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Beyond pure offsetting: Assessing options to generate Net-Mitigation-Effects in carbon market mechanisms

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HIGHLIGHTS

- Options for net emission reductions of market-based mechanisms are assessed.
- Research combines past and current views for project and sector-based mechanisms.
- Implementation ensures initiation of mitigation activities is not discouraged.
- Important insights for methodological design of new market-based mechanisms.
- Profitability-based approach for project-based mechanisms suggested.

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ABSTRACT

The current project-based carbon market mechanisms such as the Clean Development Mechanism (CDM) and the Joint Implementation (JI) do not have a direct impact on global greenhouse gas emission levels, because they only replace or offset emissions. Nor do they contribute to host country's national greenhouse gas emission reduction targets. Contributions to net emission reductions in host countries is likely to become mandatory in new mechanisms under development such as in the framework for various approaches, a new market-based mechanism and even in a reformed JI. This research analysed the question if approaches for carbon market-based mechanisms exist that allow the generation of net emission reductions in host countries while keeping project initiation attractive. We present a criteria-based assessment method and apply it for four generic options in existing mechanisms and derive implications for future mechanism frameworks. We identified the application of "discounts" on the amount of avoided emissions for the issuance of carbon credits and "standardisation below business as usual" as most promising options over "limiting the crediting period" and "over-conservativeness". We propose to apply these options differentiated over project types based on internal rate of return to ensure cost-efficiency and attractiveness.

1. Introduction

CDM and JI are introduced in the Kyoto Protocol as project-based carbon market mechanisms. Designed as baseline-and-credit mechanisms, they encourage the private sector to voluntarily identify and implement currently unregulated greenhouse gas reduction potentials. Carbon credits generated through CDM and JI are used by countries to achieve their Kyoto targets and by companies to meet obligations in emissions trading schemes. Both mechanisms increase the flexibility to most cost-effectively reduce emissions and thus allow agreeing on more ambitious targets in mandatory schemes.

Despite these advantages pure offsetting mechanisms in general and in particular CDM and JI are criticized. Several evaluations conclude that the CDM did not meet its objective to assist Non-Annex I countries in achieving sustainable development (e.g. Boyd et al. (2009), Ruthner et al. (2011), Sterk et al. (2009)). This can be explained by the fact that only the reduction of emissions is currently monetized and it is no surprise that implemented projects focus on this aspect (Olsen 2007). The JI however does not have a sustainable development aim. Furthermore, various CDM project evaluations underpin doubts that a considerable share of projects is not additional to the baseline situation and would have occurred anyway (e.g. Haya (2010), Michaelowa and Purohit (2007), Schneider (2007)). In fact, pure offsetting systems

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constitute a particular risk to increase the overall emission levels since they result by definition at best in a zero-sum game. Offsets representing actual emission reductions are used to legitimise the same amount of emissions elsewhere and have currently no direct global impact on emission levels.

Similarly, no emission reduction effect occurs for the account of the host countries of projects. Emission reduction units issued to JI projects need to be backed with Assigned Amount Units (AAU) from the host countries' Kyoto budgets. In this way JI projects do not contribute to achieving the host country's greenhouse gas emission reduction target. Host countries with no AAU surplus are moreover concerned that JI projects harvest cheap mitigation opportunities which are not available for the host country to comply with own reduction targets. CDM host countries are in a different situation since they do not have own emission reduction targets yet. The current CDM host countries might however take over reduction targets in the future and have with the current outflow of cheap mitigation opportunities a reduced scope for own activities (Muller, 2007).

In response to criticism against existing mechanisms and limited acceptance from some JI host countries, this research addresses the question whether approaches exist that allow the generation of net emission reductions in host countries while keeping project initiation attractive. We introduce the term "Net-Mitigation-Effect" as an amount of greenhouse gas reduction generated by credited mitigation activities which are not issued as offsets to the markets. This amount of net reduction is attributed to the host country and automatically constitutes a climate benefit in the CDM. JI projects with climate benefits additionally require the cancelation of AAUs. Thus, the realisation of Net-Mitigation-Effects leads to mechanisms which go beyond pure offsetting. In addressing the above mentioned concerns this might pave the way for continued or increased acceptance of existing mechanisms.

Against this background, it is noteworthy that recent decisions require net reductions to be ensured in the Framework for Various Approaches (FVA) and for a New Market-based Mechanism (NMM) (see Section 2.2 for details). This renewed interest in net emission reductions confirms that a broad assessment of existing approaches to go beyond pure offsetting is useful and leads to important insights for the reform of existing mechanisms and the methodological design of new market-based mechanisms.

In this research we systematically analyse various options for project-based mechanisms which qualify to generate net reductions while previous publications mainly focussed on discounting approaches, although no agreement on discounting in the CDM was ever reached. Discounting is defined as a percentage of certified emission reductions which is not rewarded with carbon credits to the advantage of the investor. Chung (2007) e.g. proposed discounting in the CDM after 2012 to generate mitigation contributions from non-Annex-I countries. Schatz (2008) advocates discounting as a means to increase the integrity of the CDM by siphoning off windfall profits. Schneider (2009) discussed different CDM discount variations and their overall carbon market impacts. A rather complete overview on the different discounting objectives is provided by Kollmuss et al. (2010). Kollmuss et al. also discussed various discounting limitations and found that even negative impacts on the carbon markets integrity exist. Castro and Michaelowa (2010) analysed discounting as a means to improve the regional distribution of projects and concluded that discounting only marginally enhances the competitiveness of least developed countries over leading CDM host countries.

The remainder of this article is organised as follows. In Section 2, further background information is provided on existing experiences and current developments around the generation of Net-Mitigation-Effects. Section 3 describes the applied methodological approach and defines the most relevant Net-Mitigation-Effects approaches. Section 4 contains details of the analysis in which selected options are assessed based on individually developed criteria. These qualitative results are discussed and provide the basis for recommendations in chapter 5.

2. Background

2.1. Existing Net-Mitigation-Effect experiences

Only few examples exist where Net-Mitigation-Effects are generated on purpose while in some cases Net-Mitigation-Effects occur as side-effect. CDM and JI projects potentially contribute to non-certified emission reductions if project operation is continued after the crediting period and assuming a baseline for the projects still exist. The shortening of crediting periods as deliberate approach to generate a Net-Mitigation-Effect is moreover discussed by experts (Cames, 2009). Conservative approaches beyond scientifically required levels might also generate reductions which are not rewarded with credits (Warnecke, 2014). CDM implementation in China applies a taxation of revenues from reduction units to steer the development of project types. Taxation rates vary from 65% to 2% for priority project types. These are partly reinvested through China's Clean Development Mechanisms Fund to support further mitigation activities (NDRC, 2005). In this way a Net-Mitigation-Effect might indirectly be generated.

Certain EU Member States, which domestically allowed JI projects, also made Net-Mitigation-Effect experiences. Projects resulting in N_2O emission reductions from nitric acid production had to apply most conservative baseline assumptions in France, Germany and partly Portugal (e.g. below current emission levels). It is, however, difficult to assess whether this can be considered a Net-Mitigation-Effect or whether it reflects strict enforcement of the additionality requirement. France additionally generates a direct Net-Mitigation-Effect by issuing certificates for only 90% of the emission reductions generated (Ministère de l'ecologie et du développement durable, 2007). Among other reasons, the legislation refers to the requirement for Kyoto Parties included in Annex I to maintain a commitment period reserve in its national registry of at least 90% of its assigned amount or 100% of five times its most recently reviewed inventory, whichever is lowest (UNFCCC, 2001).

Denmark's pilot system for domestic emission reduction projects currently issues no credits but direct financial compensation to projects (Danish Energy Agency, 2011). Although it is currently not an offsetting system, it leads to a Net-Mitigation-Effect of 100%.

Since 2003, New Zealand's Projects to Reduce Emissions Programme supports power generation projects that reduce emissions. Projects were selected via two tender rounds in which applicants had to state a "bid ratio", being the ratio of the number of units requested relative to the emission reductions delivered. Projects with lower bid ratios were preferred and project developers had an incentive to offer a "discount". The bid ratio also includes emission reductions achieved before 2008 since the programme awarded credits only for reductions taking place in 2008–2012. In the first tender round, the average ratio was 0.96, in the second round it was 0.85. Phylipsen and Ward (2007) states that the high value in the first round might be due to the fact that the concept of the bid ratio was not well understood at that time.

The 2009 proposal for a US cap-and-trade mechanism, also known as the Waxman-Markey bill, never passed the senate but included a differentiated treatment of international and domestic offsets. For international offsets a discount factor was proposed to favour domestic offsetting. The ratio for international offsets to replace one ETS allowance was proposed to 1.25:1 (Larsen, 2009).