively influence environmental integrity to varying degrees, depending on the relationship between the mitigation activity and the design of the host country's mitigation contribution (NDC). Furthermore, the level of detail and accuracy of the national GHG inventory is of key relevance. The following discussion builds on the assumption that GHG reductions are reflected in the host country's GHG inventory.

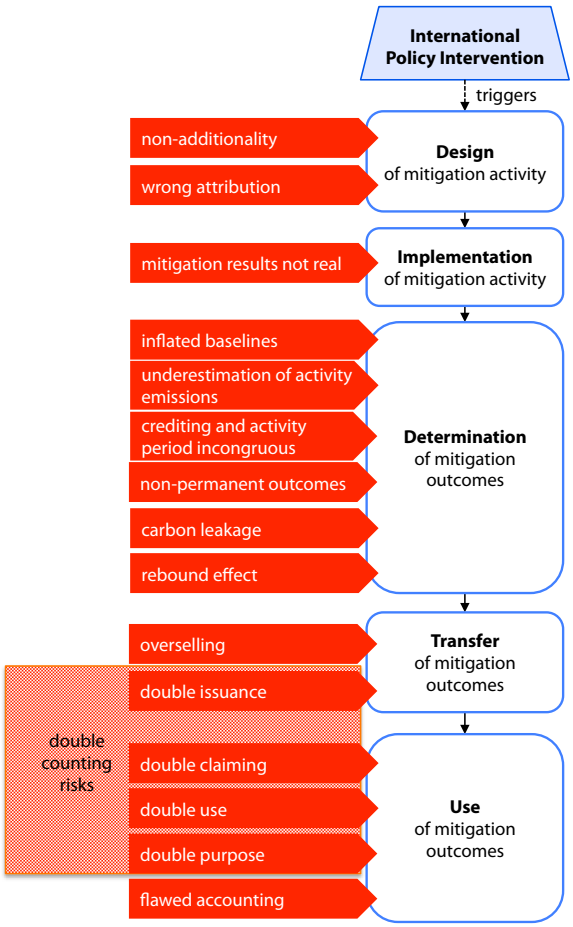

Figure 2: Environmental integrity risks in the process of transferring mitigation outcomes. *Source: Wuppertal Institut.*

If the mitigation activity is outside the scope of the mitigation contribution, the exporting

country will not (be able to) account for the mitigation outcomes exported. Therefore, any mitigation outcomes stemming from a non-additional activity that are transferred to another country and then used for compliance with a mitigation target will necessarily lead to an increase of global emissions, thereby undermining the environmental integrity of the system. This situation describes the impact of non-additional activities implemented under the CDM. Here, mitigation outcomes (units) are transferred from developing countries (uncapped environment) to developed countries (capped environment). Since developing countries have not adopted mitigation targets under the Kyoto Protocol, exported mitigation results are not accounted for by the host countries. Units from non-additional activities therefore directly undermine the environmental integrity of the system by lifting the cap.

In contrast, if the mitigation activity is within the scope of the national mitigation commitment, the host country can (and should) account for the mitigation outcomes transferred by adjusting the national mitigation target or its emissions budget / inventory accordingly. In theory, non-additional activities that are within the scope of the host country's mitigation commitment will not negatively affect the environmental integrity of the system, as long as the exporting country reduces the respective amount of emissions elsewhere in order to comply with its mitigation target.

In practice, however, this only works if mitigation targets of exporting countries are sufficiently ambitious and if there is a clear link between the mitigation target and actual emissions. If this link is missing, and the mitigation target can be reached easily even after inventory emissions have been adjusted for the exported mitigation outcomes, environmental integrity is threatened by non-additional activities even if they are within the scope of the host country's mitigation target. As the case of some eastern European countries with large surpluses of emission allowances (so called hot air) under JI has shown, transfers of mitigation outcomes from non-additional activities can seriously affect environmental integrity (Kollmus et al. 2015).

4.1.2 Wrong attribution

Another risk associated to the implementation phase is when mitigation outcomes are wrongly attributed to the mitigation activity. This risk is particularly high if the mitigation activity addresses the behaviour of individuals, which is also influenced by several other factors. These factors can be other mitigation activities (or policies) as well as general circumstances not directly related to climate change mitigation.

Consider a national policy that aims at reducing emissions from the transport sector by launching a bicycle purchase subsidy programme. The decision of consumers to buy (and use) a bicycle and thereby reduce car use might be influenced by factors not related to the subsidy programme, such as changes in lifestyle, awareness about health benefits, etc. The situation becomes even more complex if other climate change mitigation activities are implemented simultaneously, for instance the reduction of fossil fuel subsidies that results in an increase of gasoline prices. In the end, it will be difficult to disentangle the multiple factors that have influenced the consumer decision and clearly attribute the mitigation results to each of the climate change mitigation activities. Each of these factors can be a necessary precondition for achieving the mitigation outcome. Individually, however, each of these factors might however not suffice to trigger the mitigation activity on its own. Correctly attributing the mitigation outcome to the mitigation activity is key for ensuring that emission reductions are not overestimated and environmental integrity is preserved.

4.2 Implementation

4.2.1 Mitigation outcomes not real

One very obvious yet relevant risk relates to the very existence of the mitigation outcomes. If inexistent emission reductions are transferred elsewhere and accounted against real emissions, overall emissions would be higher than without such transfers.

The most obvious risk to environmental integrity is when the **mitigation activity as such is non-existent**. Challenges associated with determining the existence of a mitigation activity relate to the scale, scope and other design variables of the activity. In general terms, large-scale projects with a technical focus can be expected to be straight forward to identify: the installation of a wind park, for instance, is easy to determine. Similarly, if the mitigation activity is a policy, its existence might be proven with the adoption of the respective law by the legislative bodies and its date of entry into force. However, if the size of the mitigation activities gets smaller, ensuring their existence can become more challenging, increasing the associated transaction costs.

Even if the mitigation activity as such is real, there is still the risk that the **mitigation outcomes are not real**: The mere existence of a wind farm does by itself not ensure it is operational. And even if the wind farm is operational there is still a risk that the produced green energy is not fed into the grid and the activity does therefore not displace fossil-fuel based energy and lead to a reduction of GHG emissions. Similarly, the adoption of a climate change mitigation policy does not ensure that mitigation activities on the ground are actually incentivised. In order to safeguard environmental integrity, these risks must be adequately addressed.

4.3 Determination of mitigation outcomes

4.3.1 Calculation of mitigation outcomes based on inflated baselines

One key risk associated to determination of mitigation outcomes is related to the calculation of the reference emissions level. In order to calculate the impact of the activity, the emission reductions achieved with the mitigation activity are compared to a hypothetical baseline scenario, which describes the emissions accruing in the absence of the activity. If the emissions in this scenario are overestimated, the emission reductions achieved by the mitigation activity will also be overestimated. If the overestimated mitigation outcomes calculated on inflated baselines are exported and then used for compliance, the global GHG emissions levels are higher than without such transfers, thereby undermining environmental integrity.

4.3.2 Underestimation of activity emissions

If the emissions resulting from the mitigation activity are not determined correctly, environmental integrity is put at risk. Therefore, adequate provisions are needed to ensure that the actual emissions level is equal to (or below) the level used for calculating the emission reductions of the activity.

4.3.3 Crediting period and activity implementation period incongruous

Similarly, the time period for which a mitigation activity is credited must coincide with the actual implementation period of the activity. If the crediting period is longer than the implementation phase of the activity and mitigation outcomes transferred are used for pledge attain-

ment, global emissions could be higher than without these transfers.

4.3.4 Mitigation outcomes not permanent

Another risk to environmental integrity relates to the lifetime of the mitigation results achieved in the mitigation activity.

The risk of non-permanence is particularly relevant in the context of land-based activities. Consider, for instance, country A implements a reforestation activity and obtains emission reduction certificates in return. These certificates are then exported and used by country B to attain its emissions pledge. If an unpredicted event, such as a fire or a disease, leads to the reemission of the carbon stored in the reforested area in country A while country B continues using the mitigation results for pledge attainment. If non-permanence is not accounted for, global net emissions will be higher than without the transfer having occurred.

4.3.5 Mitigation activity results in carbon leakage

Carbon leakage refers to the situation when carbon dioxide or another GHG is transferred in time or space outside the scope of the mitigation activity.

Think of, a climate change mitigation activity that aims, for example, at reducing land-based emissions by establishing a forest conservation area. While deforestation activities and emissions in the area will likely be reduced, pressure on surrounding forests might increase, resulting in an emissions rise in these areas. Hence, global emissions have not been reduced but only their origin was shifted. If the mitigation outcomes from the activity that leads to carbon leakage are exported to another country and used for pledge attainment, overall emissions will be higher than without such transfers.

4.3.6 Mitigation activity leads to rebound effect

A similar phenomenon is the so-called rebound effect. It refers to a situation where the implementation of a mitigation activity leads to a reduction of GHG emissions associated to a specific activity, which are, however, countered by changes in behaviour and consumption. Rebound effects are particularly relevant in the context of energy efficiency activities.

Consider, for instance, a policy which requires car producers to increase the efficiency of their vehicles. In theory, a more efficient car which with a reduced fuel consumption of 50% would result in emissions reduced by the same amount. However, these efficiency gains and the associated cost reductions might lead to a more frequent use of the vehicle. This direct rebound effect can significantly reduce the climate change mitigation impact of the activity (Santarius 2014).

Furthermore, there might also be indirect rebound effects: The cost (and time) savings accruing from the mitigation activity could be used for activities that negatively impact the climate system. In the example mentioned above, the more efficient vehicles lead to cost savings for the final consumer. If the consumer uses these cost savings to increase its air travel, the mitigation impact of the activity might be significantly reduced.

Both types of rebound effects can significantly reduce the impact of a mitigation action and should be taken into account when calculating the transferrable mitigation outcomes.

4.4 Transfer of mitigation outcomes

4.4.1 Overselling of Mitigation Outcomes

Overselling is relevant for mitigation actions that are implemented within the scope of the host countries' climate change mitigation pledge.

Overselling is a risk closely related to the question of legal bindingness of climate change contributions: Assume country A has adopted a non-legally binding mitigation goal and sells an amount of mitigation outcomes that is higher than the surplus the country actually achieved in the respective time period. Without further provisions, the country could simply refrain from meeting its contribution and walk away with the revenues stemming from the sale of mitigation outcomes. If mitigation results would be used by the importing country for pledge attainment while the host countries' emissions increase after the transfer has taken place, global emissions would be higher than without these transfers.

4.4.2 Double issuance of mitigation units

Double issuance refers to the situation when one emission reduction results in the issuance of two (or more) mitigation units that can be used for pledge attainment. Therefore, double issuance can only occur in cases where units are issued. Double issuance can lead to double counting. Double counting occurs if one emission outcome is used more than once to account for the achievement of one or more climate change mitigation targets. There are various cases how double issuance can occur (see Table 1).

The most obvious case of double issuance is when one mitigation activity is registered twice in one GHG mitigation programme, leading to one emission reduction to result in the issuance of two units. Another case is when a climate change mitigation activity is registered in two GHG mitigation programmes. Here, each mitigation outcome from the activity would result in the issuance of a unit in each GHG mitigation programme. A more challenging form of double issuance can occur if two mitigation activities overlap. This can happen if the scope of the mitigation activity is not clearly defined. This form of double issuance can involve one or two mitigation programmes (Schneider et al. 2014).

All of these forms of double issuance can lead to double counting and threaten the environmental integrity of the system if the units issued are used for pledge attainment.

4.5 Use of mitigation outcomes

4.5.1 Double claiming: Host and importing country claim same mitigation outcome

Double claiming is another risk that can lead to double counting: it refers to a situation when two Parties claim one mitigation outcome for achieving their individual climate change mitigation targets: the Party where the emission reduction occurred and another Party using the transferred mitigation outcome that resulted from the mitigation activity. Double claiming is only relevant if the mitigation activity is within the scope of the host country's mitigation pledge.

4.5.2 Double use / selling: one mitigation outcome is used more than once

Double use occurs when one mitigation outcome is used for mitigation pledge attainment more than once, either by the same Party or by different Parties. While similar to double claim-

Mechanism(s) involved	Entities involved	Description	Example(s)
One	One	Two units are issued under the same mechanism to the same entity for the same emissions or emission reductions.	Double registration of a project activity under the same mechanism, double issuance due to two monitoring reports that overlap in time.
Two	One	Two units are issued under two mechanisms to the same entity for the same emissions or emission reductions.	A project developer registers a project under two mechanisms.
One	Two	Two different entities are each issued a unit under the same mechanism for the same emissions or emission reductions.	The producer and the consumer of a biofuel claim the same emission reduction under two projects registered under the same mechanism (see Box 1).
Two	Two	Two units are issued under the two mechanisms to two different entities for the same emissions or emission reductions.	The producer of a biofuel claims an emission reduction under mechanism A, and the consumer claims it under mechanism B.

Table 1: Different forms of double issuance. *Source: Schneider et al (2014)*

ing, double use does not involve the Party where the mitigation activity has taken place, but one (or more) Parties using the transferred mitigation outcome for pledge attainment. Double use is another risk that can lead to double counting of mitigation outcomes.

4.5.3 Double purpose: Interference with financial and / or technical pledges

One form of double counting that does not directly impact the overall GHG emissions is double purpose. It refers to the situation when one mitigation outcome is used to meet a mitigation target while at the same time the financial (or technology) transfers associated to that mitigation outcome is used to meet a financial (or technology) pledge. While not directly undermining the achievement of mitigation pledges, double purpose is nevertheless a threat to environmental integrity since it reduces the means of implementation for climate action (Schneider et al. 2014).

4.5.4 Flawed Accounting

Without robust accounting, transfers of mitigation outcomes between two or more countries can lead to cumulative emission levels that are higher than the emission levels that would be achieved without these transfers taking place, thus undermining environmental integrity.

If countries with very diverse mitigation targets exchange mitigation outcomes among themselves, proper accounting for the transferred mitigation outcomes can however become challenging, since the large diversity of the mitigation targets involved makes it difficult to ensure that the climate impact of the mitigation outcome generated in the exporting country is equivalent to the climate impact of the mitigation outcome which it replaces in the importing country (a-ton-is-a ton principle).

Transfers of mitigation outcomes between two countries with different timeframes can be used as an example to illustrate the core of the problem: if a country with a single-year target exports a mitigation outcome generated in a year preceding the target year to a country with a multi-year target, the “climate value” of the mitigation outcome is not the same for both coun-

tries. For the exporting country, the mitigation outcome is not covered by the single-year target and has therefore no direct impact on the achievement of its individual target. For the importing country, in contrast, the mitigation outcome does have a high climate value as it contributes in achieving its mitigation target. It is unclear how these two contradicting values can be reconciled without modifying / aligning the individual mitigation targets of the Parties involved (see: Lazarus et al. 2014).

5 Addressing environmental integrity risks

How can environmental integrity be preserved while allowing for the transfer of mitigation outcomes across national borders? This chapter explores this question with the various risks in mind that have been identified in section 4 while also considering relevant provisions that have already been established with the adoption of the Paris Agreement. With this approach, different tools to address integrity risks will be identified. These can broadly be assigned to the different phases of the transfer process.

5.1 Design

5.1.1 Additionality provisions

Non-additionality of mitigation activities is particularly critical if the activities are beyond the scope of the NDC or if the NDC lacks ambition (see section 3.1). The accompanying decision of the Paris Agreement requires additionality of emission reductions achieved in the context of Art. 6.4 (Decision 1/CP21 para 37 (d)). Respective provisions will have to be included in the rules, modalities and procedures governing the implementation of Art. 6.4. Such provisions could also require Parties to demonstrate the additionality of the mitigation activity at two levels: at the climate policy level and at the level of the individual activity ((Forth 2015).

Hence, on the one hand, Parties would have to clearly indicate how the activity relates to the NDC, whether it is within or beyond the scope of the NDC, and if it is used to achieve the NDC or if it is an additional contribution. This will require an increased level of detail and transparency when communicating the NDCs to the UNFCCC, including information on the NDC' level of ambition and respective multilateral processes for reviewing the information provided.

On the other hand, Parties will also have to show why the activity as such would not have been implemented without the additional incentive provided by Art. 6. For this purpose, the additionality provisions under the CDM and the experiences made in their application can provide valuable input. In particular and given the broader scope activities under the Paris Agreement will presumably have, approaches such as Programmes of Activities (PoAs) and Standardized Baselines could provide a good basis to be elaborated further.

5.1.2 Positive / negative lists of mitigation activities

In principle, any activity that reduces emissions or sequesters GHGs from the atmosphere could be used as a basis for generating mitigation outcomes that are transferrable to other Parties. However, characteristics of mitigation activities vary considerably. While some activities result in emission reductions that can be easily identified and quantified (for example large scale renewable energy projects), other types of activities are difficult to monitor and measuring their climate impact is challenging (such as activities in the transport sector). In addition, some types of activities may be prone to a particularly low level of likelihood of being additional.

To safeguard environmental integrity, eligibility could be limited to low-risk activities that

provide a high level of certainty when calculating their mitigation outcome. This could be done by using a positive list, which covers low-risk activities, or by using a negative list, which contains certain high-risk activities that cannot be implemented. Both approaches, however, come at the price of reduced coverage of the instrument. Here, an adequate balance between coverage and risk management should be reached.

5.2 Implementation of the mitigation activity

5.2.1 MRV framework

Several environmental integrity risks related to the implementation phase of the mitigation activity can be addressed by agreeing robust rules for the measurement, reporting and verification (MRV) and establishing a respective framework.

In this context, measurement refers to the gathering of information on the progress and impact of the mitigation activity. Reporting is the process of transparent and standardised compilation of the information, while verification describes the process of reviewing the information through an independent process against pre-defined criteria such as completeness, consistency and accuracy. A robust MRV framework can ensure that mitigation impacts are real and increase certainty regarding their attributions to the mitigation activity. Under the Paris Agreement, an MRV framework will have to be established for transfers under Art. 6.4. The elaboration from this framework can and is expected to take into account the experiences made with existing approaches and mechanisms, namely, the CDM (Decision 1/CP.21 para 37 (f).

If designed appropriately, an MRV framework can also be used to address impacts that are beyond the scope of the activity itself. For instance, the risk of carbon leakage can be addressed if the MRV framework does not only require monitoring of the activity area but if also the activities in areas or sectors where emissions might increase due to the implementation of the activity are monitored. A precondition for this to happen is expanding the sectoral or geographic scope of the MRV activities beyond the mitigation activities borders. Similarly, MRV methods can contribute to properly detecting and quantifying the rebound effect of a mitigation activity if the scope of the MRV framework is expanded beyond the direct impact of the mitigation activities'.

5.3 Determination of mitigation outcomes

5.3.1 Rules for baseline-setting

In order to estimate the emission reductions of a mitigation activity, the emissions from the activity must be compared with a hypothetical baseline scenario. Robust rules for establishing this baseline ensure that the emissions in this hypothetical scenario are not overestimated.

For developing such rules under the Paris Agreement, the Kyoto Protocol's flexible mechanisms can provide valuable input: The Standardized Baselines Framework developed under the CDM allows to establish baselines for projects and programmes in entire sectors. Hence, instead of defining project-specific baselines, the sectoral baseline can be used by several activities in the sector. The approach is further to reduce transactions costs while making the definition of a baseline more objective. In the context of the Paris Agreement, the data used for the development of sectoral baselines could inform the establishment of baselines for activities that go beyond the project level.

5.4 Transfer of mitigation outcomes

5.4.1 Mitigation outcomes and activities registry

In order to allow for the tracking of mitigation outcomes, a **mitigation outcome registry** can contribute to increasing transparency. Such an electronic standardised registry could contain all information (quantity, status, ownership, location and origin) on the internationally transferrable mitigation outcomes held by a Party (Levin et al. 2014). The registry could be further combined with a transaction log, in order to allow for the tracking of transfers. If transfers are supervised internationally, the transaction log could also be established at the international level. Mitigation outcome registries and transaction logs can help addressing the risk of double use/double selling of mitigation outcomes and are important elements of a robust accounting system.

The information gathered, reported and verified by the MRV framework could be recorded in a **mitigation activities registry**, installed either at the national or at the international level. Irrespective of its level of installation, the registry allows to record different types of information of the mitigation activity relevant for its clear identification, including the sector(s), the installation(s) covered, the geographic area and the temporal scope of the activity.

This information allows to clearly define the boundaries of the mitigation activity, which is particularly relevant for delineating individual mitigation activities from each other, thereby contributing to addressing the risk of wrong attribution. For this purpose, the information recorded in the registry would have to be very detailed and include all emission sources affected by the mitigation activity. The mitigation activities registry could further serve to reduce the risk of double issuance, if it also records, if the mitigation activity is registered under a mitigation programme. The information on the mitigation activity also allows to determine, whether the mitigation activity is within or outside the scope of the NDC, which has relevant implications in terms of accounting (see section 5.5.2 below).

With the Paris Agreement allowing for the use of bilateral and multilateral programmes (Art. 6.2) as well as UN-supervised activities (Art. 6.4) to be used for pledge attainment, both types of registries should be installed in order to increase transparency of the activities undertaken..

5.4.2 International rules on how to avoid double issuance

To fully address the risk of double issuance, however, activities registries should be complemented by internationally agreed rules. These rules could require bilateral mechanisms under Art. 6.2 to require the proponents of the mitigation activity to submit a written attestation that they have the sole right to the credits and will not seek credits under another scheme. Such an attestation could also be required from those entities participating under Art. 6.4. This requirement could be combined with other approaches, such as regular checks by the regulator of the mechanism (for an overview of approaches see: Schneider et al. 2014).

5.4.3 ITMO reserves and validity rules

The risk of overselling could be addressed by requiring Parties to establish a mitigation outcome reserve, similar to the commitment period reserve under the Kyoto Protocol. This reserve would limit the tradable amount of mitigation outcomes depending on the emission reductions achieved in the past, thereby ensuring that the mitigation outcomes exported lie above the exporting countries mitigation contribution.

Another possibility would be to establish international rules on the validity of emission reductions: Accordingly, mitigation outcomes transferred could only be used for compliance by the importing country if the exporting country achieves its NDC. As a result, Parties participating in the transactions would sign respective liability agreements, which reduce the uncertainty for the importing country.

5.5 Use of mitigation outcomes

5.5.1 GHG emission inventories

GHG emission inventories are part of the general accounting framework. Such inventories are needed if a Party wants to participate in transferring mitigation outcomes. Information on exported and imported mitigation outcomes would have to be submitted together with the inventories, in order to calculate the total emissions level and to assess whether the contribution has been achieved..More generally, inventories are needed as a reference to determine the ambition and appropriateness of NDCs.

5.5.2 Accounting rules

In order to preserve environmental integrity, robust accounting of the mitigation outcomes transferred is essential. In particular, accounting rules can address double claiming and double use of units (Schneider et al. 2014). Robust accounting rules ensure that the transfers do not result in emission levels that are higher than the emission levels in a situation without these transfers having taken place.

In Paris, Parties have already agreed on some basic principles. As a result, the Paris Agreement contains a provision to address the risk of double counting by requiring host Parties not to use emission reductions resulting from the use of Art. 6.4 to demonstrate achievement of their NDC if they are used by another Party (Art. 6.5). Similarly, with regard to the participation in Art. 6.2, the agreement text requires Parties to ensure environmental integrity and transparency, and apply robust accounting for ensuring, inter alia, the avoidance of double counting. According to the accompanying decision, Parties will be required to make corresponding "adjustments" for emissions and removals covered by their nationally determined contributions (NDCs) to ensure that double counting is avoided (Decision 1/CP21, para 36).

The most promising approach for implementing such adjustments is accounting for net flow of mitigation outcomes. This, however, only relates to mitigation outcomes falling within the scope of the NDC. For mitigations outcomes not occurring within the NDC's scope, reporting should be made a requirement.

5.5.3 NDCs guidance and conditionality

One possibility to address some of the remaining accounting questions could be addressed by agreeing on robust rules that guide the design of the nationally determined contributions. As outlined above, a process to develop a guidance on NDCs features has already been launched (Decision 1/C.21 para 26). In addition to this general guidance, specific design provisions for NDCs of those countries willing to participate in transfers of mitigation outcomes could be established. With these provisions, the variety of the NDCs of Parties using Art. 6 would be minimized to a certain extent and the challenges in adjusting the NDCs to the mitigation outcomes transferred could be reduced.

Despite the guidance on the design of NDCs, due to their bottom-up nature, NDCs will presumably continue displaying some diversity. In order to allow different NDC-types to use Art. 6 while safeguarding environmental integrity, the participation of Parties with specific NDC-types could be made subject to certain conditions.

For instance, the participation of Parties with a particular NDC type could be limited to transfers with Parties that have adopted the same type of NDC. Similarly, exchange of mitigation outcomes among Parties with different types of NDCs could be subject to certain conditions, such as providing additional information or limiting transfers to mitigation outcomes that have been generated in a specific sector or year. With this approach, a balance between the bottom-up nature of the Paris Agreement and the goal of ensuring robust accounting could be reached.

5.5.4 Criteria for dealing with different readiness levels

In addition to the differences among countries in relation to the design of their NDCs, countries will also continue to differ regarding their institutional and technical capacities (for instance, regarding the correct quantification of emission reductions or the accuracy of the inventory). Differences will presumably also prevail regarding the national legal framework, for instance, regarding the attribution of carbon rights.

These different levels of "readiness" for participating in market mechanisms could be taken into account when regulating access of Parties to the different types of market mechanisms. For instance, participation of Parties with limited technical and institutional capacities could be limited to Art. 6.4, where activities are supervised internationally, while countries with larger capacities and experience could be allowed to use Art. 6.2.

6 Conclusions

With this paper, the authors aim at stimulating the debate on the key environmental integrity risks associated to the international transfer of mitigation outcomes taking place in the context of crediting and shed some light on how these could be addressed under the Paris Agreement.

After presenting the basic provisions of the Paris Agreement, the process of transferring mitigation outcomes was presented to highlight the various integrity risks associated to the different stages of this process. Building on this analysis, tools and approaches for addressing integrity risks have been presented, which could be used as a basis for further developing the basic principles enshrining in the Paris Agreement.

The analysis shows that some of the environmental integrity risks can be addressed mainly at the technical level. This relates, inter alia, to the risks of mitigation outcomes being unreal or non-permanent as well as to carbon leakage and rebound effects. Here, robust MRV provisions should be established. Another set of risks that can be addressed with technical provisions are those related to double counting. Robust and uniform accounting rules applicable to all countries combined with clear reporting provisions and registries (for mitigation activities and outcomes) are substantial elements for addressing these risks. For the elaboration of most of these technical provisions, the experiences made under the Kyoto Protocol as well as the instruments at jurisdictional level and on the voluntary markets can provide valuable input.

However, some environmental integrity risks will be difficult to address. This relates in particular to the risk of activities not being additional: Under the Kyoto Protocol, non-additional activities have been an issue of concern for many years now. While standardised approaches developed under the CDM may help to reduce the subjectivity of project-based assessments, the uncertainty intrinsically linked to the counterfactual nature of the concept of additionality will persist. This is further exacerbated by the fact that additionality might in the future have to be demonstrated at the level of the individual activity as well as against the national climate policy. In particular with regard to the latter, it will be very challenging to develop a set of provisions that provide incentives for countries to develop truly additional activities while at the same time raising the ambition of their NDCs. The process of establishing such provisions can be expected to be politically controversial, potentially significantly reducing the attractiveness of market-based approaches.

Another set of risks that will be difficult to address are those related to accounting among countries with diverse types of NDCs. Transferring mitigation outcomes internationally and using these for pledge attainment requires a certain level of comparability. With very diverse NDCs such comparability cannot provided. In this context, the issue of single-year targets is particularly problematic. Therefore, clear and uniform requirements for the design of NDCs for those countries willing to use market-based approaches will have to be established. This, again, can be expected to lead to political controversies that reduce the attractiveness of using the mechanisms established with Art. 6.

With this tasks ahead, the climate community is currently confronting a particularly challenging situation: While the single elements of the Paris Agreement and their implications still need to be disentangled, new solutions that fit this new, yet nebulous regime, must be developed in

parallel. For this purpose, a dynamic and open process is needed, which allows to take into consideration developments in different sub-domains and levels of the ongoing climate negotiations. Constantly cross-checking the requirements needed from a scientific point of view with the (changing) circumstances in the real world and the developments of the ongoing political process seems one particularly promising way for developing viable solutions. This process of establishing provisions for the use of market mechanisms should be guided by the overarching goal of safeguarding the environmental integrity of the Paris Agreement.

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