Policy paper

Standardized Baselines for the CDM – Are We on the Right Track?

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Summary

For a long time, the Clean Development Mechanism (CDM) has been criticized for its cumbersome procedures and risks of weak environmental integrity. As a potential solution to both of these shortcomings, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) called for the use of "standardized baselines" at the Cancun conference in late 2010. This policy paper provides a brief overview of the current CDM framework for standardized baselines, identifies important shortcomings, assesses lessons learned on standardization from CDM methodologies, and recommends directions for the further development of standardized baselines. The paper reflects the views of researchers who have worked on standardization in offsetting mechanisms for over a decade.[1]

While the current framework contains innovative ideas and proposals, our assessment and experience suggest that it may not achieve its objectives. It poses major practical challenges and could, at the same time, both discourage valuable and additional projects by under-crediting them and reduce environmental integrity by over-crediting others. It employs an approach that inadequately considers the circumstances, technologies and trends in the applicable sector by using the same (default) approach and performance thresholds regardless of the sector, project type, and location. The use of constant performance benchmarks over time may fail to reflect ongoing or expected trends. Practical challenges abound with regard to data availability. Furthermore, since the use of standardized baselines is proposed to be voluntary, only project developers that could achieve more credits than using a project-based baseline may choose them, weakening the environmental integrity of the system.

Drawing on the lessons learned from standardization in CDM methodologies and other schemes, we recommend avoiding the use of one single methodological approach for different sectors, project types and locations, and exploring more practical, robust and data-driven approaches that are developed for specific project types. The development of such approaches should be based on actual projects and reflect the particular circumstances of the sector, project type and location. We further recommend that standardized baselines should be mandatory once approved, but to carefully select for which purposes, sectors, project types and baseline emission sources standardized baselines are used. We also recommend review, road-testing and impact assessments of proposed approaches prior to approval, in order to ensure the overall quality, practicability, effectiveness and robustness.

[1] See, for example: Broekhoff 2007, Hayashi et al. 2010, Lazarus et al. 2000, Probase 2002, Schneider 2009, Spalding-Fecher and Michaelowa 2012

1 Introduction

Setting baselines for the calculation of greenhouse gas emission reductions under the CDM has been an expensive and time-consuming exercise. Rejection rates of proposed methodology submissions have been high, and stakeholders complain about inconsistencies within and between methodologies and in the assessment of proposed projects. Moreover, the tests used to assess project additionality (i.e. whether a project is mobilized through the CDM or is business-as-usual) have been heavily contested.

Since the earliest days of the CDM, standardization has been seen as a potential solution to these problems. Indeed, the use of performance benchmarks was established in the Marrakech Accords in 2001, which allowed for baselines to be set as the "average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category".[2] Over the past five years, standardized approaches, such as performance benchmarks and default values, have increasingly been included in baseline and monitoring methodologies under the CDM. The move towards standardization accelerated in 2010 when the Parties called for the use of "standardized baselines" in the CDM, with the aim "to reduce transaction costs, enhance transparency, objectivity and predictability, facilitate access to the clean development mechanism, particularly with regard to underrepresented project types and regions, and scale up the abatement of greenhouse gas emissions, while ensuring environmental integrity" (UNFCCC 2010). Under standardized baselines, baseline technologies, baseline emission factors and additionality criteria are not determined on a project-by-project level but are established for a project type or sector in one or several CDM host countries. Over the past two years, the first guidelines and procedures for the establishment of standardized baselines were developed and adopted by the CDM Executive Board (see section 2 below).

We are concerned that the current and proposed regulatory framework on standardized baselines in the CDM will not achieve its objectives and could severely limit the ability of standardized baselines to contribute to global greenhouse gas abatement efforts. The analysis of and the first practical experiences with the framework suggest the proposed approaches may be impractical to apply, and could result in significant under-crediting in some cases (thereby removing the incentives from the carbon market) and in significant over-crediting in others (thereby undermining the integrity of the mechanism). Different stakeholders, from researchers (Hayashi and Michaelowa 2012 and Spalding-Fecher and Michaelowa 2012) to project developers, non-governmental organizations[3] and the Methodologies Panel under the CDM Executive Board[4], have voiced their own concerns with the direction taken so far in the regulatory framework on standardized baselines.

Despite rock-bottom CER prices imperiling the global carbon market and few new projects being developed, we believe that standardized baselines could have an important role to play in the CDM and in the development of other carbon markets in the long term. For this reason it is important to ensure that the regulatory framework on standardized baselines is practicable, workable and robust. We believe that a different approach towards standardized baselines is required to achieve these objectives.

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2 Decision 3/CMP.1, Annex, paragraph 48(c)

3 See https://cdm.unfccc.int/public_inputs/index.html

4 In a note prepared for EB70 in November 2012 (Methodologies Panel 2012), the Methodologies Panel concludes that "the existing guidelines may not in every case lead to robust standardized baselines" and "recommends to thoroughly revise" them.

2 Overview of the current framework for standardized baselines

The current framework for standardized baselines consists mainly of the “Guidelines for the establishment of sector specific standardized baselines” (UNFCCC 2011, hereafter referred to as “the Guidelines”), the “Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines” (UNFCCC 2012a), and the “Procedures for the submission and consideration of standardized baselines” (UNFCCC 2012b), as well as forthcoming standards, guidelines and forms to implement these guidelines and procedures.

Standardized baselines can be derived from approved methodologies, approved tools or the Guidelines. The latter are considered as the main new methodological building block for the development of standardized baselines. The following summary of the main approach in the Guidelines is based on requirements included in the Guidelines as well as additional information provided by the UNFCCC secretariat during workshops and roundtables with regard to the planned application of the approach.

The Guidelines provide for an approach to develop positive lists of fuels, feedstocks and/or technologies that are deemed additional and to identify a “baseline fuel, feedstock and technology” which then defines the baseline emission factor. The Guidelines require information on the fuels, feedstocks and technologies in the market/sector (e.g. steel or clinker production) and data on how much output (e.g. tons of steel or clinker) is produced based on each specific type of fuel, feedstock and/or technology that is used in the market.

For the determination of the positive list, a two-step additionality test is applied: First all fuels/feedstocks/technologies are ranked according to their carbon intensity. For technologies, the ranking is to be carried out based on design efficiency data provided by manufacturers on each technology, independent of the size and age of the plant. All fuels/feedstocks/technologies that have a lower carbon intensity than a given percentile of output are candidates for the positive list. The percentile is to be defined by the CDM Executive Board. In a second step, the Designated National Authorities (DNAs) of the host country have to demonstrate for each of the candidates that they are either less economically attractive than the non-candidates or face barriers. Only fuels/feedstocks/technologies for which this can be demonstrated will be included in the final positive list.

The "baseline fuel, feedstocks and technology" is similarly defined as the fuel, feedstock or technology that has the highest carbon intensity among low-carbon fuels, feedstocks or technologies in the market. The range of low-carbon fuels, feedstocks or technologies can be defined by the same or a different percentile as used for additionality testing and would also be defined by the CDM Executive Board. The baseline fuel, feedstock and/or technology defines the baseline emission factor (in tons of CO_2per ton of output). For "baseline technologies", the emission factor is also determined based on design efficiency data provided by manufacturers, independent of the size and age of the plant.

For a number of elements in the guidelines it is not yet clear how they should be applied in practice. These are planned to be further elaborated in 2013. The Guidelines do not yet cover all sectors (e.g. transportation is excluded) and stakeholders are invited to propose revisions to expand their applicability, though procedures to submit such proposals are not yet in place.

3 Summary assessment of the current framework for standardized baselines

While the current framework contains innovative ideas and proposals, our assessment and experiences suggest that the framework poses major practical challenges and may not result in meaningful or robust standardized baselines. Specifically, we identify the following issues:

- **Use of one single methodological approach:** The Guidelines provide for one single methodological approach for different project types, sectors and locations (see section 2 above). This approach poses major challenges:
    - **Performance benchmarks are not always suitable:** Performance benchmarks are a promising approach for some project types and sectors. However, for other project types and sectors, such as fuel switching in an existing plant, a performance benchmark approach is difficult or impossible to apply. For many project types and sectors, standardized tests and methods should be based on other parameters and conditions which better correlate to the circumstances under which technologies are likely to be additional.
    - **Use of the same default stringency levels:** The framework uses initially the same default stringency levels for many different technologies and sectors. This will likely lead to significant over-crediting for some project types – thereby undermining the integrity of the mechanism – and significant under-crediting for other project types – thereby removing the incentives from the CDM for project developers (see Hayashi and Michaelowa 2012).
    - **Sector-specific circumstances:** Sector-specific circumstances, technologies and trends are not adequately considered. This can lead to standardized baselines that do not reflect ongoing trends, that are based on outdated technologies, or that are overly ambitious (e.g., an emission factor of zero in situations where a significant proportion of new installations is based on fossil fuels).
    - **Comparing new and existing, small and large plants:** The approach uses data from the entire stock of all existing plants in the industry to establish performance benchmarks. Using all existing plants may be appropriate to establish performance benchmarks for retrofit projects which improve the performance of existing plants. However, comparing the performance of greenfield CDM plants with a stock of existing plants, some of which may have been built decades ago, could in many cases result in unrealistic and outdated baselines. Similarly, the size and different features of plants in the industry are not considered. This could, for example, result in situations where a small CDM plant is compared to mostly larger and therefore more efficient plants in the industry, potentially resulting in significant under-crediting.
- **Voluntary use of standardized baselines:** Under current rules, project developers can decide to use either a project-specific or a standardized baseline. The possibility to choose among two options could result in situations where project developers only select a standardized baseline if it provides for higher baseline emissions than a project-specific baseline. Even with rather stringent standardized baselines, this approach can result in over-crediting of emission reductions (see Spalding–Fecher and Michaelowa 2012).
- **Use of constant baseline emission factors:** It is proposed to use one constant baseline emission factor which is applied continuously for at least one crediting period (i.e. up to 10 years, and up to 30 years for afforestation and reforestation project activities). Any updates to the baseline emission factor are only applied at the renewal of the crediting period. While

the use of constant baseline emission factors may be appropriate in some industries with low rates of innovation and long plant life times, constant baseline emission factors do not reflect the reality of industries in which the emissions intensity changes significantly over time. The use of constant baseline emission factors is also problematic in the light of the vintage of data used to establish standardized baselines. In some situations, baseline emissions may be determined based on data from well beyond 10 years in the past.[5]

- **Linking additionality assessment and baseline determination:** When applying the Guidelines it is required that standardized baselines be used in all cases for both assessing additionality and determining baseline emissions. In addition, it is proposed that all baseline emission sources must be established through standardized baselines. This approach reduces the flexibility to select the most suitable approach for the sector and project type concerned. For example, many project types have several baseline emission sources. For some of these project types it may be more accurate, and result in lower transaction costs, if one baseline emission source is quantified through a standardized baseline (e.g. an emission factor for grid electricity), while another baseline emission source is quantified through a project-specific baseline (e.g. an emission factor for heat generation). Similarly, for some project types the assessment of additionality may be simpler and more reliable on a project-by-project level, while the baseline emissions could be determined through a standardized baselines, or vice-versa. The proposed framework does not foresee such hybrid approaches.
- **Data availability:** The Guidelines require the collection of a large amount of activity data and information on technologies used in each plant, which in many sectors and countries is not available. Gathering such data for an entire market or sector could be difficult or impossible, in particular if data are commercially sensitive or would need to be collected from individual households. Another challenge is that the proposed framework intends to base the data partially on hypothetical design efficiencies which may not reflect the actual, on-the-ground efficiency of the technologies. In a number of sectors, it may be possible to establish standardized baselines based on other data sources, such as actual performance data (e.g. where industry associations collect data on national or international levels), sample measurements for deemed savings, or data from CDM plants. Such approaches are currently not foreseen in the proposed framework.
- **"Prior consideration":** A key principle in the CDM is that projects seeking registration need to provide proof that they considered the CDM before proceeding with the investment. This is usually done by a simple written notification to the UNFCCC secretariat of the intent to register a CDM project. The provision screens out projects that started several years before applying for the CDM and that are clearly not additional. Recently proposed rules to amend the current framework would essentially remove this requirement for projects using standardized baselines to demonstrate additionality. This could potentially result in the registration of a large number of CDM projects which are clearly not additional.
- **Lack of clarity of the framework:** The current framework is in many aspects not very clear and explicit. For example, the terms and definitions used in the framework, such as "sector", "measure" or "output", are not fully clear and may not reflect the reality of many industries

[5] This is illustrated with the following example: In 2014, a standardized baseline is proposed based on data of plants operating in 2012. The approved standardized baselines is valid for the years 2015 to 2017. In 2017 a project is registered which starts operation and crediting in 2020. A single crediting period of 10 years is used which implies that the standardized baseline, based on 2012 data, can be used up to 2029.

which produce several (non-homogenous) co-products, use multiple fuels or implement multiple measures to improve plant performance.

4 Use of innovative elements of standardization in approved CDM methodologies

Standardized approaches to assess additionality and quantify emission reductions have already been introduced in several baseline and monitoring methodologies under the CDM by using performance benchmarks or default values. This includes methodologies for a variety of different sectors, such as grid-based power production, cement production, aluminum production, nitric acid production, HFC-23 abatement, efficient refrigeration appliances, efficient buildings, and efficient cooking stoves.

These methodologies largely address the issues discussed above:

- The specific characteristics of the industry and the technologies are taken into account. Technological improvements in the industry are factored in, for example, by using performance benchmarks which decline over time or are regularly updated during the crediting period, or by introducing adjustment factors that account for technological improvement over time;
- For Greenfield projects, data from recently constructed plants (and not the entire stock of plants) is used to assess additionality and determine baseline emissions, or the data is updated at appropriate intervals.
- The use of standardized performance benchmarks or default values is usually mandatory. Where the use of default values is voluntary, they are made sufficiently conservative.
- Some methodologies draw on already available data collected by industry associations (e.g. for aluminum production) or use default values derived from baseline data from CDM projects or the literature.
- Projects which establish additionality through performance benchmarks nevertheless have to demonstrate that the CDM was considered when proceeding with the project.

These examples illustrate important lessons learned in the consideration and approval of standardized approaches in baseline and monitoring methodologies in the past decade. The development of standardized baselines should draw upon these experiences and lessons learned and should build on this past work. Also, approved methodologies using standardized approaches have undergone a comprehensive review process, involving desk reviewers and expert panels, which provided measures of quality assurance and quality control before approval by the CDM Executive Board. Finally, most approved methodologies were developed in the context of actual projects and real world data which helped to take practical constraints into account.

Some methodologies using standardized approaches have been rarely applied so far. These were mostly developed in a top-down manner, or requirements were introduced during the approval process which turned out to be impractical. This illustrates the need to develop standardized approaches in close co-operation with practitioners and experts in the field who are aware of practical constraints, such as data availability, and to take into consideration the particular circumstances of the sector and technologies involved.

5 Recommendations

A significant amount of research has emerged and experiences have been gained with standardization, both in the CDM and in other offsetting schemes, as well as from benchmarking under emissions trading schemes. We recommend **drawing to a larger extent on these practical experiences** in the development of standardized baselines under the CDM.

We specifically recommend:

- **Avoiding the use of one single methodological approach** for different sectors, project types and locations, and **exploring practical, robust and data-driven approaches** that are developed **for specific project types.** The development of such approaches should be based on actual projects and conducted in close consultation with experts in specific sectors and practitioners in the field. The methodological approaches should reflect the particular circumstances of the sector, project type and location, and "account for the technology- and context-specific factors", as recommended by the High-Level Panel on the CDM Policy Dialogue (2012). These factors include, for example, the size and type of technologies, the availability of data, whether Greenfield or Brownfield projects are being targeted, consideration of the ongoing trends and innovation in the sector, and whether the technologies and products are locally or globally used and traded.
- Ensuring that the **proposal of standardized baselines** by DNAs is **voluntary** but that their **application is mandatory** once they are approved.
- **Ensuring that standardized performance benchmarks, emission factors or default values change over time and/or reflect the actual situation** for sectors with significant technological innovation or significantly changing trends, such as a new fuel type becoming available. A pre-determined path for the development of emission factors and default values over time could ensure both investor certainty and environmental integrity. Using standardized baselines that change over time would implement the recommendation by the High-Level Panel on the CDM Policy Dialogue (2012) to "ensure that the focus of incentives constantly shifts to the next generation of technologies, in order to drive technological change."
- Continuing to require demonstration of "**prior consideration**" of the CDM by requiring projects using a standardized baseline to demonstrate that they have considered the CDM in proceeding with the decision to implement the project.
- Initiating **on-the-ground data collection**, in cooperation with interested host country governments and industry associations, to facilitate the establishment of standardized baselines. The availability of relevant performance and additionality parameters is for many sectors an important prerequisite for the development of more robust standardized approaches. A starting point might be a systematic mining of the already available data from sources such as industry associations, national statistics, market studies and registered CDM projects.

A key lesson learned is that **standardized baselines**, while a valuable tool, **may not be suitable for all sectors, project types or countries**. The establishment of meaningful standardized baselines may be difficult in complex sectors with multiple products or in sectors with strongly varying circumstances among the installations. Moreover, for some sectors or some baseline emission sources, project-specific approaches may provide more accurate results and have lower transaction costs. We therefore recommend regulators not to be carried away by "standardization for standardization's sake" but to **adopt a flexible approach** where standardized baselines may be used for the estimation of some baseline emission sources or sectors, while project-specific baselines are used for other baseline emission sources and

sectors, or where standardized additionality tests are combined with project-specific baseline estimates or vice-versa, depending on the context of the sector, project type, and location.

We also recommend to ensure the overall quality, practicability, effectiveness and robustness of proposed approaches for standardized baselines by providing for a **thorough review** of any proposed approach, such as for the methodology approval process, and conducting **road-testing** and preparing an **impact assessment** before final approval. The current downturn in the CDM market should allow for some time in the development of the regulatory framework for standardized baselines in order to assure it achieves its objectives.

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