

CDM-EB91-AA-A09

Analysis of demand for and usage of methodologies developed top-down

Version 01.0



United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) requested the secretariat at its ninetieth meeting (EB 90 report, para. 54 (a), to provide an information note, for consideration at a future meeting, containing an analysis of the demand for and usage of methodologies developed top-down; specifically, the analysis should include the frequency with which different top-down methodologies are utilized by project activities and programmes of activities (PoAs).

2. Purpose

2. The purpose of this document is to present analysis and findings of the demand for and usage of methodologies developed top-down.

3. Key issues and proposed solutions

3. The request from the Board was in the context of the concept note on the development of standards with a methodological framework for specific project types and sectors. The analysis showed that:
 - (a) The “top-down development of methodologies” has been one of the key instruments used by the Board and the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) to address regional distribution of CDM projects. It is among the selected activities for which the CMP provided to the Board a mandate at four successive meetings (CMP 4, 5, 6 and 7), demonstrating a strong interest. This mandate is still relevant, as the regional distribution of projects is one of the areas for which there are further expectations that the CDM will continue to make progress;
 - (b) The **demand** for top-down development of methodologies is high, particularly from countries with low capability;
 - (c) The **usage** of top-down methodologies is much higher than the usage of bottom-up methodologies, particularly in countries with low capability;
 - (d) Methodologies developed top-down have also significantly contributed to expand the reach of the CDM in new mitigation areas and to the uptake of PoAs.

4. Recommendations to the Board

4. The secretariat recommends that the Board take note of the information contained in this document, and may wish to provide further guidance.

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1. Introduction

1. The Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) requested the secretariat at its ninetieth meeting (EB 90), while considering the concept notes referred to in paragraphs 49 and 50 of the EB 90 report, to provide the following information notes for consideration at a future meeting:
 - (a) Analysis of the demand for and usage of methodologies developed top-down, specifically including the frequency with which different top-down methodologies are utilized by project activities and programmes of activities (PoAs); and
 - (b) Assessment of whether the existing approved methodologies have used the principle of discounting emission reductions and, if yes, a list of them including a description of the approaches therein.
2. Paragraph 49 of the EB 90 report was in the context of the concept note on the development of standards with a methodological framework for specific project types and sectors. Paragraph 50 of the EB 90 report was in the context of the concept note on approaches for additionality demonstration.
3. The assessment contained in this document is in response to the mandate mentioned under paragraph 1 (a) above (i.e. on the analysis of the demand for and usage of methodologies developed top-down) and other requests will be addressed in 2017.
4. As CMP requests and EB mandates also covered work on methodological tools and additionality, the usage of and demand for these products are also included in this concept note.

2. Analysis and Findings

2.1. Section Overview

5. This section is organized as follows: section 2.2 identifies and explains the differences between the approaches used to develop, revise and consolidate methodologies and distinguish between the “bottom-up”, the “top-down” and the “consolidated/hybrid” approaches, section 2.3 provides an overview of the various CMP mandates received over the years related to top down work on methodologies, section 2.4 provides background information on how the methodology development process evolved, section 2.5 provides data on the three types of approaches used to develop methodologies, section 2.6 provides data on how the usage of methodologies developed bottom-up and top-down compare to each other, section 2.7 provides comparative data on the cost to develop bottom-up methodologies compared to top-down, section 2.8 provides evidence from a literature review on the value of methodologies developed top-down, and section 2.9 summarizes the results of a recent survey on the value of top-down methodologies to stakeholders.

2.2. Approaches for methodology development

6. In this document “top down” is understood as the process in which the Board and its infrastructure, including the secretariat, play a major role in terms of cost and effort for the development of methodologies, taking into account any stakeholder feedback for the

finalization of the product. “Bottom up” is understood as the process in which the submitter (e.g. project proponent, designated national authority (DNA) or any other stakeholder) initiates the process and plays a major role in terms of cost and effort for the development of methodologies.

7. There are also a significant number of “hybrid” methodologies with limited scope that were initially approved under the bottom-up process, but were subsequently combined into a single methodology¹ through top-down work by the methodology panel, small scale working group and the secretariat... In response to the CMP and Board mandates, many of the methodologies approved under the bottom-up process have also been revised over a period of time through top-down work to address pertinent issues such as consistency, standardization, accuracy and conservativeness. However these methodologies² were not consolidated into other methodologies, and therefore are not categorized as top-down.
8. According to the Terms of Reference (ToR) for the CDM methodologies³, methodologies are required to be:
 - (a) Applicable in different geographical regions and for different project categories while accommodating their specificities;
 - (b) Consistent, transparent and predictable;
 - (c) Rigorous to ensure accurate estimation of emission reductions;
 - (d) Appropriately standardized to allow a reasonable estimation of baseline to ensure conservative estimation of reductions.
9. The bottom-up development of methodologies in many instances do not fully meet all of the above requirements. For example, when project proponents develop new methodologies, their primary focus would be to ensure that the underlying methodologies will be applicable to their project, and therefore, project proponents often pay less attention to other issues such as broad applicability, standardization and consistency with existing methodologies for comparable mitigation activities. In parallel, a large number of requests for revisions to broaden the applicability of approved methodologies have been submitted by project developers for consideration by the Board.
10. To address the above issues and fulfil the requirements in the ToR, the CMP requested the Board to consolidate methodologies in order to broaden their applicability and enhance consistency. Despite all these efforts, and having more than 200 CDM methodologies available for use, it is still challenging to select an appropriate methodology for a given mitigation activity. At the same time, some types of mitigation activities, particularly those relevant to countries with low capabilities are still not

¹ Such methodologies have an “approved consolidated methodology” (ACM)” designation and therefore have a much broader scope.

² These methodologies retained their “Approved Methodology” (AM) designation.

³ See Appendix C of CDM Modalities and Procedures.

covered, making it difficult for those countries to mobilize their full potential of CDM projects.

11. The CMP and the Board needed to address the issues discussed above concerning the narrow applicability of bottom up methodologies to expand the reach of the mechanism, particularly to make it accessible to countries with low capabilities. The approach taken has been to accept that complying with the ToR for CDM methodologies will lead to complexity, but to ensure that these complexities are dealt with by the regulatory body and not by the user of the mechanism. Guided by this vision, the CMP and the Board introduced several important changes to the CDM, including:
 - (a) Additional top-down development of methodologies;
 - (b) Default values;
 - (c) Standardized baselines;
 - (d) Redefined eligibility criteria for PoAs;
 - (e) Digitization.
12. Some of the anticipated impacts from these changes included:
 - (a) Lower transaction cost for the project developer (cost shifted to the regulator);
 - (b) Enhanced simplicity for the user (high level of standardization);
 - (c) Enhanced regional distribution of projects (barrier related to the development of methodology in countries with low capability removed);
 - (d) Consistency (the bottom-up submission of methodologies is one of the reasons for inconsistencies between methodologies, since the same issues are being addressed using different approaches);
 - (e) More predictability (further standardization enhances predictability);
 - (f) Broader applicability (because of the enhanced standardization);
 - (g) Availability of methodologies that are relevant to the potential of mitigation actions of the least-developed countries (LDCs) (e.g. methodology for rural electrification).

2.3. CMP mandates on top-down methodological work

13. The CMP has consistently emphasized the development of top-down methodologies as one of the critical elements in achieving regional distribution. Table 1 below provides an excerpt of the CMP decisions specific to the development of top-down methodologies. In addition to new methodologies in specific areas, the CMP has also requested top-down work on development of methodological tools, simplified methods for additionality, default conservative values for methodological parameters, methodologies for application in PoAs, methodologies for underrepresented regions and project types, cost-effective monitoring methodologies, standardized baselines and digitization (See details in Appendix 1).

Table 1. CMP mandates on top-down methodological work

When	Decision	Mandate to the Board
2005	Decision 7/CMP.1	To expand its efforts to broaden the applicability of approved methodologies and to prepare consolidated methodologies that, wherever possible, cover the full range of methodological approaches and applicability conditions as in the underlying approved methodologies;
2008	Decision 2/CMP.4: Para 54	Facilitate the <u>development and approval of new and revised existing methodologies</u> , based on the specific needs of, and potential for, application in countries underrepresented in the CDM, in order to assist those countries in realizing their CDM potential by expanding project activity types, while ensuring environmental integrity
2009	Decision 2/CMP.5: para 23	Authorizes the Executive Board to prioritize, the consideration and <u>development of baseline and monitoring methodologies</u> that are applicable to under-represented project activity types or regions
2009	Decision 2/CMP.5: Para 48 (a)	To <u>develop top-down methodologies</u> that are particularly suited for application in underrepresented countries
2010	Decision 3/CMP.6: Para 46	To <u>develop standardized baselines</u> in consultation with relevant DNAs, prioritizing methodologies that are applicable to LDCs, SIDs, Parties with 10 or fewer registered CDM project activities as of 31 December 2010 and underrepresented project activity types or regions, inter alia, for energy generation in isolated systems, transport and agriculture
2010	Decision 3/CMP.6: Para 63	To <u>accelerate the development of top-down baseline</u> and monitoring methodologies that are applicable to underrepresented project activity types and regions, including providing support to the development and application of national grid emission factors
2011	Decision 8/CMP.7: Para 22	To conduct further work to develop simplified <u>top-down baseline and monitoring methodologies</u> , tools and standardized baselines, as appropriate, and in consultation with relevant DNAs, for use in countries and for project activity types underrepresented in the CDM, and to expand the scopes covered by the guidelines for the establishment of sector-specific standardized baselines

2.3.1. The evolution of the methodology development process

14. In 2001, the Marrakesh Accords (Decision 17/CP.7) mandated the Board to develop simplified modalities and procedures, with the aim to promote the fast-tracking of small-scale projects primarily to reduce transaction costs and bearing in mind the need to promote equitable geographic distribution of CDM project activities at regional and sub-regional levels.
15. The Board, in 2002 (Annex 4, EB 04), recommended 14 small-scale methodologies developed top-down, contained in Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities, for consideration by the Conference of the Parties (COP). The Board at its seventh meeting (January 2003), noted the adoption by the COP (Decision 21/CP.8) of simplified modalities and procedures for small-scale CDM project activities. Although the Board initially envisaged only clarification requests on small-scale methodologies, it subsequently allowed revision requests by the project proponents. By 2009 provisions were in place to allow

submission of new small-scale methodologies by the project proponents for consideration by the Board.

16. On the other hand, project proponents have proposed draft large-scale CDM methodologies for consideration by the Board since the end of 2003. **To date 142 large-scale and 95 small-scale methodologies have been developed.** The methodologies have also been revised (e.g. broadening the applicability, further clarifications) over the period informed by the request for revisions, clarification and deviations through the bottom-up process.⁴

2.4. Distribution of Methodology by Category

17. As seen in table 2 below, the majority (80 percent) of the large-scale methodologies were developed bottom-up, whereas majority (57 percent) of the small-scale methodologies were developed top-down. However, top-down large-scale methodologies make up only 4 percent; when combined with consolidated methodologies the share increases to 20 percent. These methodologies are listed in Appendix 3.

Table 2. Categorization of methodologies

	Large Scale (AMs/ACMs)	Small Scale (AMs)
Total Methodologies	142	95
Bottom up	114 (80%)	34 (36%)
Top Down	5 (4%)	54 (57%)
Consolidated/Hybrid (bottom-up/top down)	23 (16%)	7 (7%)

2.5. Comparison between usage of top-down and bottom-up methodologies

18. Table 3 and 4 show the comparison of average number of projects and PoAs registered per methodology category (large and small scale) based on number of methodologies actually used and the total number of methodologies that are available. It shows that the average use of hybrid/top-down methodology as compared to bottom-up is substantially higher. It is however also noted that the application of top-down large-scale methodologies has been limited.

⁴ To date there are total of 466 revision requests (Small-scale (SSC): 206 and Large Scale (LS): 260), 762 clarification requests (SSC: 463, LS: 299) and 72 deviation requests (SSC: 16 and LS: 56).

Table 3. Average number of projects registered per methodology category (Large Scale)

Large scale Projects					
Meth Category	Number of methodologies available	Number of methodologies used	Number of PAs/PoAs registered	Average project per methodology used	Average project per methodology available
Bottom-up	114	53	501	9	4
Top-down	5	-	-	-	-
Hybrid	23	19	4236	223	37

Source: Based on CDM Database

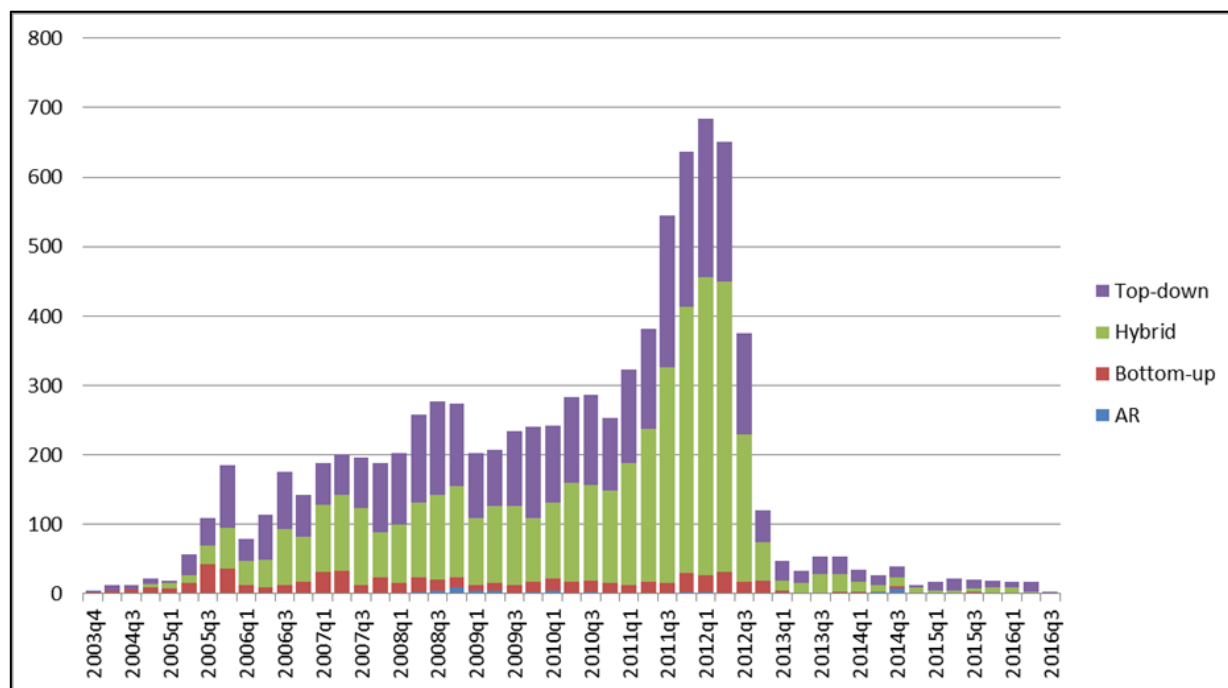
Table 4. Average number of projects registered per methodology category (Small Scale)

Small Scale Sale Projects					
Meth Category	Number of methodologies available	Number of methodologies used	Number of PAs/PoAs registered	Average project per methodology used	Average project per methodology available
Bottom-up	34	17	41	2	1
Top-down	54	44	3741	85	69
Hybrid	7	6	21	4	3

Source: Based on CDM Database

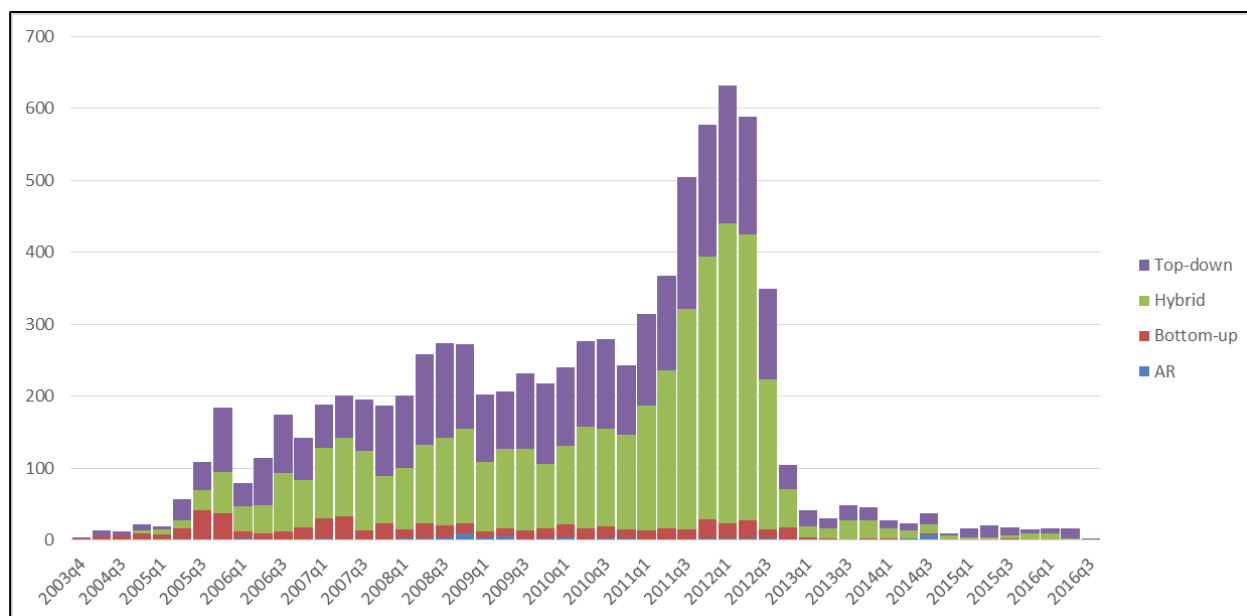
19. Figure 1 below presents quarterly information on the evolution of CDM projects and PoAs in the pipeline (registered/at registration) and the category of methodologies used by those projects/PoAs from 2003 to 2016. It shows that the application of top-down and hybrid methodologies has been pre-dominant, irrespective of the market factors (e.g. post-2012).

Figure 1. Evolution of CDM projects and PoAs applying top-down, hybrid and bottom-up methodologies



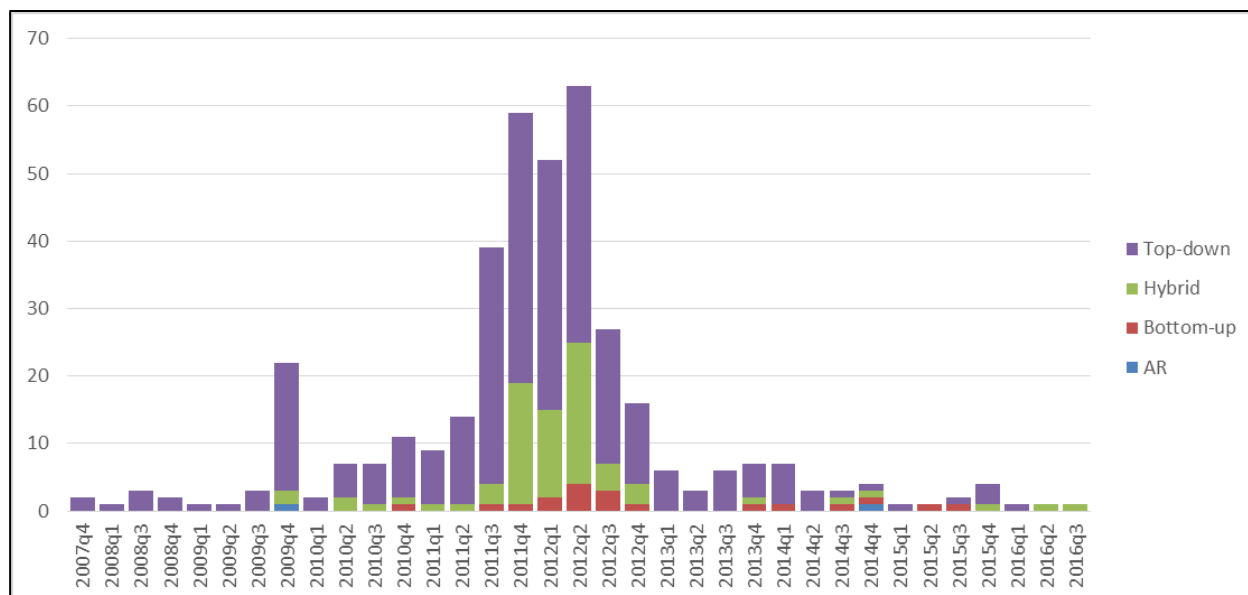
Source: CDM database

20. To determine whether the demand for and uptake of top-down methodologies shows different patterns for projects as opposed to PoAs, figure 2 below presents quarterly information on the evolution of CDM projects (i.e. without PoAs) in the pipeline (registered/at registration) and the category of methodologies used by those projects from 2003 to 2016. Although the application has been limited (almost always fewer than 50 projects in any quarter), bottom-up methodologies have been consistently used for CDM project activities up until 2013, with the usage tapering off afterward. It is noteworthy that top-down and hybrid methodologies continue to be used for CDM activities, although on fewer occasions, probably because they offer a more cost-effective monitoring, reporting and verification option.

Figure 2. Evolution of CDM projects applying top-down, hybrid and bottom-up methodologies

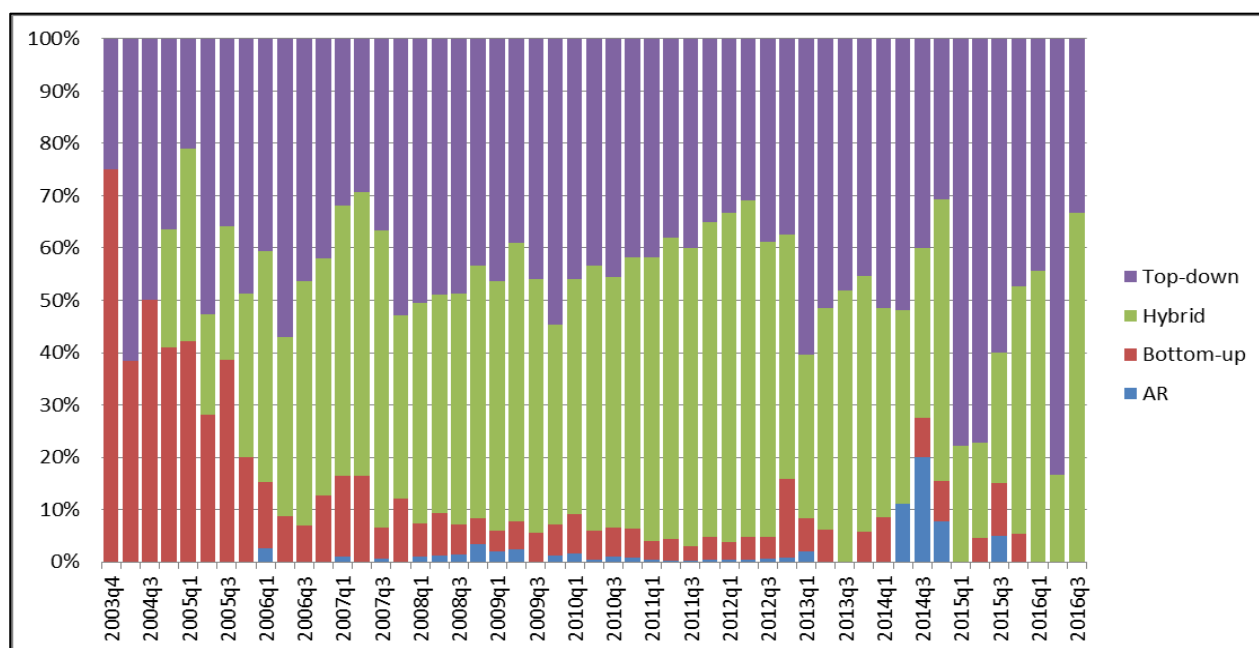
Source: CDM database

21. Figure 3 below presents quarterly information on the evolution of CDM PoAs in the pipeline (registered/at registration) and the category of methodologies used by those PoAs from 2003 to 2016. Application of bottom-up methodologies has been conspicuously small and a late phenomenon in the evolution of the PoAs. No more than five have been developed in any quarter, and application has been sporadic except in the peak PoA development period of 2011 to 2012. Application of top-down and hybrid methodologies has been so predominant that when combined with the other regulatory changes in PoA rules, it may not be out of place to conclude that they triggered the development of PoAs to some extent.

Figure 3. Evolution of CDM PoAs applying top-down, hybrid and bottom-up methodologies

Source: CDM database

22. Figure 4 below shows the proportion of the application of methodologies by category (i.e. top-down, bottom-up, hybrid, AR) in projects/PoAs from 2003 to 2016. Although the bottom-up methodologies dominated in the very initial stages of the CDM, consolidated and top-down methodologies have been accounting for over 90 percent of the projects since 2006.

Figure 4. Proportion of share of top-down, hybrid and bottom-up methodologies

Source: CDM database

23. Tables 4 and 5 below show that large number of top-down methodologies are applied to small-scale projects and PoAs, implying that they may have been largely successful in reducing transaction costs, as envisioned by the CMP and the Board. On the other hand, the application of bottom-up methodologies has been quite limited. It should also be noted that a major portion of these projects (e.g. cook-stoves, solar water heaters, solar cookers, water purification, energy-efficient lighting, and biogas digesters) are dispersed and located in underdeveloped regions. The analysis also shows that the application of top-down large-scale methodologies has been limited to a single case, whereas the hybrid methodologies dominate the application in all areas. It is to be noted that development of top-down large-scale methodologies has been a more recent phenomenon (only five have been developed) and coincided with the price drop in certified emission reductions. Therefore it may be premature to draw conclusions on the demand for and utilization of top-down large-scale methodologies, although evidently this category has a low share of project application at this stage.

Table 5. Usage of small-scale methodologies across projects and PoAs

Meth Category	CPA	PA	PoA
AR		29	
Bottom-up	4	19	9
Hybrid	9	35	10
Top-down	1679	2958	243
Top-down (multiple methodologies combined)	148	403	51

Source: CDM database

Table 6. Usage of large-scale methodologies across projects and PoAs

Meth Category	CPA	PA	PoA
AR		42	2
Bottom-up ACMs			2
Bottom-up AMs	5	570	8
Hybrid	120	4415	76

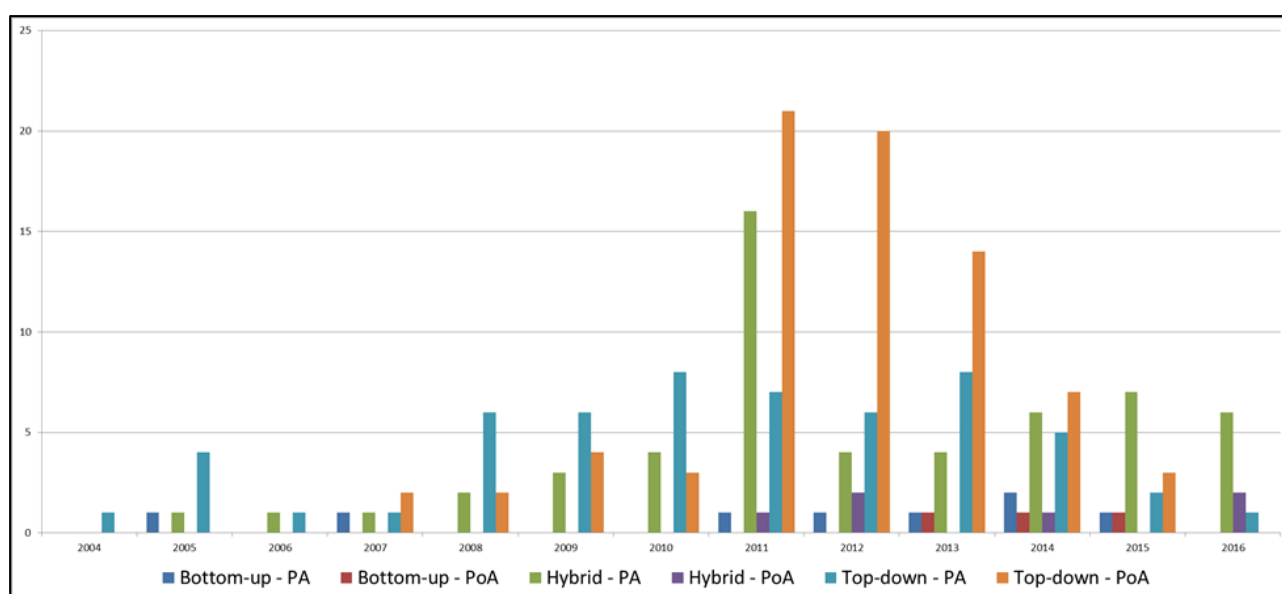
Source: CDM database

24. Table 7 and figure 8 below show the share of top-down and bottom-up methodologies applied in projects and PoAs hosted in LDCs. More than 60 percent of projects/PoAs in LDCs have applied top-down developed methodologies (mostly small-scale), while very few bottom-up methodologies have been applied. In fact, the top-down methodologies have been the mainstay for the PoAs in LDCs, thereby directly making a positive contribution to a more even regional distribution of CDM than has been consistently sought by the CMP. The nature of mitigation activities, the high cost of developing a bottom-up methodology, and the lack of capacity in these countries may have played a role.

Table 7. Distribution of projects in LDCs and category of methodology applied

	LDC	% Share	Total	%Share
AR	16	7%	73	1%
Bottom-up	11	5%	622	7%
Hybrid	61	27%	4,464	50%
Top-down	136	61%	3,705	42%
Total	224	100%	8,864	100%

Source: CDM database

Figure 5. Distribution of projects and category of methodology applied in LDCs

Source: CDM database

25. The CMP has also consistently requested, as part of top-down methodological work, that the requirements on additionality be simplified through quantitative approaches, where feasible. In response, the Board has encouraged the development of a positive list of technologies for additionality. As a result, based on a top-down analysis, a number of technologies have been approved by the Board for inclusion in the small-scale and micro-scale additionality tools.
26. Table 8 and 9 below show the number of CDM projects that have applied the automatic additionality provisions under the micro-scale and small-scale additionality tools introduced top-down during 2010 and 2011, respectively. Among 3083 registered small-scale CDM projects and 235 PoAs, 317 project activities and 150 PoAs for grid/off-grid renewable energy technologies and for industrial and residential applications (e.g. cook-stoves, solar water heaters, solar cookers, water purification, energy-efficient lighting, and biogas digesters) have been registered applying the small-scale or micro-scale additionality tool for automatic additionality.

Table 8. CDM projects applying small-scale or micro-scale additionality tool for automatic additionality

Title	Number of regular projects	Number of PoAs
Total registered CDM projects	7936	295
Using small scale-methodologies	3083	235
Using small scale-methodologies registered ⁵	317	150

Source: Based on CDM database (as of July 2016)

Table 9. Distribution of registered CDM projects and PoAs, by region, applying small-scale or micro-scale additionality tool for automatic additionality

Region	Registered Regular Projects	Registered PoAs
Africa	17 (5.4%)	55 (36.7%)
Americas	18 (5.7%)	18 (12%)
Asia	278 (87.7%)	75 (50%)
Europe	3(0.9%)	-
Oceania	1 (0.3%)	2 (1.3%)
Total	317	150

Source: Based on CDM database (as of July 2016)

2.6. Cost of top-down and bottom-up methodologies

27. Table 10 below compares the cost of top-down and bottom-up methodologies. It indicates that developing the top-down CDM methodology is more cost-effective.

Table 10. Cost of developing methodologies

Cost of developing Bottom-up CDM methodology	Cost of developing Top-down CDM methodology
Approximately USD 125,000 ⁶	Approximately USD 17,432-35,000 ⁷
Euro 70-120,000 ⁸	
USD 50,000 -100,000 ⁹	

⁵ Version 1.0 of the Micro-scale Additionality Tool was approved on 28 May 2010 (EB 54, Annex 15). The first batch of positive list of technologies that are automatically defined as additional under the small-scale additionality tool was approved on 29 September 2011 (EB 63, Annex 24).

⁶ (World Bank, 2010).

⁷ Please see Appendix 2 for details about assumptions and estimates.

⁸ (Micahelowa, 2012).

⁹ (Asian Development Bank, 2013).

2.7. Literature review on the value addition of top-down methodologies

28. In addition to the above analysis, literature¹⁰, has been reviewed, and following are the key findings related to the demand for, and use, value and impact of the methodologies developed top-down (see Appendix 4 for details):
- (a) Regulatory developments undertaken by CDM EB, through developing methodologies top down taking into account suppressed demand, establishing positive list for additionality and allowing the use of standardized baselines facilitate implementation of energy access projects and contribute to improved geographical distribution of the CDM;
 - (b) The limitations of the bottom-up approach, which, while providing flexibility and opportunities for methodologies of all types of projects to be considered, results in fewer general and broadly accessible methodologies;
 - (c) Defending broader methodologies as compared to more narrowly defined methodologies may take more time and therefore lead to higher costs (e.g. USD 125,000 per methodology). Top down methodologies in new areas may be able to consolidate the 'learning by doing' in order to enhance predictability and efficiency as well as unleash a new path for a different type of project/activity to access carbon finance;
 - (d) Other offset schemes (e.g. in Australia, Canada and the USA) make wide use of standardized approaches developed top-down.

2.8. Outcome of the survey on the value addition of top-down methodologies

29. To collect information regarding the value of top-down methodologies and standardized baselines to stakeholders, a survey was performed from 2 to 17 August 2016. The survey was sent to 297 stakeholders from governments and public and private institutions; the regional collaboration centres supported the further dissemination of the survey. Fifty-nine completed surveys were received. The results indicate an overall positive response to the value that top-down methodological work brings to the mechanism and stakeholders. The results are as follows:
30. For CDM projects:
- (a) 78 percent of respondents believe that the absence of applicable methodologies or standardized baselines is a barrier to the development of CDM projects;
 - (b) 14 percent of respondents believe that project participants have the capability to develop suitable methodologies or standardized baselines on their own;
 - (c) 92 percent of respondents believe that the top-down development of methodologies makes it easier to develop CDM projects for sectors or project types where methodologies or standardized baselines do not currently exist; and

¹⁰ (Asian Development Bank, 2011), (Corrado Clini, 2011). (German Federal Environmental Agency (UBA), 2014). (Perspectives, 2011), (World Bank, 2011), (World Bank, 2010).

- (d) 86 percent of respondents believe that the top-down development of methodologies or standardized baselines helps increase the development of CDM projects in countries with low capacity.

31. For PoAs:

- (a) 80 percent of respondents believe that the absence of applicable methodologies or standardized baselines is a barrier to the development of PoAs;
- (b) 14 percent of respondents believe that project participants have the capability to develop suitable methodologies or standardized baselines on their own;
- (c) 88 percent of respondents believe that the top-down development of methodologies makes it easier to develop PoAs for sectors or project types where methodologies or standardized baselines do not currently exist; and
- (d) 86 percent of respondents believe that the top-down development of methodologies or standardized baselines helps increase the development of PoAs in countries with low capacity.

32. In their commentary, respondents also indicated that:

- (a) The top-down development of standardized approaches can greatly contribute to scaled-up mitigation efforts; whereas the development of bottom-up methodologies is a very long process, and the methodologies are often too specific, applicable to a very small number of cases, require very specific skills and expertise, and result in a piecemeal approach to mitigation;
- (b) The further improvement of standardized methodologies or defaults can greatly enhance the implementation of PoAs by reducing the transaction costs associated with their implementation. It will also enhance the value of the CDM if mitigation activities can be supported at greater scale than project by project;
- (c) CDM methodologies are not easy to apply. However SBs make the demonstration of additionality easier. One respondent indicated that the UNFCCC should develop SBs for grid emission factors, waste, transport and wastewater for all countries regardless of whether the country is an LDC, as this would increase the use of PoAs that can be used to implement mitigation actions aligned to nationally determined contributions (NDCs);
- (d) Due to limited funding to support for the development of bottom-up standardized baselines it would be prudent to scale up the support from the EB for top-down development of standardized baselines. This would be especially useful for the replication of standardized baselines in countries with similar sectoral priorities;
- (e) While the two approaches have their merits, a hybrid approach should be considered whereby the UNFCCC starts with a top-down framework that is used for input by those on the ground who work with local data and situations.

33. Respondents also articulated some general issues related to CDM methodologies which could provide room for improvement:
- (a) More guidance should be developed in navigating the right choice of methodology for a given mitigation activity, including the presence of standardized baseline;
 - (b) The time taken to develop top-down methodologies needs to be reduced; at times it takes more time than bottom-up submissions, a delay that is largely attributable to the available technical expertise in the host country.

3. Key Findings

34. The analysis of the demand for and usage of methodologies developed top-down shows that the top down development of methodologies have had positive impacts on the CDM. More specifically:
- (a) Methodologies developed top-down have been frequently and predominantly applied for PoAs, in underdeveloped regions and LDCs evidently contributing to reduced transactions costs of undertaking CDM; and thereby addressing the issue of regional distribution;
 - (b) Since 2008, top-down and hybrid methodologies have accounted for over 90 percent of projects and PoAs developed in every quarter of every year; and has become possible only through consolidated (hybrid) and top-down methodologies;
 - (c) Top-down small-scale methodologies have accounted for the major share of projects and PoAs since the beginning of CDM and continue to do so;
 - (d) Top-down development of large-scale methodologies has been a more recent phenomenon, with only five being approved. One of the reasons that they are not yet utilized could be that the time during which the methodologies were developed coincided with the price drop for CDM credits;
 - (e) A large number of methodological tools have been developed through top-down methodological work that have been frequently applied in projects and PoAs covering both the small and large scale projects. The tools are contributing to standardization, consistency and accuracy of emission reduction estimates; and
 - (f) Top-down methodological work mandated by the CMP has also included simplification and standardization of additionality demonstration, addressing suppressed demand, development of conservative default factors and standardization of monitoring parameters. The positive list of technologies for additionality developed top-down has been widely and increasingly applied (over 300 projects and 150 PoAs).

4. References

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Appendix 1. CMP mandates on top down methodological work

Table. CMP mandates on top down methodological work

	When	Decision	Mandate to the Board
	2006	Decision 1/CMP.2: Para 15	To develop generic and user-friendly methodological tools that can assist PPs in designing or applying methodologies and thereby ensuring consistency and simplicity.
	2006	Decision 1/CMP.2: Para 30	To recommend to CMP a simplified methodology for calculating emission reductions for SSC project activities that propose the switch from non-renewable to renewable biomass.
	2007	Decision 2/CMP.3: Para 18	To further develop generic and user-friendly methodological tools that can assist PPs in designing or applying methodologies and thereby ensure the simplicity and consistency of methodologies.
	2007	Decision 2/CMP.3: Para 18	To continue to improve the additionality tool, in cooperation with its support structure and relevant stakeholders, by providing clear guidance on the application of the tool, bearing in mind the need not to add undue complexity.
	2008	Decision 2/CMP.4: Para 35	To examine the large proportion of approved methodologies which have never been utilized, identify the reasons for non-utilization, and to take the lessons learned into account in the approval and revision of methodologies.
	2008	Decision 2/CMP.4: Para 43	To explore the use of default emission factors for SSC end-user energy efficiency methodologies, where appropriate;
	2008	Decision 2/CMP.4: Para 46	To expand the applicability of methodologies for PoAs by allowing a combination of SSC methodologies;
	2008	Decision 2/CMP.4: Para 47	To develop options to assist in the calculation of emission factors for off-grid electricity generation;
	2009	Decision 2/CMP.5: Para 34	To further improve the "Tool to calculate the emission factor for an electricity system" for project activities hosted in countries with a paucity of relevant data, including by providing flexibility for the calculation of grid emission factors
	2010	Decision 3/CMP.6: Para 38	To continue to simplify the modalities for demonstrating additionality for project activities up to 5 MW that employ RE as their primary technology and for EE project activities that aim to achieve energy savings at a scale of no more than 20 GWh per year based on experience gained and to expand, as appropriate, their applicability to type III projects that reduce emissions by less than 20,000 tonnes of CO ₂ equivalent per annum.
	2010	Decision 3/CMP.6: Para 40	To examine alternative approaches to the demonstration and assessment of additionality
	2011	Decision 8/CMP.7: Para 17	To extend the simplified modalities for the demonstration of additionality to a wider scope of project activities, inter alia EE project activities and RE based electrification in areas without grid connection, and to develop simplified baseline methodologies for such project activities;
	2012	Decision 5/CMP.8 Para 35:	To continue its work on the simplification and streamlining of methodologies , with the aim of reducing transaction costs for all project activities and PoAs, especially those in regions

			underrepresented in the CDM.
	2013	Decision 3/CMP.9: Para 13	To expedite its work on the development of country-specific baseline and additionality thresholds for sectors in countries underrepresented in the CDM, in coordination with those countries;
	2013	Decision 3/CMP.9: Para 11	To continue its work on the simplification and streamlining of methodologies , with the aim of reducing transaction costs for all project activities and PoAs, especially those in regions underrepresented in the CDM;
	2013	Decision 3/CMP.9: Para 14	To examine alternative approaches to the demonstration and assessment of additionality;
	2013	Decision 5/CMP8: Para 36	To consider the use of more cost-effective approaches in A/R methodologies for the estimation of baseline stocks and removals, including the use of remote sensing for monitoring, as long as conservative estimates are used to guarantee the environmental integrity of A/R projects;
	2014	Decision 4/CMP10: Para 18	To develop and digitize methodology-specific design document forms for project activities and PoAs;
	2014	Decision 4/CMP10: Para 6	To continue its work on the simplification and streamlining of baseline and monitoring methodologies with the aim of reducing transaction costs for all project activities and PoAs, taking into account that countries, regions and subregions underrepresented in the CDM are especially affected by high transaction costs;
	2014	Decision 4/CMP10: Para 8	To explore additional cost-effective approaches to demonstrating the eligibility of land to qualify as a CDM A/R project activity, and report back on this matter to the COP serving as the meeting of the Parties to the KP at its 11th session for its consideration;
	2015	Decision 6/CMP11: Para 15	To develop more cost-effective and context-appropriate approaches for monitoring, reporting and verification with a focus on project activities involving households and communities, addressing, inter alia: (a) Procedures to manage data gaps; (b) Regionally appropriate calibration requirements; (c) The use of sectoral and nationally collected data where appropriate;
	2015	Decision 6/CMP11: Para 14	To continue the development of digitized project and programme design document forms for CDM project activities and PoAs;

Appendix 2. Methodology and assumptions to estimate a cost of developing a top-down methodology

1. The average cost of developing a top-down methodological product is derived based on:
(i) the ETS data¹ on effort spent in carrying out top-down methodological work under projects 223 and 244² over the period 2014-2016; and (ii) the standard cost of staff.
2. Since the ETS data do not distinguish how much effort was spent on each methodological product but provides aggregated data by staff category and project type, the data on total effort spent (i.e. USD 1.015 Million) covers:
 - (a) Development of new methodologies, standards, and tools;
 - (b) Revision of methodologies, standards and tools;
 - (c) Improvement of PoA regulations;
 - (d) Others (e.g. additionality, sampling and other guidelines).
3. The average cost of developing a top-down methodology is then estimated using following conservative assumptions:
 - (a) There were 72 top-down methodological products delivered under above project during 2014-2016. Among them are 15 products deemed straightforward revisions (e.g. revisions of methodologies to include the requirements of approved tools) and hence are not accounted in the estimation of the cost of developing the methodology;
 - (a) The total cost (USD 1,015 Million) corresponding to the total effort (20,278 hours)³ is divided by the number of products (72-15=57) which results in average USD 17,432 per product. It is assumed a top-down methodology would incur double the average cost, resulting in approximately 87 staff days of effort or USD 35,000.

¹ Effort Tracking System of the SDM Programme.

² Number of new methodologies and revised methodologies delivered top-down through projects 223 and 244.

³ Please note that total effort is considered to be conservative in calculating the cost of developing a methodology since it also involves substantial effort spent on other products (e.g. improvement of PoA regulations).

Appendix 3. Usage of small and large scale methodologies

Table 1. Usage of large scale methodologies

	Methodology	Status of projects (registered/issued) and category of methodology used					Methodology Category
		CPA	CPA issued	PA	PA issued	PoA	
1	ACM0001	7	2	230	112	6	Hybrid
2	ACM0002	113	9	3250	1216	46	Hybrid
3	ACM0003	0	0	33	10	0	Hybrid
4	ACM0004	0	0	112	94	0	Hybrid
5	ACM0005	0	0	17	10	0	Hybrid
6	ACM0006	1	0	142	61	1	Hybrid
7	ACM0007	0	0	16	6	0	Hybrid
8	ACM0008	2	0	84	42	2	Hybrid
9	ACM0009	0	0	5	4	0	Hybrid
10	ACM0010	0	0	9	2	0	Hybrid
11	ACM0011	0	0	3	1	0	Hybrid
12	ACM0012	0	0	145	51	0	Hybrid
13	ACM0013	0	0	6	1	0	Hybrid
14	ACM0014	1	0	27	7	1	Hybrid
15	ACM0016	1	0	9	3	1	Hybrid
16	ACM0017	0	0	1	0	0	Hybrid
17	ACM0018	1	0	55	6	1	Hybrid
18	ACM0019	0	0	25	5	0	Hybrid
19	ACM0022	0	0	9	0	0	Hybrid
20	AM0003	0	0	5	4	0	Bottom-up
21	AM0006	0	0	10	8	0	Bottom-up
22	AM0008	0	0	8	7	0	Bottom-up
23	AM0009	2	0	23	8	2	Bottom-up
24	AM0013	0	0	8	7	0	Bottom-up
25	AM0014	0	0	6	3	0	Bottom-up
26	AM0015	0	0	28	27	0	Bottom-up
27	AM0016	0	0	40	39	0	Bottom-up
28	AM0018	0	0	11	8	0	Bottom-up
29	AM0022	0	0	13	11	0	Bottom-up
30	AM0023	0	0	14	5	0	Bottom-up
31	AM0024	0	0	12	6	0	Bottom-up
32	AM0025	1	0	66	12	1	Bottom-up
33	AM0026	0	0	6	4	0	Bottom-up
34	AM0028	0	0	24	16	0	Bottom-up
35	AM0029	0	0	60	31	0	Bottom-up
36	AM0030	0	0	3	1	0	Bottom-up
37	AM0031	0	0	10	5	0	Bottom-up
38	AM0032	0	0	2	1	0	Bottom-up
39	AM0033	0	0	5	2	0	Bottom-up
40	AM0034	0	0	58	41	0	Bottom-up
41	AM0035	0	0	2	1	0	Bottom-up
42	AM0036	0	0	8	3	0	Bottom-up
43	AM0037	0	0	2	1	0	Bottom-up
44	AM0039	0	0	5	0	0	Bottom-up

	Methodology	Status of projects (registered/issued) and category of methodology used					
		CPA	CPA issued	PA	PA issued	PoA	Methodology Category
45	AM0041	0	0	3	1	0	Bottom-up
46	AM0044	0	0	1	0	0	Bottom-up
47	AM0045	0	0	2	1	0	Bottom-up
48	AM0048	0	0	4	0	0	Bottom-up
49	AM0050	0	0	1	0	0	Bottom-up
50	AM0053	0	0	1	0	0	Bottom-up
51	AM0055	0	0	6	3	0	Bottom-up
52	AM0056	0	0	1	0	0	Bottom-up
53	AM0057	0	0	1	0	0	Bottom-up
54	AM0058	0	0	11	5	0	Bottom-up
55	AM0059	0	0	4	1	0	Bottom-up
56	AM0061	0	0	2	1	0	Bottom-up
57	AM0062	0	0	2	1	0	Bottom-up
58	AM0063	0	0	1	0	0	Bottom-up
59	AM0066	0	0	1	0	0	Bottom-up
60	AM0067	1	0	0	0	1	Bottom-up
61	AM0069	0	0	1	0	0	Bottom-up
62	AM0070	0	0	2	1	0	Bottom-up
63	AM0072	0	0	2	1	0	Bottom-up
64	AM0073	0	0	2	0	0	Bottom-up
65	AM0074	0	0	1	0	0	Bottom-up
66	AM0078	0	0	4	2	0	Bottom-up
67	AM0080	0	0	1	0	0	Bottom-up
68	AM0083	0	0	1	0	0	Bottom-up
69	AM0084	0	0	1	0	0	Bottom-up
70	AM0088	0	0	1	0	0	Bottom-up
71	AM0090	1	0	0	0	1	Bottom-up
72	AM0107	0	0	10	0	0	Bottom-up

Table 2. Usage of small-scale and AR methodologies

	Methodology	Status of projects (registered/issues) and category of methodology used					
		CPA	CPA issued	PA	PA issued	PoA	Methodology Category
1	AMS-I.A.	23	18	37	9	6	Top down
2	AMS-I.B.	2	0	0	0	2	Top down
3	AMS-I.C.	162	130	313	107	23	Top down
4	AMS-I.D.	125	3	2157	785	57	Top down
5	AMS-I.E.	84	8	24	8	16	Top down
6	AMS-I.F.	28	0	46	5	15	Top down
7	AMS-I.I.	5	0	0	0	5	Top down
8	AMS-I.J.	4	0	0	0	4	Top down
9	AMS-I.L.	2	0	0	0	2	Bottom-up
10	AMS-II.A.	9	4	2	0	3	Top down
11	AMS-II.B.	0	0	13	6	0	Top down
12	AMS-II.C.	48	25	14	6	11	Top down
13	AMS-II.D.	4	0	56	30	4	Top down
14	AMS-II.E.	3	3	20	5	1	Top down
15	AMS-II.F.	1	0	1	0	1	Top down
16	AMS-II.G.	130	83	33	4	49	Top down

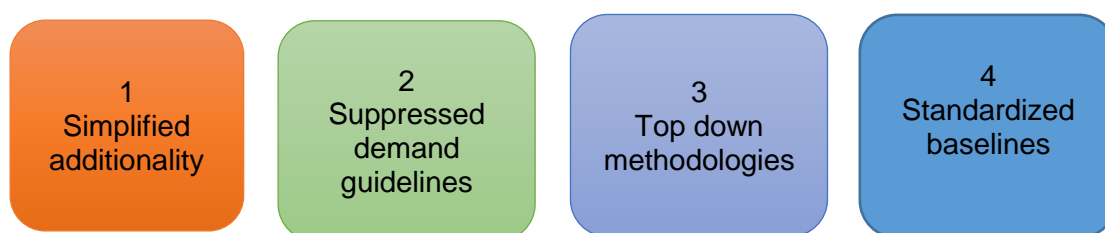
	Methodology	Status of projects (registered/issues) and category of methodology used					Methodology Category
		CPA	CPA issued	PA	PA issued	PoA	
17	AMS-II.H.	0	0	3	0	0	Top down
18	AMS-II.J.	132	50	37	6	20	Top down
19	AMS-II.K.	2	0	2	0	2	Bottom-up
20	AMS-II.L.	5	0	0	0	1	Top down
21	AMS-II.M.	1	0	0	0	1	Top down
22	AMS-III.AG.	0	0	1	0	0	Bottom-up
23	AMS-III.AH.	0	0	3	1	0	Top down
24	AMS-III.AL.	0	0	2	0	0	Bottom-up
25	AMS-III.AM.	0	0	1	0	0	Bottom-up
26	AMS-III.AN.	0	0	1	0	0	Bottom-up
27	AMS-III.AO.	1	0	6	1	1	Top down
28	AMS-III.AQ.	0	0	2	0	0	Bottom-up
29	AMS-III.AR.	10	0	2	0	9	Top down
30	AMS-III.AS.	0	0	5	0	0	Bottom-up
31	AMS-III.AV.	35	28	0	0	10	Top down
32	AMS-III.AW.	0	0	1	0	0	Bottom-up
33	AMS-III.AY.	1	0	0	0	1	Bottom-up
34	AMS-III.B.	2	0	24	15	2	Top down
35	AMS-III.BA.	0	0	1	0	0	Hybrid
36	AMS-III.BB.	1	0	0	0	1	Hybrid
37	AMS-III.BD.	0	0	1	0	0	Bottom-up
38	AMS-III.BI.	0	0	1	0	0	Bottom-up
39	AMS-III.C.	3	0	6	1	1	Top down
40	AMS-III.D.	1067	2	181	55	15	Top down
41	AMS-III.E.	0	0	41	19	0	Top down
42	AMS-III.F.	20	0	56	12	10	Top down
43	AMS-III.G.	1	0	43	13	1	Top down
44	AMS-III.H.	16	0	240	87	10	Top down
45	AMS-III.I.	0	0	8	3	0	Top down
46	AMS-III.J.	0	0	2	0	0	Top down
47	AMS-III.M.	0	0	2	0	0	Top down
48	AMS-III.N.	0	0	3	0	0	Top down
49	AMS-III.P.	0	0	5	0	0	Top down
50	AMS-III.Q.	0	0	47	10	0	Top down
51	AMS-III.R.	94	87	34	9	8	Top down
52	AMS-III.S.	1	0	0	0	1	Top down
53	AMS-III.T.	0	0	1	0	0	Top down
54	AMS-III.Y.	0	0	3	0	0	Top down
55	AMS-III.Z.	2	0	10	2	2	Hybrid
56	AR-ACM0001	0	0	7	3	0	Hybrid
57	AR-ACM0003	0	0	6	0	0	Top down
58	AR-AM0003	0	0	4	2	0	Bottom-up
59	AR-AM0004	0	0	8	5	0	Bottom-up
60	AR-AM0005	0	0	5	4	0	Bottom-up
61	AR-AM0009	0	0	2	0	0	Bottom-up
62	AR-AMS0001	0	0	17	4	0	Top down
63	AR-AMS0003	0	0	1	0	0	Top down
64	AR-AMS0007	0	0	10	0	0	Top down

Appendix 4. Literature review

1. Based on a literature review, the following statements were found that demonstrate the value and impact of methodologies developed top-down:

- (a) “New developments in CDM regulation, in particular using standardized baselines and taking into account suppressed demand, can accelerate the development and implementation of energy access projects in LDCs, provided their operationalization is simplified and enhanced. Other major building blocks in this context are the establishment of a positive list approach to additionality demonstration for micro-scale project activities and the development of top-down methodologies (see Figure 6)” (World Bank, 2011);

Table 1. Major initiatives taken by CDM EB



- (b) “The most substantial issues that have been addressed so far include several measures to improve geographical distribution of the CDM, such as identification of barriers, the launch of the NFP, the elimination of fees for LDCs, the loan scheme, as well as the development of top-down methodologies appropriate for their circumstances” (Castro, 2015);
- (c) “In the early years of the CDM, the regulatory body did not have enough experience of methodology development, and the challenge was to set up methodologies applicable to multiple projects, regardless of project-specific conditions. This may contribute to reduce transaction costs, increase transparency, ensure better predictability of emission reductions and allow a faster project cycle. Yet, their use may not be appropriate for all types of projects and could require significant upfront costs and efforts to be developed. Standardization is not a new concept under the CDM. However it has not been widely exploited, for reasons related to the origins of the mechanism itself. In fact, the CDM was conceived as a global mechanism encompassing any possible emission reduction activity for the six gases of the Kyoto Protocol. For such a mechanism, it was impossible to elaborate top-down methodologies for all eligible activities, both financially and within a reasonable timeframe. Therefore, in view of a quick start-up of the mechanism, it was decided to leave to project proponents the possibility to propose methodologies that would be subject to approval by the ‘CDM Executive Board’. Therefore, the tendency was inevitably project-specific (none of the proponents had interest in developing methodologies applicable to other projects). On the contrary, in other offset schemes outside the UNFCCC, restricted geographical scope and limited eligible project categories

allowed easier development of top-down methodologies. Offset schemes used in Australia, Canada and the USA make wide use of standardized approaches” (Corrado Clini, 2011);

- (d) “Top-down methodology development was requested in 2009. Methodologies will be particularly suited for countries with fewer than ten registered CDM projects” (Asian Development Bank, 2011);
- (e) “Thanks to Standardized Baseline (SBL), it is now possible to verify both analyses at national level (or even internationally) and thus dramatically reduce the requirements for individual projects and hence reduce transaction costs. The findings of the feasibility study on development of a standardized baseline using small scale methodology for rural electrification (AMS-I.L), in collaboration with the DNA and the carbon market experts for rural electrification show that SBL can be well integrated into Ethiopia’s national development policy. As a result, the World Bank afforded the Ethiopian Development Bank a loan in the amount of USD 40 million to fund a rural electrification programme as PoA being developed by the World Bank’s Carbon Initiative for Development (Ci-Dev), with the Ethiopian Development Bank acting as project manager” (German Federal Environmental Agency (UBA), 2014);
- (f) “Development of new methodologies are thus critical to the development and expanded reach of the CDM/JI since each new methodology has the potential to unleash a new path for a different type of project/activity to access carbon finance. However, the development of methodologies is a public good since once a methodology is approved it can be used by any project developer. As such, there is no clear first-mover advantage for those that champion methodologies. But there are costs. In the World Bank’s experience, a new methodology costs approximately USD 125,000 and takes two years to be developed, from inception to approval. Clear incentives to develop broader and more widely accessible methodologies are missing, slowing down innovation and climate change mitigation. Although there are numerous approved methodologies, too few have broad applicability. More than three quarters of all registered CDM projects or projects under validation use one of only fifteen of the approved CDM methodologies. Seventy-one approved CDM methodologies have never been used at all, or only once. Given the time and costs associated with the development of a new methodology, this is certainly a sub-optimal use of limited resources. It largely reflects limitations of the bottom-up approach, which, while providing flexibility and opportunities for methodologies of all types of projects to be considered, results in fewer general and broadly accessible methodologies. This is often a result of an iterative methodology approval process during which stringency and applicability restrictions tend to increase. Defending broader methodologies as compared to more narrowly defined methodologies may take more time and therefore lead to higher costs. It is also true that methodologies – typically developed during the concept stage of a project – are not sufficiently flexible to accommodate evolving project designs.....Tools that control risks and define uncertainty could help reduce costs of submitting broader methodologies by streamlining project assessment and enhancing consistency, transparency and predictability. This could also be facilitated by better procedures for the submission and revision of methodologies and broadening their scope and eligibility. The regulatory structure must mature and consolidate the ‘learning by

doing' in order to enhance predictability and efficiency. This could be achieved by streamlining and clarifying both the rules of the mechanisms along with procedures and documentation requirements. Other possible improvements include the development of more top-down methodology guidance by the CDM regulators" (World Bank, 2010);

- (g) "Many CDM project types relevant to the poorest countries and strata of society have a high but greatly dispersed potential. Generic, standardized small-scale methodologies would be able to reduce CDM transaction costs, but may require project type specific 'interpretations'. The development of a simple, robust large-scale methodology approach can have higher initial costs but once established can mobilize a much larger range of projects, especially among very small-scale projects, due to its simplicity. An 'insurance-type' strategy is to first submit the simplified approach to the small scale working group and then further develop it under the standardized baseline process. This combination was used for the rural electrification methodology developed in this study. It may not be necessary once the standardized baseline process is fully elaborated, but the experience with PoAs shows that it can take quite some time to elaborate a new approach to project and methodology development" (Perspectives, 2011).

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Document information

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