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Article 6.4 crediting outside of NDC commitments under the Paris Agreement: issues and options

Policy Briefing

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Carbon Limits works with public authorities, private companies, financial institutions and non-governmental organizations to reduce emissions of greenhouse gases, primarily from the energy sector. Our team supports clients in the identification, development and financing of projects that mitigate climate change and generate economic value, in addition to providing advice in the design and implementation of climate and energy policies and regulations.

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Executive Summary

A key question related to the rules for the Article 6.4 mechanism under the Paris Agreement is whether the mitigation activities generating emission reductions must be inside the scope of the transferring country's NDC or not. Many countries do not have economy-wide NDC commitments, with some sectors or gases being excluded, including some countries that have stated their interest in engaging with the international market mechanisms. This paper examines the benefits and risks of allowing Article 6.4 crediting outside of the scope of NDC commitments, as well as the tools to mitigate those risks. Given the limited coverage of NDCs in many countries, the potential for emission reductions through voluntary cooperation on mitigation outside of NDCs is clearly substantial. Whether this could create disincentives for expanding the scope of NDC and/or for increased ambition depends on two factors: the detailed rules for crediting, at the UNFCCC level or among a group of potential buyer countries. such as how baselines are related to NDC commitments); and the *net* change in financing opportunities, considering both carbon and climate finance,[1] that could be available for countries with ambitious, economy-wide NDC commitments. In addition, for countries where poor data availability and lack of understanding of mitigation potential was a reason for excluding sectors from their NDC commitment, allowing crediting in those sectors could facilitate their inclusion in future NDC cycles, as could any reduction in mitigation costs driven by increased experience and economies of scale. Evaluating the balance between these positive and negative incentives is largely subjective, and will vary by across the transferring countries. More importantly, there are multiple policy options that could reduce the risks of perverse incentives and low-quality units, and which could be incorporated into the current negotiations on the rules for Article 6 crediting. At the end of the day, Parties must weigh the residual risks – after applying a combination of risk mitigation options – against the potential benefits to decide whether and how to allow Article 6.4 crediting outside of the scope of NDC commitments.

[1] The distinction here between climate and carbon finance is based on whether the payments made for mitigation lead to the transfer of tradable units for the purpose of NDC compliance or not. Both forms of financing could potentially use the same MRV system, but climate finance does not lead to a transfer of units from one country to another for purposes of NDC compliance.

1. Introduction

Article 6 of the Paris Agreement provides the opportunity for countries "to pursue voluntary cooperation in the implementation of their nationally determined contributions". This cooperation may "involve the use of internationally transferred mitigation outcomes [ITMOs] towards nationally determined contributions [NDCs]" (Article 6.2) or the use of "a mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development…supervised by a body designated by the [CMA][2]" (Article 6.4) (Cames, Healy, et al. 2016).[3] Importantly, Article 6 also specifies that transferred emission reductions may only be used by one country to fulfil their NDC commitment – in other words, there should be no "double counting" of emission reductions. This implies, as articulated in the COP decision[4], that when units are transferred there should be a "corresponding adjustment" so that only one country can use the reductions toward their NDC goals (OECD 2017).[5] Of course, this assumes that all units are transferred, but the Article 6.4 mechanism could also be used as a standard for monitoring, reporting and verifying (MRV) emission reductions without transferring the resulting units from one country to another, just as the Clean Development Mechanism (CDM) has been used to provide MRV for climate financing (World Bank 2017; Schneider, Spalding-Fecher, and Cames 2015).[6] For all transferred units, regardless of the mechanisms, preventing double counting and tracking the related adjustments requires a "robust accounting" system that not only defines and tracks progress towards national NDC targets but also transparently accounts for all international transfers that affect the assessment of progress towards those targets (Kreibich and Hermwille 2016; Schneider et al. 2016; Howard et al. 2017).[7]

A key question related to the rules for the Article 6.4 mechanism is whether the mitigation activities generating emission reductions must be inside the scope of the transferring country's NDC or not. Many countries do not have economy-wide NDC commitments, with some sectors or gases being excluded, including some countries that have stated their interest in engaging with the international market mechanisms (Howard et al. 2017; Graichen, Cames, and Schneider 2016). There is no language in Article 6.4 or the related COP decision that explicitly restricts Article 6.4 crediting to inside the scope of NDCs. Some recent policy analyses have raised concerns, however, about the risks of crediting outside of the scope of NDC commitments and whether/how corresponding adjustments and avoiding double counting might be addressed in this case (Schneider et al. 2017; Kreibich and Hermwille 2016). The **objective** of this paper is to examine the benefits and risks of allowing Article 6.4 crediting outside of the scope of NDC commitments, as well as the tools to mitigate those risks.

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[2] Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

[3] Article 6 also includes a framework for non-market approaches to voluntary cooperation (Article 6.8), which is outside of the scope of this paper.

[4] FCCC/CP/2015/L.9/Rev.1

[5] This could be done, for example, through adjusting the greenhouse gas (GHG) inventory of the transferring country (within the scope of their NDC) by adding back the transferred units, or reducing that country's emissions target as specified in their NDC (OECD 2017).

[6] Units from Article 6.4 might also be used in other international systems such as ICAO's Carbon Offset and Reduction Scheme for International Aviation (CORSIA), although these transfers would also need robust tracking to that there was no double counting with the use of mitigation outcomes for NDC goals.

[7] An accounting system also should address domestic transfers (e.g. banking or carry over of units), international review of the final accounting balance, and facilitating compliance with NDCs (Schneider et al. 2016)

The next sections outline some of the benefits of crediting outside NDCs, particularly in terms of speeding up global action on mitigation. Section 3 then turns to any analysis of the risks that crediting outside of NDCs could present to the goals of the Paris Agreement. Policy options to reduce or manage these risks are the subject of section 4, which are followed by conclusions in section 5.

Note that this paper is not intended to be a comprehensive assessment of environmental integrity issues under the Paris Agreement, or even for all of Article 6. Other studies have addressed this broader scope (Michaelowa and Hoch 2017; Schneider et al. 2017; Kreibich and Obergassel 2016; Kreibich and Hermwille 2016), while the focus here is specifically on Article 6.4 crediting outside of the scope of NDCs. In addition, the analysis assumes that a robust accounting system will be agreed so that all transferred units and their application against NDC targets can be transparently tracked.

2. Potential benefits of crediting outside of NDCs

This section highlights the potential benefits of allowing Article 6.4 crediting outside of the scope of the transferring country's NDC commitment:

- **Greater opportunity for funding and realizing emission reductions**: the coverage of NDC commitments varies along several dimensions, including sectors and which greenhouse gases are included. Precisely quantifying the total greenhouse gases not included within NDCs is difficult, because almost no countries report future emission projections and the breakdown of those emissions by sector and gas. Several indicators suggest, however, that the additional emission reduction opportunities are significant. First, 92 countries, representing 14% of current global emissions, do not have economy-wide targets and therefore exclude certain sectors from their NDC commitments (Graichen, Cames, and Schneider 2016). Of course, part of the emissions of those 92 countries is covered, since some sectors are included. Even for included sectors, however, often not all GHG are included. 39 countries, representing 57% of global emissions, include all six Kyoto Protocol gases[8], but 16 countries, with 25% of global emissions, include only CO_2. China's NDC goals for GHG mitigation, for example, are only for CO_2 emissions, and India's exclude some sectors and gases as well. According to estimates from Schneider et al (2017) (based on Meinhausen & Alexander (2016)), 6.1 $GtCO_2e$, or approximately 12-14% of global emissions in 2030, are not covered by NDC targets. Obviously, only a portion of these emissions could be abated through crediting projects under Article 6.4, but clearly the opportunities are substantial. Moreover, if these sectors are not a high priority for mitigation policies and actions in the transferring countries, and are not already included as part of country-driven action to reduce emissions, the marginal cost of abatement could potentially be lower than within the scope of NDC commitments, where the crediting baselines may reflect the commitments contained in the NDC for that sector.[9].
- **Incentives for expanding NDC coverage and ambition**: while many papers discuss the possibility of disincentives for countries to increase the scope of their NDC coverage (see section 3

[8] CO_2, CH_4, N_2O, HFCs, PFCs, SF_6

[9] Because Article 6.4 transfers outside of NDCs would also generate funding for the Adaptation Fund (i.e. because the Paris Agreement text says that a share of the proceeds from this mechanism should be used for adaptation funding), the larger market size for crediting would also increase financial flows for adaptation in vulnerable countries

below), there may also be ways in which allowing crediting outside of NDCs could provide positive incentives for increasing coverage. There are several possible reasons for this:

- Based on interviews with practitioners engaged in supporting NDC development, a key reason why some countries did not include sectors in their NDC commitments was the lack of data on mitigation potential and costs. Conversely, a key reason that the energy sector (and power generation in particular) is included in *all* NDCs is the higher quality of data and the availability of relatively simple methodologies for converting activity data to GHG emissions estimates. Using market-based mechanisms such as Article 6.4 crediting in these sectors not yet included could identify low cost mitigation potential, and strengthen the data quality that is needed to include the sectors within future NDC goals. Identifying cost-effective mitigation potential when these parameters are not well known is, in fact, one of the key reasons for using market-based mitigation instruments at the national and international level (Fuessler et al. 2015; Grubb et al. 2011; Ellis, Corfee-Morlot, and Winkler 2007; Raab 2012; IETA 2016).
- In addition to increasing data availability, the implementation of large numbers of mitigation projects in a sector not currently covered by an NDC commitment could potentially reduce the cost of mitigation, based on "learning curves" or "experience curves", in which costs per unit of capacity tend to decline for newer technologies in proportion to cumulative production (de La Tour, Glachant, and Ménière 2013; Rubin et al. 2015). The impact, however, would depend very much on the size of potential crediting outside of Article 6.4 versus the total global market for the respective technology. For technologies such as wind and solar, for example, the impact of experience curves has been driven by increases in *global* production, because most of the costs for these technologies are based on globally-available equipment. Nevertheless, the substantial size of potential markets outside of NDCs discussed above suggests that experience curve effects are possible, particularly for cost components whose economics are driven by local/national factors (e.g. efficiency of maintenance systems, unit costs for installation/implementation). In addition, increased scale of implementation at the national level could reduce other barriers such as awareness, information and institutional barriers.

- **Less political resistance to stringent standards**: ensuring environmental integrity when crediting outside of NDCs is primarily about enforcing stringent rules to promote high unit quality (see discussion in the next section). While this does present technical and sometimes political challenges, the experience of the CDM has shown that over time significant improvements can be agreed at an international level. For crediting inside NDCs, on the other hand, ensuring environmental integrity involves many decisions about how and whether crediting thresholds should be related to NDC goals, how those goals are presented and justified, and whether the goals are sufficiently ambitious to provide a reasonable basis for establishing crediting thresholds. For this reason, securing international agreement on protecting environmental integrity for crediting outside of NDCs could possibly be *easier* than what is needed to ensure the same for crediting inside NDCs.

In summary, there are likely to be large opportunities for global emission reductions that may only be realized through allowing Article 6.4 crediting outside of the scope of NDCs. By increasing data availability, cost reductions and capacity building in these sectors, such crediting activities could also facilitate including these sectors in future NDC commitments. The strength of this incentive may vary considerably by country, however, and be most relevant in countries where lack of mitigation data and experience in certain sectors was a key reason for not including them in the scope of their initial NDC.

3. Potential risks of crediting outside of NDCs

Having considered some of the benefits of allowing crediting outside of the scope of NDCs, this section now turns to the risks, particularly the possible disincentives for increasing NDC ambition and the environmental integrity[10] risks.

- **Disincentives for expanding NDC coverage and ambition**: One of the most common arguments against allowing crediting outside of the scope of NDCs is that this creates a "perverse incentive" for countries to not move towards economy-wide targets (Obergassel 2016). The reasoning is that, if they increase the coverage of their NDC goals, the transferring country would lose the crediting revenue. This is because the crediting projects would no longer be eligible, by virtue of the mitigation activity being part of the NDC commitment (i.e. the activities would no longer be additional, or the baseline would be such that no emission reductions would be generated). This argument includes several implicit assumptions, however, which require more consideration. First, it assumes that countries will strategically choose the scope of their NDC taking into consideration the potential for crediting in various sectors. Second, it assumes that this crediting revenue would necessarily be lost if those sectors were covered by an NDC commitment. Third, it assumes that there are no opportunities for increased financing for the country from increasing the scope of sectoral coverage, which might offset the loss of potential crediting revenue.
  - For the first issue, discussions with experts involved in support NDC development suggest that countries did not consider the availability of crediting revenue when setting the scope of their INDC goals prior to the Paris Conference in December 2015. During most of the Paris Agreement negotiations, it was not clear whether any crediting mechanisms would be included in the final agreement (Obergassel et al. 2016), and final version of Article 6 only same near the end, much as the final version of the CDM came very late in the Kyoto Protocol negotiating process (Spalding-Fecher et al. 2012)[11] (i.e. although in the latter case, piloting of cooperation mechanisms based on the UNFCC (i.e. AIJ, Activities Implemented Jointly) was already underway before the Kyoto Protocol was agreed). As mentioned above, the coverage of NDC goals was often related to data availability and the degree of confidence in mitigation opportunities. In addition, other pollical factors were key to both coverage and ambition (Grubb, Vrolijk, and Brack 1999; Spalding-Fecher et al. 2012; Obergassel et al. 2016), and countries often choose to build their NDC upon existing national climate policies and action plans, which might have also prioritised certain sectors.[12] Finally, the fact the global carbon credit market had shrunk dramatically from 2011 to 2015 meant that countries may not have considered this as a major factor is setting NDC scope and ambition, and, in any case, most of the revenue from CDM was not received by government. Of course, this is not to say that the same will be true during formulation of the next round of NDC commitments from 2023, because at that point the

[10] Environmental integrity in this paper means that global emissions do not increase as a result of the use of Article 6 crediting mechanisms, in comparison to a situation where countries do not use crediting mechanisms.

[11] Of course, in the case of the Kyoto Protocol, the question was more whether the prospect of project-based crediting schemes influenced the goal setting from countries that were potential buyers, while the question here is whether potential *sellers* of credits took these mechanisms into account when formulating their national mitigation commitments.

[12] As a parallel example, research suggests that the Annex I country goals finally agreed by countries in Kyoto in 1997 were also not related to the availability of crediting as a flexibility mechanism, even though pilots under Activities Implemented Jointly (AIJ) were well underway (*ref – Policy Dialogue report)

rules for Article 6 will be in place and the performance of crediting markets under the Paris Agreement will be known.

- For the second question of how NDC coverage could affect crediting revenue, this depends on what type of commitment the country makes in the newly covered sector, and how the baselines for crediting would then be set in that sector. While baselines outside of the NDC would more likely be related to technical standards or more generic benchmarks, baseline setting inside of the NDC (or the "crediting threshold") is likely to reflect the NDC commitments (Broekhoff et al. 2017). For example, if (i) a country makes ambitious, unconditional commitments in the sector that require new domestic policy instruments and financing (e.g. requiring land-fill gas capture, or providing feed-in tariffs for renewable energy that make those investments financially viable), and (ii) the rules for Article 6 crediting do indeed link the crediting threshold to NDC commitments (i.e. crediting is only allowed for actions that go beyond the unconditional NDC commitments), then crediting revenue would indeed be lost when a new sector is included in the NDC scope. However, neither of these two assumptions is necessarily true. While countries have committed to progressively increasing the ambition of their NDCs, this is not expressed in the Paris Agreement quantitatively, nor is there any mechanism to test the level of ambition. A country could therefore include a new sector in their next NDC, and publish a goal for that sector that was either equivalent to business as usual (BAU) emissions or only slightly below that. In that case, even if the crediting baselines within the NDC were linked to transferring country's commitments, the credited emission reductions might not change significantly.[13] More importantly, although a number of policy experts have argued why baselines for crediting within NDCs should be linked to those NDC commitments (Broekhoff et al. 2017; Schneider et al. 2017; Fuessler et al. 2014), this is not yet part of the Article 6 rulebook, and may not necessarily be included in those rules.
- Finally, increasing the ambition of their NDCs might afford countries more opportunities to access climate finance, and this could be more important that impacts on crediting revenue. While climate finance funders do not restrict the use of their loans and grants to activities inside the scope of NDC commitments, they may favour countries that are perceived as having an ambitious climate policy with broad NDC commitments. This could be true not only for access to climate finance[14], but even for carbon financing as well, because groups of buyer countries may impose their own restrictions on the type of transferring countries from which they will buy (e.g. countries with economy-wide targets) (Victor 2015). Countries might also have more opportunity to access technical assistance for a sector that is covered by their NDC, from resources and networks that are dedicated to supporting countries in achieving their NDC goals (as opposed to supporting more general mitigation action).

[13] An added complexity here is that the Paris Agreement does not define "conditional" and "unconditional" commitments. Some countries have chosen to use these terms, but even then have not necessarily been clear about what the "conditions" are for reaching certain targets, while other countries do not state whether their commitments are conditional or not.

[14] The distinction here between climate and carbon finance is based on whether the payments made for mitigation lead to the transfer of tradable units or not. Both forms of financing could potentially use the same MRV system, but climate finance does not lead to a transfer of units from one country to another for purposes of NDC compliance.

- **Environmental integrity/unit quality**[15] **risks**: a second important concern about allowing crediting outside the scope of NDCs is that, because these transfers will mostly likely not affect the transferring country's achievement of their NDC goals, the mechanism does have a "self-policing" incentive to maintain high quality of transferred units. In other words, when two countries transfer emission reductions inside their NDC under Article 6.4, and the acquiring countries applies these against their NDC commitments, to ensure that there is no double counting of these units towards achieving NDC commitments, a "corresponding adjustment" will be made to the transferring countries' inventory (e.g. adding back the units to the inventory or reducing their allowable emissions). This means that the transferring country has a strong incentive to ensure that the transferred units represent real emission reductions beyond their NDC goals, because otherwise the corresponding adjustments may make it more difficult to reach their commitments. By contrast, when the transfer involves emissions reductions outside of the NDC, then, by definition, the transferring country does not have to worry about the impact of the transfer on meeting their NDC commitments. They would, however, still have to follow all of the rules agreed by the supervisory body, which would be designed specifically to address environmental integrity, as per the requirements of the Paris Agreement. Whether the "self-policing" effect of crediting within NDCs provides an incremental reduction in environmental integrity risks depends on two important assumptions: the level of ambition of the transferring country's NDC commitments and the unit quality risks associated with the specific project type.
  - In terms of ambition, many papers have noted that transferring countries whose NDC targets are above the BAU scenario do *not* have any incentive to promote unit quality and "self-police" emission reduction transfers inside the scope of their NDC commitments. Even if the transfers do not represent real emission reductions, the corresponding adjustments will not compromise the transferring country's ability to meet their NDC goals. This was the case many countries in Joint Implementation under the Kyoto Protocol. The countries with large surpluses (e.g. Russia and Ukraine, whose emissions targets were well above their actual emissions) could transfer units with very low environmental integrity and still meet their KP commitments, while those with stringent targets (e.g. Germany, France, Spain) were very strict on the type and quantity of units can could be transferred (Kollmuss, Schneider, and Zhezherin 2015). In summary, when comparing crediting inside and outside the scope of NDCs, the "self-policing" effect is only relevant for countries with ambitious targets. How important is this qualification? The estimates of "hot air" (i.e. surplus emissions, where NDC goals are above BAU) vary, but the recent Schneider et al. (2017) paper for the German Environmental Agency estimates that hot air could reach 2.2 to 3.5 $GtCO_2e$ in 2030. For comparison, the total committed emission reductions versus BAU, in those countries that have ambitious NDCs, is 5.3 to 10 $GtCO_2e$, so hot air could eliminate a substantial share of these reductions.
  - The need for self-policing and the environmental integrity risks for crediting outside of NDCs (as well as inside) also depend on the scope of the crediting mechanism (e.g. sectors, project types), and the robustness of additionality assessment and baseline development. Several major research studies on the additionality of the CDM, for example, found that reliably assessing additionality is more difficult for project types with other streams of revenue, particularly when those revenue streams are large compared to the value of the carbon revenue (i.e. the "signal-to-noise" ratio is low), or where the projects benefit receive substantial policy

[15] Unit quality means that unit of 1 tCO2e transferred represents at least 1 tCO_2 of real, measurable and permanent emission reductions, compared to a baseline situation without the use of the crediting mechanism (Schneider et al. 2017).

support (e.g. feed-in tariffs) (P. Erickson, Lazarus, and Spalding-Fecher 2014; Ruthner et al. 2011; Spalding-Fecher et al. 2012). Examples include large scale renewable power (e.g. wind and solar in emerging economies), waste gas utilisation and energy efficiency, where the impacts of energy pricing and other energy policies, as well as the overall investment climate, are more often the key factors determining investment flows. This does not mean that none of these projects need the incentives provided by a crediting scheme to be viable – particularly projects in higher risk markets in low income countries – but rather that it becomes very difficult for a regulator (e.g. the UNFCCC) to reliably assess additionality across the full range of projects. Including sectors where evaluating additionality is problematic could therefore increase the environmental integrity risks for crediting outside of scope of NDCs. Conversely, if sectors where additionality can be relatively easily evaluated have been left outside the scope of the NDC, the allowing of crediting for these technologies would promote environmental integrity[16].

Double counting and accounting risks: mitigation activities outside of the scope of the transferring country's NDC may not be captured in the accounting system and transparency framework put in place to track progress towards NDC goals. While this does mean that the accounting system is not as comprehensive as for activities within NDC goals, the risk of "double counting" – in the strict sense of using mitigation outcomes for two countries to achieve their NDC goals - should be relatively low because the transferring country, by definition, does not need these emission reductions to reach their NDC commitments. If the units are to be transferred outside of the Paris Agreement framework – for example to the CORSIA[17] offset system that will service the international aviation industry – then appropriate links between registries and accounting systems would be needed to ensure that the unit were only used in one system (Schneider and La Hoz Theuer 2017).

Overall, while crediting outside of the scope of NDCs may create some perverse incentives and – depending on the sectors included - environmental integrity risks, the magnitude of these risks is difficult to judge and will depend on the scope of crediting. Whether these risks outweigh the benefits of crediting outside of the scope of NDCs depends, in part, on whether the risks can be managed or reduced, which is the subject of the next section.

4. Policy options to manage the risks of crediting outside of NDCs

Given the potential benefits from crediting outside the scope of NDCs, and the risks identified, this section discusses some of the policy options to reduce these risks. These options might be used individually, or in combination, to design a policy package that minimizes risks while initiating early mitigation action and capturing significant cost-effective emission reduction opportunities that would not otherwise be implemented.

- **Guidance on communicating NDC targets:** If the negotiations were to put forward key principles for communicating NDC targets, such as clarity, conservativeness, fairness, and progression, this

[16] An example would be where the power sector was included but the waste sector was excluded from NDC goals: crediting for land-fill gas to power projects outside of the NDC could have lower environmental integrity risks than some crediting programs based on renewable power within the scope of the NDC, where additionality is more difficult to evaluate.

[17] Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) https://www.icao.int/environmental-protection/Pages/market-based-measures.aspx

could potentially encourage ambitious goals through greater transparency (Howard et al. 2017; Schneider et al. 2017). Such principles, however, only provide a platform for greater clarity and do not ensure that NDC goals are set below BAU emission levels (Briner and Moarif 2016). An even more effective step would be guidance stating that future revisions of NDCs shall include any sectors that benefitted from Article 6.4 crediting in previous NDC cycles. This would be then be equivalent to limiting the duration of crediting outside the scope of NDC commitments (see below).

- **Guidance on crediting rules/stringent requirements in Article 6.4 rules for offset quality:** In developing the rules and guidance for the Article 6.4 mechanism, the key principles from Article 6 such as environmental integrity, transparency and allowing for higher ambition could be further elaborated. Agreeing on related principles of conservativeness, additionality, transparent governance, permanence and third-party verification, for example, could enhance the quality of the units generate under the mechanism (Schneider et al. 2017; Howard et al. 2017). Principles on their own, however, without a strong governance structure to oversee and enforce them, would most likely not be sufficient to ensure unit quality for crediting outside of NDCs
- **Restricting duration of the crediting scheme**: If the primary concern about crediting outside the scope of NDC goals is that this will create a perverse incentive not to increase the coverage of those goals, then one policy option would be to only allow this type of crediting for a limited number of years. For example, the Article 6.4 rules could say that crediting outside of the scope of NDC commitments would only be allowed until 2030, or until the end of the first NDC cycle. This would make it clear that no crediting revenue could be earned by continuing to leave a sector outside of NDC commitments when these commitments were revised after the “global stock take” in 2023. The rules could also allow the crediting for more than one NDC cycle, but still restrict how long crediting outside the scope of the NDC would be allowed. While this could reduce the attractiveness of the mechanism to private sector investors for long-lived mitigation technologies (i.e. compared to system that allowed for up to 21 years of crediting, as in the CDM), the first five to ten years of mitigation projects are the most important for financial viability. For activities with long economic life and/or a transformative effect on the sector, the emission reductions would still carry on after that fixed crediting period – but to the benefit of the transferring country, since this mitigation outcome would no longer be transferred. The option could eliminate the risk of perverse incentives not to expand NDC scope (CCAP 2017).
- **Transferring country commitments to expand NDC**: another option to address possible perverse incentives would be for the transferring country to agree to expand the NDC during a future revision such that the activities that were outside the scope of the NDC are now inside – or for this commitment to be required by the Article 6.4 rules. If the transferring country makes this commitment upfront, then crediting outside the scope of the NDC cannot impact the decision on broadening the scope in future periods.
- **Updating baselines**: To address the impact of NDC commitments (or policies related to NDC implementation) on the additionality and baselines for crediting outside of the scope of NDCs, the baseline could be updated every 5 years, in line with the update to the NDC (Marcu 2017; Schneider et al. 2017). Additionality could also be revisited during that same period. The centralized supervisory body for Article 6.4 would facilitate this control over the baseline and additionality rules, without reference to a national-determined mitigation commitment. This would reduce the environmental integrity risk of crediting projects that were, in fact, now required by new government policy. While this could reduce environmental integrity risks from low quality units, it would not address the possible perverse incentive to not expand the scope of the NDC (i.e. depending on how the baseline was updated).

- **Restricting the scope of crediting (e.g. sectors, technologies, countries)**: because certain technologies and sectors have higher environmental integrity risks, crediting outside of the scope of NDCs could be restricted to those technologies where additionality is most likely. Examples include gas destruction projects with no other revenue source (e.g. non-CO2 gas reduction such as methane and N_2O destruction) (Cames, Harthan, et al. 2016; P. A. Erickson and Lazarus 2013). In addition, project types that have been common practice in emerging markets may still face insurmountable barriers in other lower income country groups, and therefore have a higher likelihood of additionality. So crediting outside of the scope of NDCs could be based on a matrix of country types (e.g. income groups) and project types. For example, biomass residue power generation might be excluded in middle income countries but allowed in low income countries. This could reduce environmental integrity risks from the transfer of low quality units.
- **Limiting the transfer and use of units from outside of NDC commitments**: Limiting the number of units from crediting outside of the scope of NDCs that could be used by the acquiring country for NDC compliance would be similar to concept of "supplementarity" under the Kyoto Protocol[18] (Grubb et al. 2011; Gillenwater and Seres 2011). The limit could be expressed in absolute terms, as a share of current emissions, as a share of 2030 emissions, or in relationship to a quantified mitigation target. This could reduce environmental integrity risks from the transfer of low quality units
- **Discounting or cancelling a share of the units transferred**: For example, if 100 tCO_2e of emission reductions were certified and transferred, only 80 tCO_2 might be applied against the acquiring country's NDC goals (i.e. a 20% discount). The remaining units would be surrendered or cancelled, and so not used towards either country's goals. While this can potentially reduce the risk from low quality units, the problem is that the magnitude of risk may not be well understood in advance and the discount may not be large enough to compensate for the environmental integrity risks[19]. In addition, the price of the credits would be higher than the actual mitigation costs, which could affect the allocation of mitigation funding.
- **Carbon clubs, which could agree to any of the above without UNFCCC agreement:** Because many of the options explained above may be politically difficult to agree under the UNFCCC process, where complete consensus is required, groups of countries could choose to agree on their own guidelines to ensure environmental integrity of Article 6 trading (i.e. including the use of Article 6.4 outside of the scope of NDCs). Agreements among a coalition of countries on climate policy are often called "carbon clubs" (Victor 2015; Nordhaus 2015), and could also include groups of buyers that invest in carbon and climate finance funds. In the case of Article 6, the club could include agreements on the quality of transferred units, the ambition of NDCs required for transfers, robust accounting practices and a commitment to progressively expand the scope of NDCs (Schneider et al. 2017). While such clubs could successfully implement any of the options above, their main disadvantage is their inherent limitation in scope – they do not prevent the trade of low quality units or unambitious NDC commitments outside of the club. Nevertheless, if they club represents a significant share of the demand for tradable units, they can exert considerable influence.

This list includes several viable options for reducing both the key risks of perverse incentives and weak environmental integrity of units. In fact, most of the options could be effective at minimizing these risks

[18] The same would be true for limiting transfer of units from crediting inside of NDCs, of course.

[19] For example, if 50% of the credits from a given project type are unlikely to be additional, then a 10-20% discount when transferring the units will not address the environmental integrity risks.

(except the guidance, on its own). The challenge, however, will be the political feasibility of the options and how they affect the relative attractiveness of Article 6.4 crediting versus other sources of mitigation demand. Restricting the crediting period or duration of the entire crediting scheme reduces the returns to investors in long-lived mitigation activities, for example, although, as discussed above, this effect might be fairly limited.

5. Conclusion

The objective of this paper was to weigh up the benefits and risks of allowing Article 6.4 crediting outside the scope of NDCs, as well as to consider policy options to minimize the risks. Given the limited coverage of NDCs in many countries, the potential for emission reductions through voluntary cooperation on mitigation outside of NDCs is clearly substantial. Whether this could create disincentives for expanding the scope of NDC and/or for increased ambition depends not only on the detailed rules for crediting (e.g. how baselines are related to NDC commitments) but also on the *net* change in financing opportunities (i.e. considering carbon and climate finance) that could flow from broadening the scope of NDC commitments. In addition, for countries where poor data availability and lack of understanding of mitigation potential was a reason for excluding sectors from their NDC commitment, allowing crediting in those sectors could facilitate their inclusion in future NDC cycles, as could any reduction in mitigation costs driven by increased experience and economies of scale in the sector. Evaluating the balance between these positive and negative incentives is largely subjective, and will vary by across the transferring countries. Perhaps more importantly, there are multiple policy options that could reduce the risks of perverse incentives and low-quality units, and which could be incorporated into the current negotiations on the rules for Article 6 crediting. At the end of the day, Parties must weigh the residual risks – after applying a combination of the risk mitigation options – against the potential benefits to decide whether and how to allow Article 6.4 crediting outside of the scope of NDC commitments.

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