IGES Policy Report -2011-01

CDM Reform 2011

Verification of the progress and the way forward

Institute for Global Environmental Strategies

About this report

Authors: Kazuhisa KOAKUTSU, Deputy Director
Nozomi OKUBO, Researcher
Kentaro TAKAHASHI, Researcher
Naoki TORII, Researcher
Akiko FUKUI, Researcher

Contributing Author: Dr. Yasushi NINOMIYA, Director

Market Mechanism Group / Institute for Global Environmental Strategies (IGES)

Scope of the report:

This report aims to propose ideas for CDM reform, targeting international negotiators of the CDM. The Market Mechanism Group of IGES has been implementing IGES CDM capacity building activities in Asia as well as developing IGES CDM databases for quantitative analysis. The group organised the IGES CDM Capacity Building General Meeting in March 3-4, 2011 at Kyoto in order to discuss ideas for CDM reform, based upon the experience gained through the activities and results of the data analysis. This report aims to introduce new findings related to progress and challenges for reforming the CDM. It will also propose how the CDM will be further improved based upon the analysis of IGES researchers.

Acknowledgements:

The authors wish to sincerely thank for the valuable comments and guidance provided by Prof. Hidefumi Imura, IGES Senior Policy Advisor and Senior Fellow, to help consolidating each chapters into a policy report.

Institute for Global Environmental Strategies (IGES)

2108-11 Kamiyamaguchi, Hayama, Kanagawa, 240-0115, Japan
Tel: +81-46-826-9592 Fax:+81-46-855-3809
E-mail: cdm-info@iges.or.jp URL: http://www.iges.or.jp/en/cdm/index.html

Contents

Executive Summary

2.1 Current status and prospects for CER issuance

- Simpler processes and procedures are needed to reduce the time from request for certified emission reduction (CER) issuance to actual CER issuance.
- Financial support and capacity-building are needed to reduce the time and cost for the verification in developing countries.

2.2 Guidelines for registration and CER issuance process

- Since changes in projects usually lead to reviews of CERs to be issued, any changes to project design documents (PDDs) laid out in the guidelines should be streamlined.
- Exemptions or simplified rules should be developed for small-scale projects
- The means of notifying of changes should be simplified via web site interface to reduce administrative costs.

2.3 New approach for demonstrating additionality

- The new approach for demonstrating additionality should avoid ambiguity to enable project proponents to fully benefit from its application.
- A list of indicators and related values proving “underdeveloped zone” status should be provided.
- Clear guidance should be provided as to which renewable energy technologies / measures should be recommended.

3.1 Standardization of grid emission factor for electricity access

- To provide a default emission factor for renewable energy projects for both least developed countries and countries with a low electrification rate instead of calculating the grid emission factor (GEF).
- To publish a GEF authorised by a designated national authority (DNA) on the clean development mechanism (CDM) website of the United Nations Framework Convention on Climate Change (UNFCCC) to address inter-regional GEF.
- To provide more options for the GEF calculation tool if specific data is not available.

3.2 Development of Standardized Baseline: learning from a biogas project case study in the Philippines

- A standardized baseline should include specific procedures criteria to reflect country-specific circumstances.
- Emission reduction calculations should be accompanied with an automatic excel-based spreadsheet, by introducing default and/or country-specific values.
- An empirical approach to utilise the approved methodology combined with information from registered CDM projects will aid in forming a standardized baseline.

01 Introduction

1. Background to this report

This year, 2011, marks the 10th year of operation of the CDM. To date, more than 3,300 projects have been registered and 680 million CERs issued (certified emission reduction credits), which has been brought about through institutional cooperation over the decade (UNFCCC, 2011j). It is important to recognise that the CDM has become fully operational and attracted quite a large amount of investment from the private sector.

The CDM should continue to improve based on its experience, and its further success will largely depend upon how the system can learn from past lessons and how quickly it can adapt to the changing situation.

2. Review of CDM operation and reform proposal

After its ten years of operation the CDM has become subject to review as a cost-effective policy tool for mitigating greenhouse gas (GHG). For example, a report prepared by the Pew Center summarised the experiences and lessons learned from CDM implementation (Pew Center, 2011). This report concludes that the CDM has created a global GHG offset market in a very short time and that the success of the CDM is mainly due to its flexibility in adapting to the prevailing circumstances. It also suggests that reform is needed to further increase standardization, to improve regional distribution, and to enhance its efficiency.

However, having worked on the market mechanism through carbon finance for more than 10 years, the World Bank pointed out that the "learning-by-doing" approach--a key element to the system and key feature for success of the mechanism--has created too frequent changes to rules, procedures, and methodologies, which has resulted in delays and insufficient regulatory predictability (World Bank, 2009).

The report further pointed out that in order to scale-up carbon finance and increase investment in low-carbon technologies, i.e., broaden the use of the CDM, reform is required to create more synergy with policies and other financial mechanisms. Specifically, the programme of activities needs to be developed, the regulatory process needs streamlining, methodologies need to be broadened, and additionality needs to be further standardised.

The CDM Reform report from IGES, compiled based on its capacity-building programme over the past eight years, provides quantitative analysis on aspects such as the impact on CER issuance due to the prolonged registration process, the effectiveness of guidance for additionality, investment analysis evaluations, and a review of programme of activities (PoA) development (IGES, 2010j). The report proposes use of increased automation and standardization, such as through use of an emission-reduction calculation spreadsheet, which would reduce uncertainty and manipulation while increasing predictability and reliability.

3. Work of CDM Executive Board and CMP decision in 2010

According to the annual report of the CDM executive board (EB) to CMP6 (for the period of 2009-2010), achievements made in 2010 were the adoption of streamlining of rules and procedures to improve efficiency and enhancement of transparency (UNFCCC, 2010m); in particular:

- The project registration and CER issuance procedures were revised.
- The project review and CER issuance processes were revised.
- Guidance on the demonstration of additionality for micro-scale projects was introduced.

In Cancun, the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) adopted the guidance to the CDM EB for further work on improving the CDM for 2011. Major decisions in terms of CDM reform were as follows (UNFCCC, 2010j):

- Establishment of standardized baseline
- Revised procedure for the registration date
- Adoption of guidance for the operation of a loan scheme for countries with fewer than 10 registered CDM projects

4. Challenges for CDM reform in 2011 and focus of this report

Based on an assessment of CDM operational experience and the regulatory reform currently underway as regards the UNFCCC CDM, three thematic categories emerge: efficiency and scale-up, standardization and regional distribution.

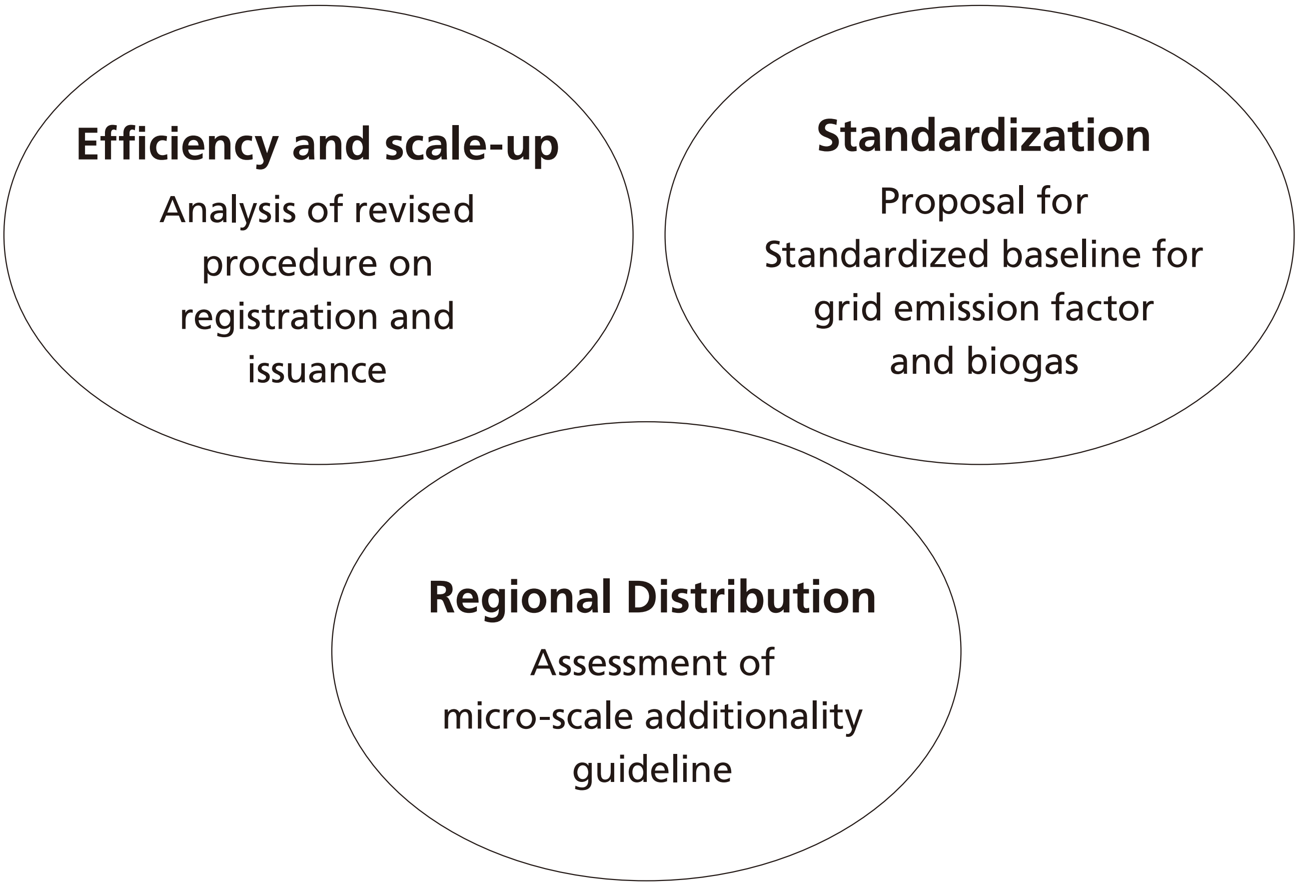


Figure 1. CDM reform and themes focused on in this report

The aim of this report is to assess and verify the current progress of CDM reform through quantitative analysis and to propose specific measures to achieve policy objectives. The report examines the progress of CDM reform in terms of its relevance for the year 2011 and aims to provide detailed analysis and assessment of the reform options currently underway from various viewpoints.

Chapters 2.1 (Current status and prospects for CER issuance) and 2.2 (Guidelines for registration and CER issuance process) evaluate how revised procedures impacted on the actual operation of the CDM. Chapter 2.3 (New approach for demonstrating additionality) assesses to what extent the implementation of new guidance on the demonstration of additionality of the micro-scale guideline facilitated the development of CDM projects in regions currently not benefiting from the CDM. Chapter 3.1 (Standardization of grid emission factor for electricity access) and Chapter 3.2 (Development of standardized baseline: learning from a biogas project case study in the Philippines) make use of specific case studies to propose a possible approach towards development of standardized baselines.

The conclusion summarises the key points raised by the analysis and discusses the future challenges.

(Kazuhisa KOAKUTSU)

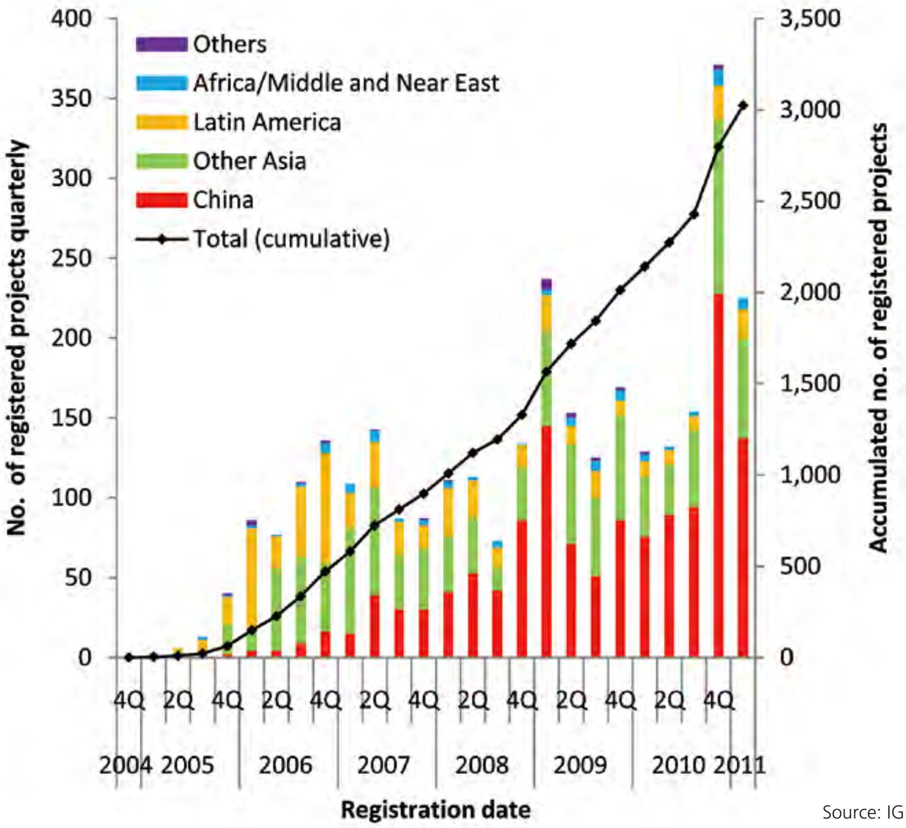
2.1 Current status and prospects for CER issuance

Kentaro TAKAHASHI

1. Registered projects increase, but many halted during validation

Since the approval of the first registered project in 2004, the number of registered CDM projects has risen—it' s already over 3,000. Figure 1 shows the number of registered projects between 2004 and 2011. Figure 2 shows the number of projects under validation between 2005 and 2011. The largest number of projects registered by the CDM EB was in 4Q 2010–and most of these were in Asia, particularly China (45%). Asia is expected to maintain its lead into the future as well, based on the trend exhibited in 2010. According to the IGES CDM Project Database (IGES, 2011a), there are currently 2,560 projects still in the pipeline, mainly as a result of a big spurt in 2010. The largest number of projects calling for public input in the pipeline spiked during 1Q 2011. While there is a growth trend in projects entering the validation process, nearly 2,000 projects have been halted within this process due to, for example, contract terminations and replacements (IGES, 2011a). This has led to an estimated loss of 1.1 billion CERs[1] by end of 2012, and 2.6 billion by end of 2020 (IGES, 2011b).

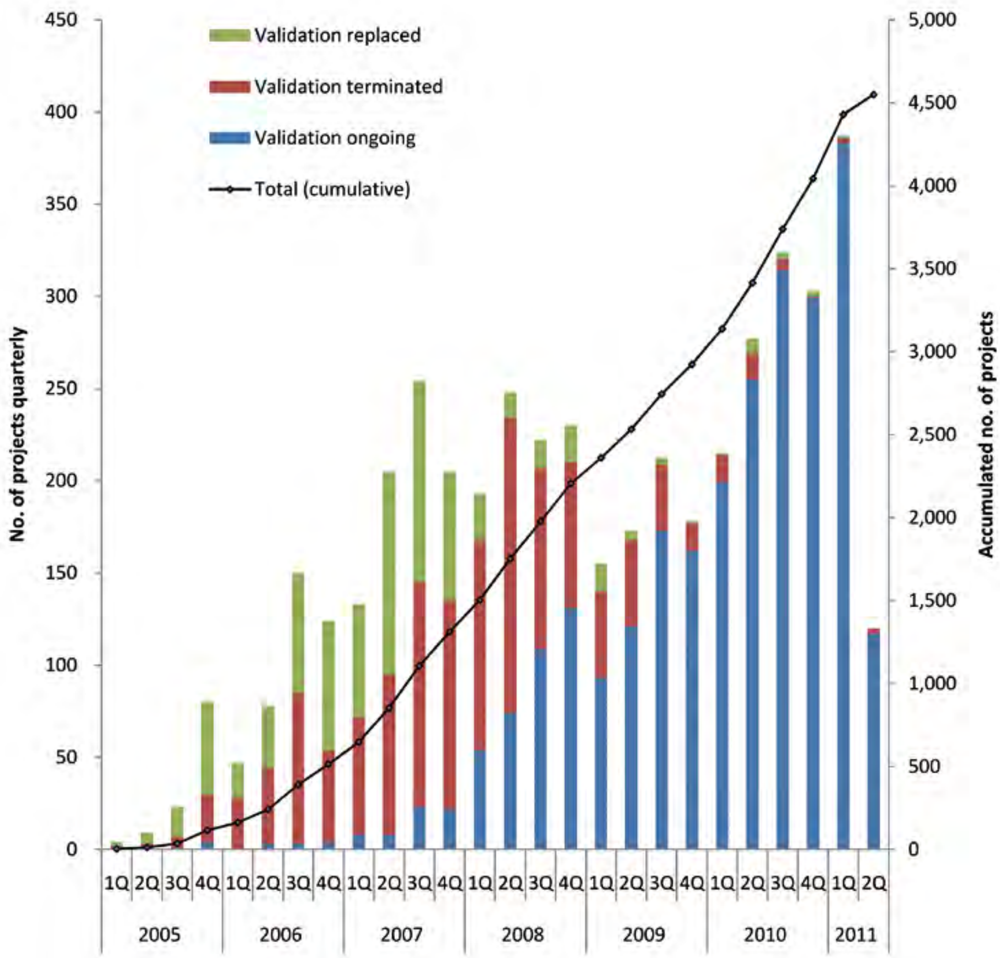
Figure 1. Number of registered projects, 2004 to 2011



Source: IGES (2011a)

1 1CER=1t-CO_{2e}

Figure 2. Number of projects under validation, 2005 to 2011



Source: IGES (2011a)

2. Registration process enhanced

During the CDM project cycle, a delay in the registration process could affect the future supply of CERs. Table 1 shows the average number of days from requesting registration to registration for projects reviewed and automatically registered[2]. In 2011, the figure for projects that were registered after a review was 234 days, compared with just 109 days for projects registered automatically–a substantial difference in time. In 2011, the delay caused by the registration process due to intervention by the CDM EB was around 120 days, a delay that may affect anticipated CER yields of projects.

Figure 3 shows the trends in automatic registration ratio and review requested ratio. Figure 3 also shows the average days from requesting registration by the quarter between 2006 and 2011. Since 2006, the average number of days from requesting registration to registration increased gradually. In 2010 it took 220 days, but by 1Q 2011 it was 115 days. This drastic change could be due to the approval of the revised "Procedure for requests for registration of proposed CDM project activities" (UNFCCC, 2011a), which allows the effective date of registration to be the date on which a complete request for registration has been submitted. In addition, the ratio of automatic registration decreased since 2007; 30% of all registered projects have had reviews requested. This situation changed, however, in July 2010, when the ratio of automatic registration was 58%, a figure which had

2 Automatic registered projects are defined as a project which could register without any reviews from CDM Executive Board in the registration process.

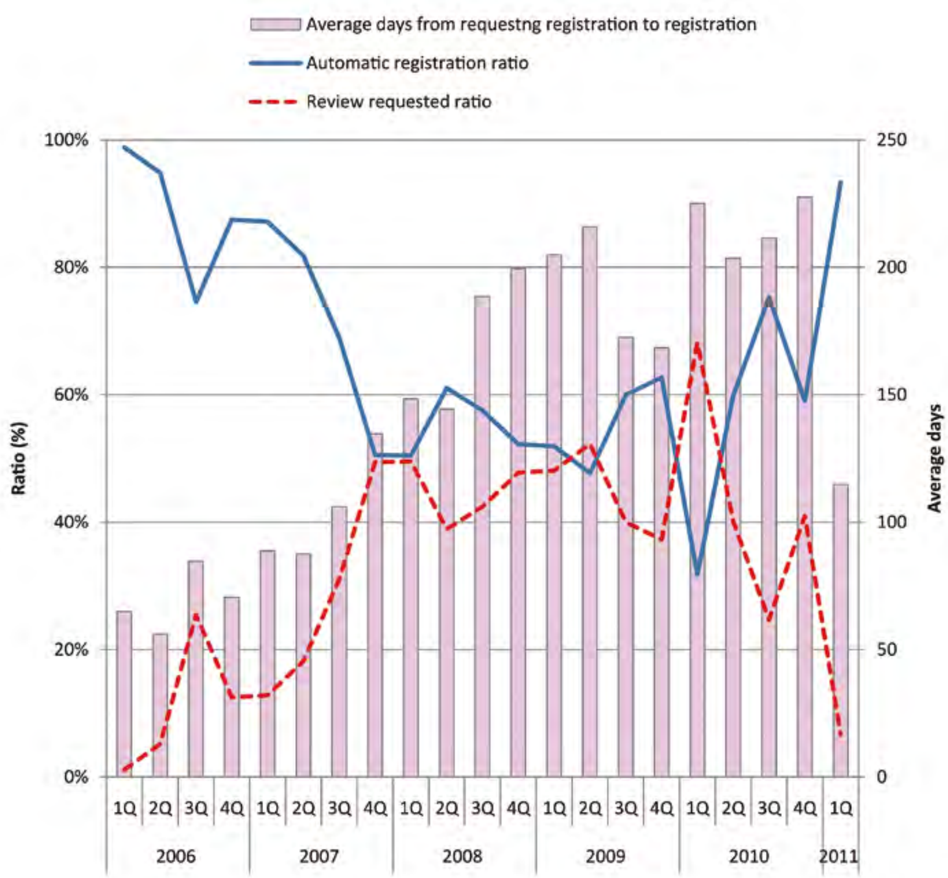
jumped to 93% in 2011. This result indicated that most of the projects in 2011 were registered without any CDM EB intervention, which itself was possibly caused by the change in review process to that adopted by the CDM EB55 (UNFCCC, 2010a). The revised review process was very simple and contributed to a decrease from 42% of requested review ratio in 2010 to 7% in 2011. This trend looks set to continue, and act as an incentive to project participants and designated operational entities (DOEs) that promote CDM projects.

Table 1. Average days from requesting registration to registration

Registration year	Requested review	Automatic registered
2006	126	63
2007	161	81
2008	228	123
2009	251	144
2010	280	176
2011	234	109

Source: IGES (2011a)

Figure 3. Trends in automatic registration and review request ratio

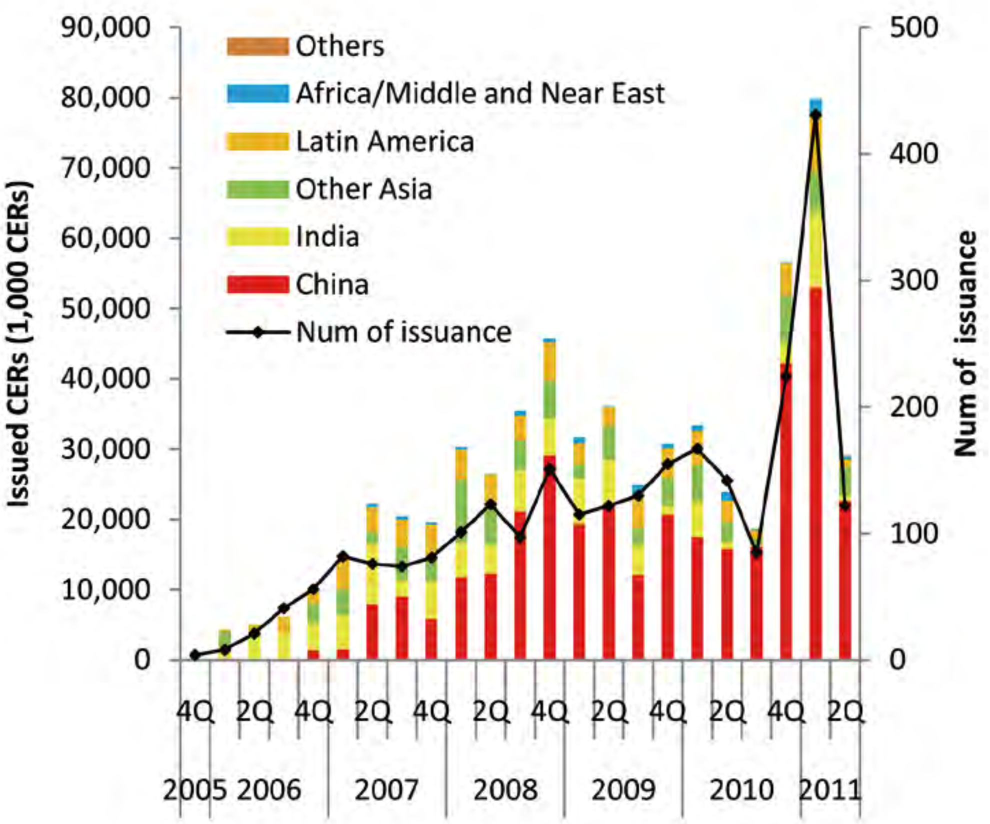


Source: IGES (2011a)

3. CERs rising but process still too lengthy

As of the end of April 2011, issued CERs had reached 605 million CER. Figure 4 shows issued CERs between 2005 and 2011. Many CERs have been issued from Chinese projects; 56% of the total issued CERs (IGES, 2011a). Issued CERs and number of issuances increased drastically in 4Q 2010. In July 2010, the CDM EB approved the revised "Procedures for review of requests for issuance" (UNFCCC, 2010b) that was requested by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP5) in 2009 (UNFCCC, 2009a). In accordance with this revision, the CDM EB assesses requests for issuance and decides on approvals, requests for reviews and rejections, whereas previously the CDM EB decided on approvals, requests for reviews, undertaking review and rejections. As a result, the review undertaken by CDM EB was eliminated in the new process.

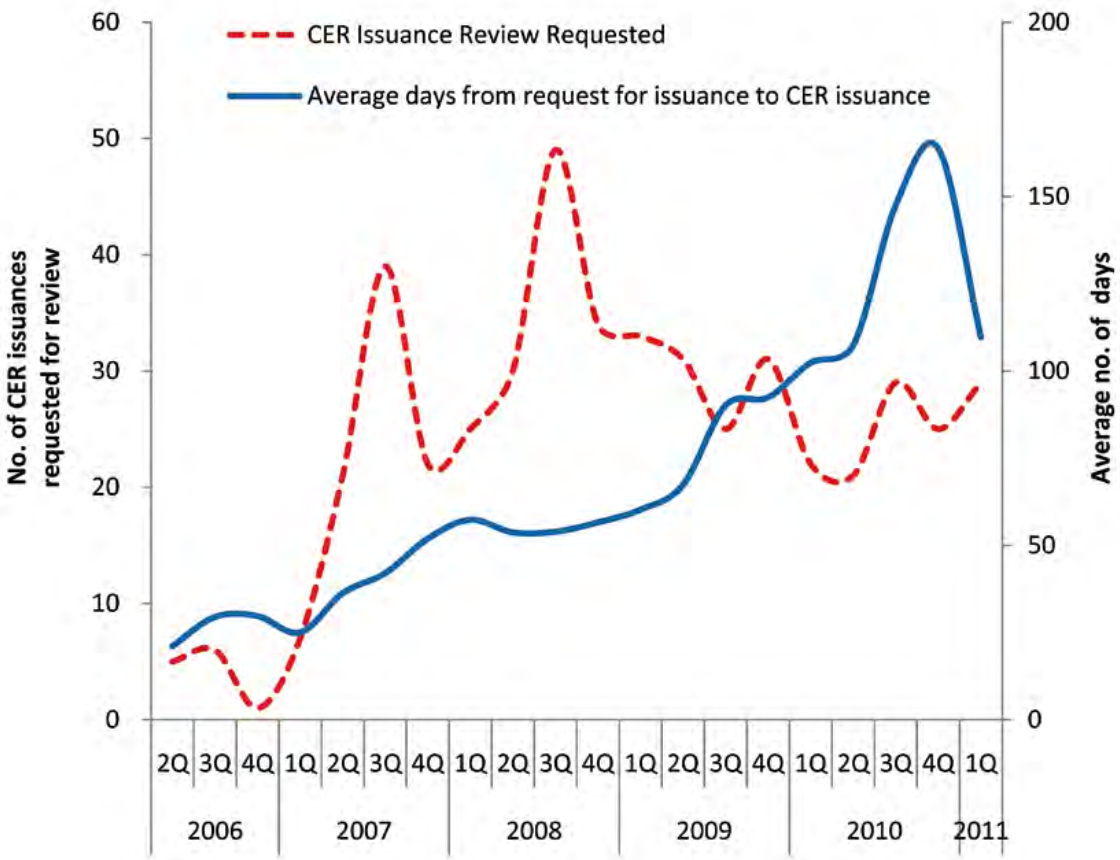
Figure 4. Number of issuances and issued CERs, 2005 to 2011



Source: IGES (2011a)

Figure 5 shows the average number of days from request for issuance to CER issuance and the number of CER review requests between 2006 and 2011. In 2010, the average number of days from request for issuance to CER issuance increased until 4Q 2010 despite introduction of the new process. This proves that the new process did not affect the time taken for CER issuance procedures. As for the requested reviews of CER issuance request, this dropped in 2Q 2010 after a peak in 3Q 2008. Since then, this number has been on the rise, implying that the new process (new procedures introduced in July 2010) increases the time from request for issuance to CER issuance.

Figure 5. Average number of days from request for issuance to CER issuance and number of CER review requests, 2006 to 2011

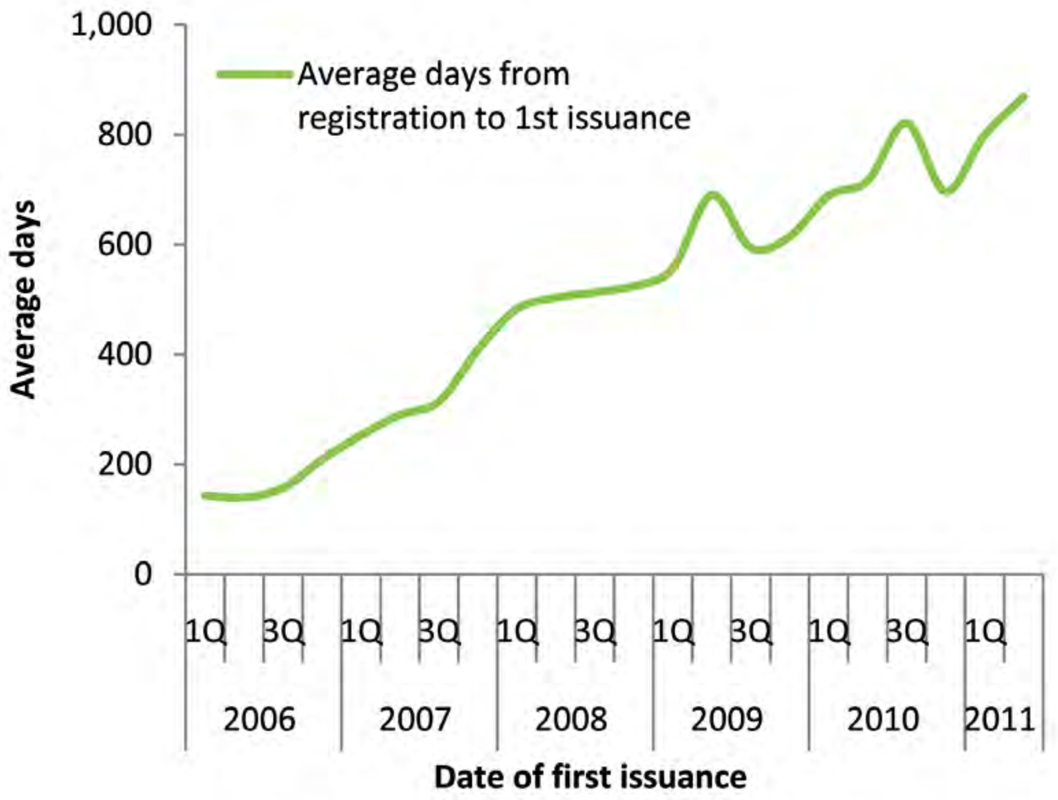


Source: IGES (2011c) and IGES (2011d)

4. Long delay before first issuance

As of the end of April 2011, 1,029 out of 3,031 registered projects had been issued CERs (IGES, 2011a), meaning that 2,002 projects had not received any CERs. IGES analysis shows that this puts into jeopardy the operations of 540 projects (IGES, 2011b). The longest amount of time without issuance from registration to the present time is 2,157 days–almost 6 years (IGES, 2011a). Figure 6 shows the average number of days from registration to 1st issuance. Since 2006, this number has risen, and reached a peak of 868 in 1Q 2011. This period of limbo after registration until first issuance, which is becoming longer and longer, is one reason why projects are brought to a halt before they' ve even gotten off the ground.

Figure 6. Average number of days from registration to 1st issuance



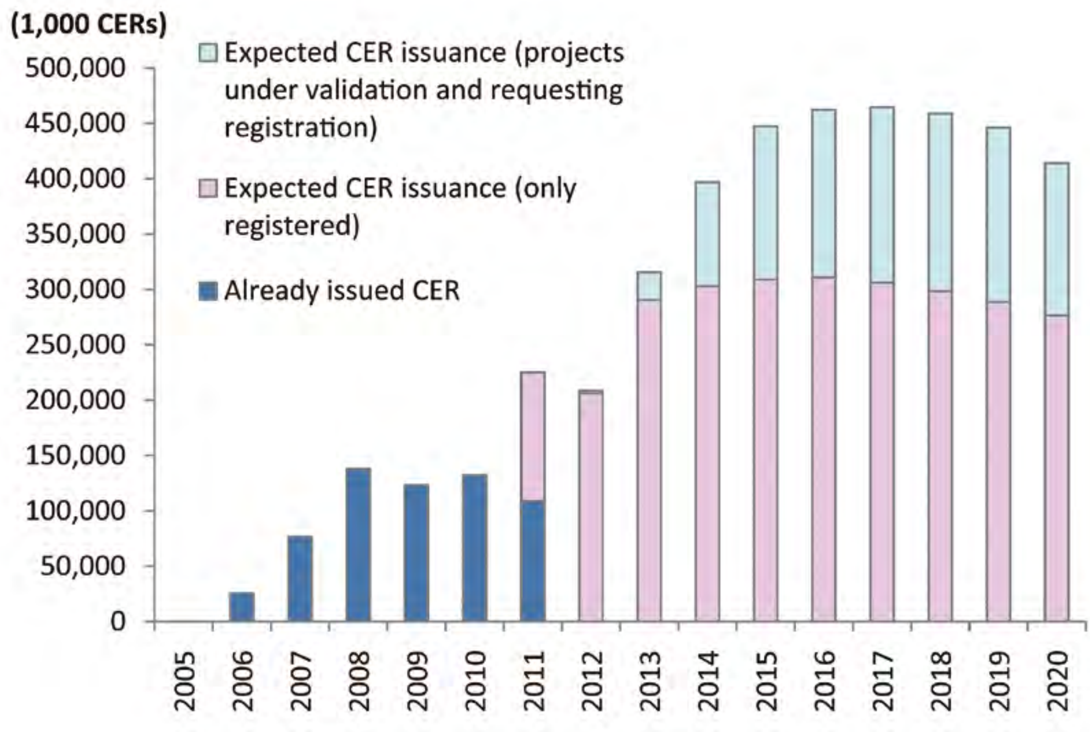
Source: IGES (2011a)

5. Annual CER issuance expected to boom post-2013

Less CERs have been issued than anticipated by PDDs so far. According to IGES research (CDM Project Data Analysis & Forecasting CER Supply (IGES, 2011b)), around 2.1 billion CERs were expected to be released by 2012. However, actual issued CERs was 0.6 billion as of the end of April 2011 (IGES, 2011a). Such difference between planned and actual figures can be accounted for by six empirical factors: 1) prolonged validation (average 329 days), 2) dropouts due to halted validation (average 19.7%), 3) delays in registration process (average 159 days), 4) non-operation risk after registration (average 8.9%), 5) prolonged CER issuance process (average 557 days) and 6) issuance success rate[3] (average 80.5%).

Figure 7 shows the expected future CERs issuance from the present to 2020. Although average CER issuance between 2006 and 2010 was around 0.1 billion, this figure has increased since 2011. As of the end of April 2011, CER issuance had already reached 0.1 billion; a tendency likely to continue into the future. In detail, (based on IGES data—CDM Project Data Analysis & Forecasting CER Supply (IGES, 2011b)), all projects could release up to 0.3 billion CERs before end of 2012 and 3.7 by end of 2020 (IGES, 2011b). Put another way, this means that, after 2012, approx. 0.3 billion CERs will be issued from the registered projects every year. Validation projects are anticipated to generate a smaller amount of CERs by 2012; 3.4 million, with a gradual increase expected after 2012.

Figure 7. Estimated future CER issuance to 2020



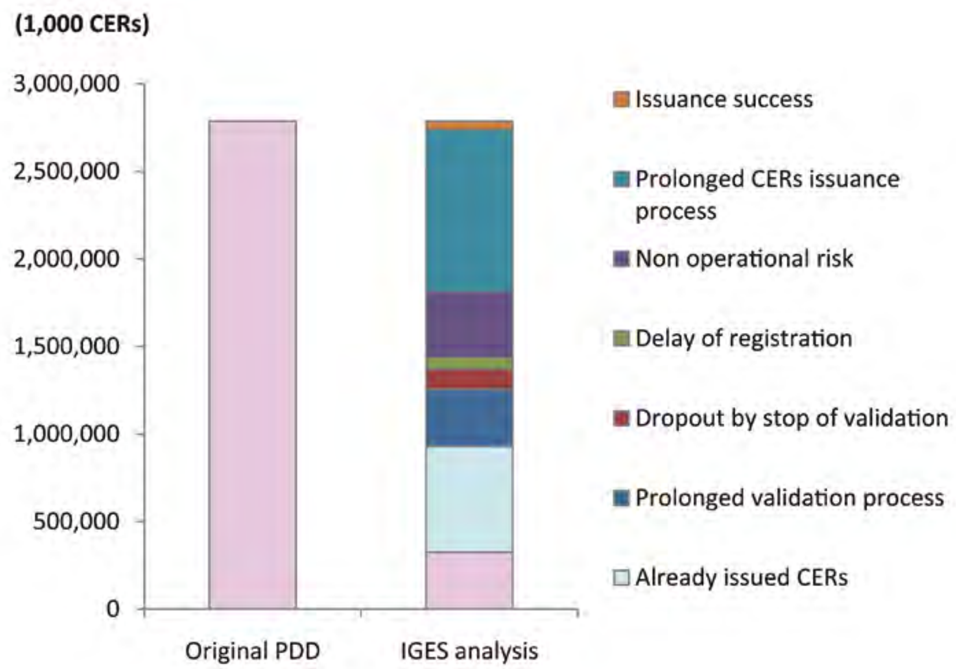
Source: IGES（2011a）

3 The issuance success rate is the ratio of the actual amount of issued CERs compared with the expected emission reduction (removals by sinks in afforestation & reforestation projects) in the same period at the time of PDD submission.

Figure 8 shows the difference in CER supply by 2012 between anticipated CERs (by PDD) and IGES estimates. The current estimate puts this figure at 1.9 billion CERs by end of 2012. Figure 8 also shows that the largest difference, 0.9 billion, might be due to the prolonged CER issuance process, a topic focused on in this paper and something that needs to be addressed. The second largest difference, 0.4 billion, is caused by non-operational risk—another point raised in this paper—which puts 540 projects on the line due to the length of time since registration. This highlights the necessity to improve the implementation stage after registration.

To address the difference in CERs mentioned above, CDM reform measures will be needed in the future. For the verification process, reductions in time and cost via a simplified process and procedures would be a benefit. In addition, it will also be needed to shorten the time until first issuance from registration, to avoid projects running out of time and falling under the guillotine. It also needs to be noted that in developing countries the survival of CDM projects is very much in the hands of the economy; CDM projects could simply be canned due to lack of funds from investors in the event of a downturn. Pre-empting this risk, financial support and capacity building should be provided to reduce the time and cost for the verification in developing countries.

Figure 8. Difference in CER supply to 2012 between PDD estimates and IGES analysis



Source: IGES (2011b)

2.2 Guidelines for registration and CER issuance process

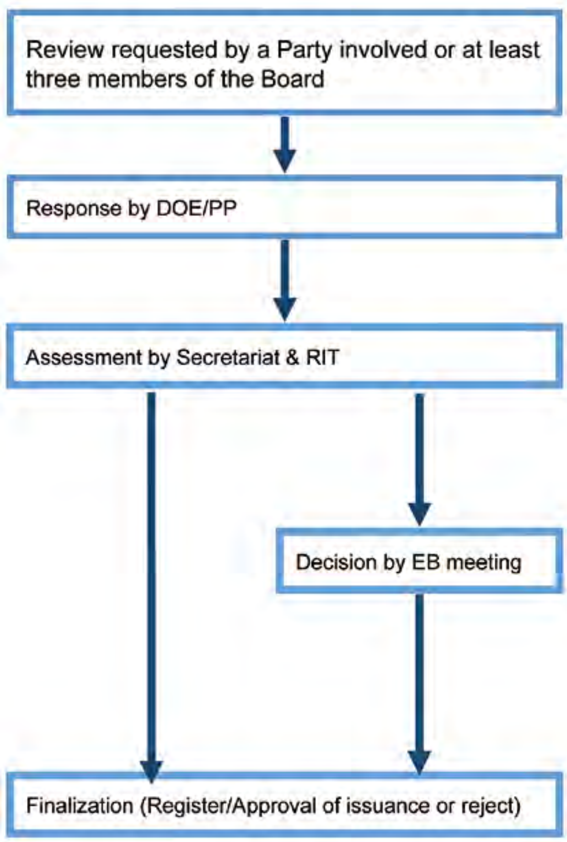
Naoki TORII

1. Trend in review requests for registration/CER issuance

As shown in Figure 1, the review process of CDM starts when a Party involved (or at least three members of the Board) requests to review either the request for registration or the request to issue CERs submitted by a DOE (UNFCCC, 2010a). The projects requested to be reviewed are then scrutinised (based on CDM rules and methods), i.e., registrations are validated or the amount of CER credits is examined. As regards overall number of review requests, Figures 2 and 3 show the numbers of projects requested to be reviewed and the annual review ratio (annual number of requests for review divided by annual number of requests for registration or CER issuance). Figure 2 shows that the review ratio for registration requests dropped after 2009 after a high of 66% and Figure 3 shows that the review ratio for CER issuance generally fluctuates though dropped to 14% in 2010.

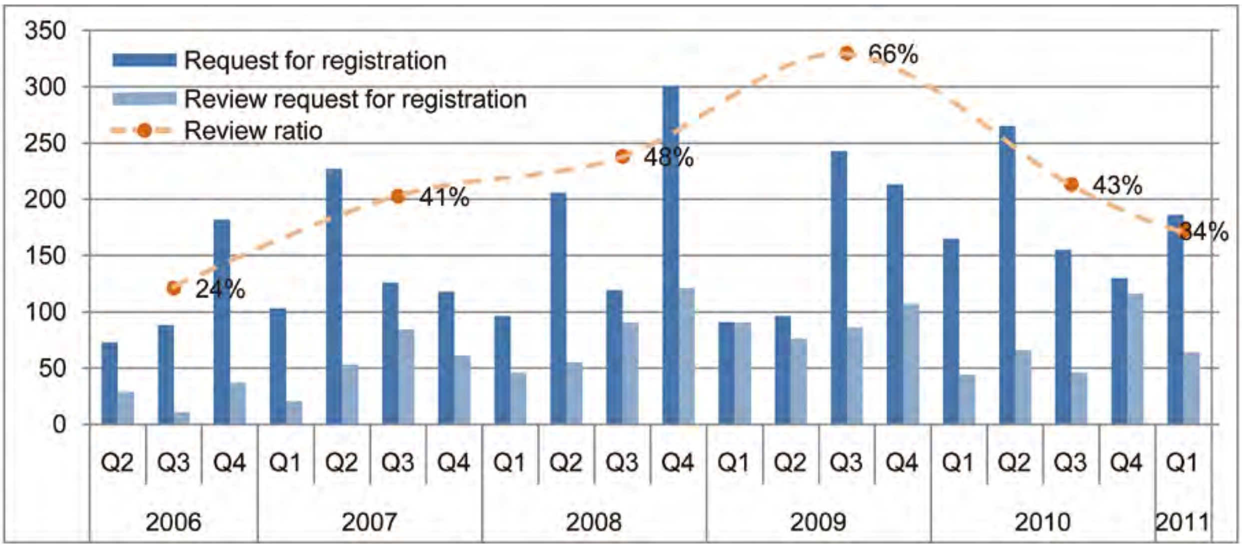
Although a slight improvement in review ratio can be seen, since the review ratio as well as total number of cases decreased compared with CER issuance reviews, as of the first quarter in 2011 the ratio still stood at about one third, which represents a barrier for DOEs and Project Participants (PPs).

Figure 1. CDM review process



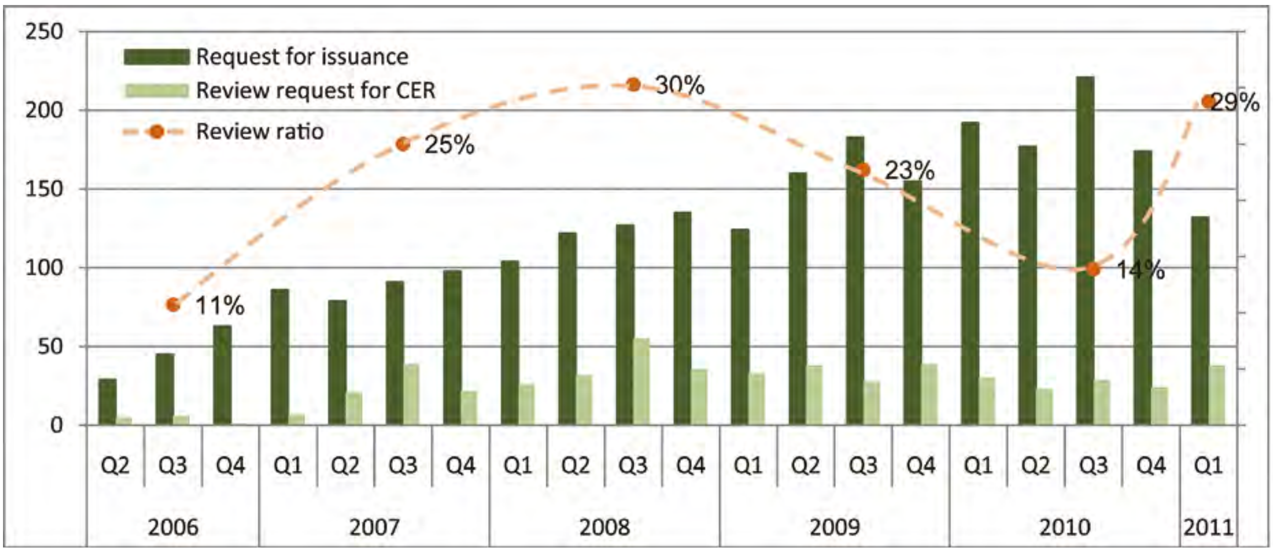
Source: IGES (2010a) and IGES (2010b)

Figure 2. Requests for registration and review



Source: IGES (2011a) and IGES (2011e)

Figure 3. CER issuance requests and reviews

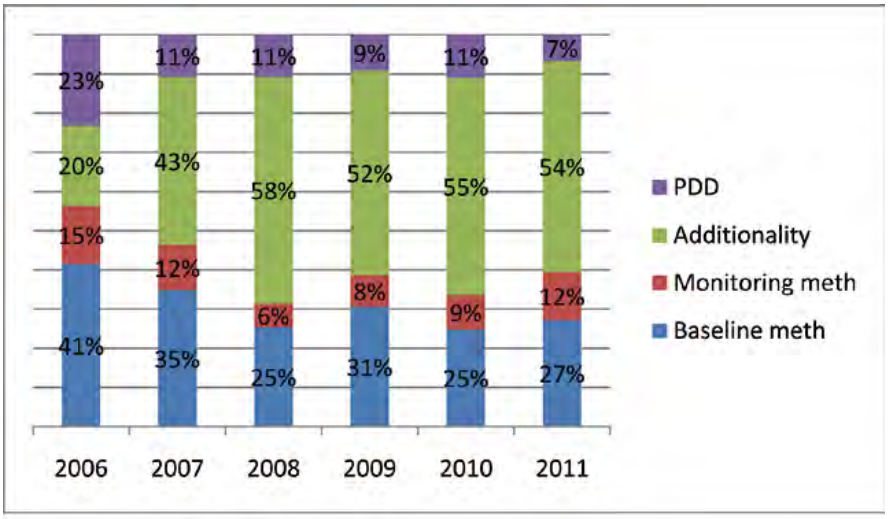


Source: IGES (2011e) and IGES (2011f)

2. Registration review requests and guidelines

Figure 4 shows that additionality is the main reason (i.e., more than half of the reasons) for registration reviews. The ratio remains high from 2007 to 2011. Figure 5 shows that investment analysis is the most cited item of the reasons for review requests (60% on average from 2006 to 2011 for review requests related to additionality). (IGES, 2011e)

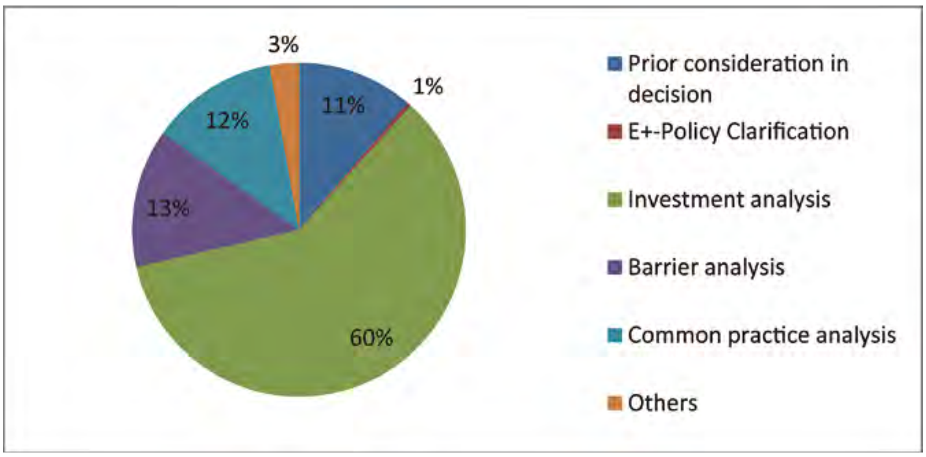
Figure 4. Reasons for registration review requests



Source: IGES (2011e)

"Guidelines on the assessment of investment analysis" was first adopted at the 39th CDM Executive Board Meeting (hereafter EB) in May 2008. The guideline was revised twice thereafter and the latest version 3, came into effect on 30th April 2011 (UNFCCC, 2009b). The main revisions were "guidance on the treatment of costs incurred prior to the project activity start date" (EB 41, August 2008) and "guidance on the treatment of interest payments in income tax calculations" (EB 51, December 2009) (UNFCCC, 2009b). Figure 6 shows how the guidelines affected the numbers of review requests.

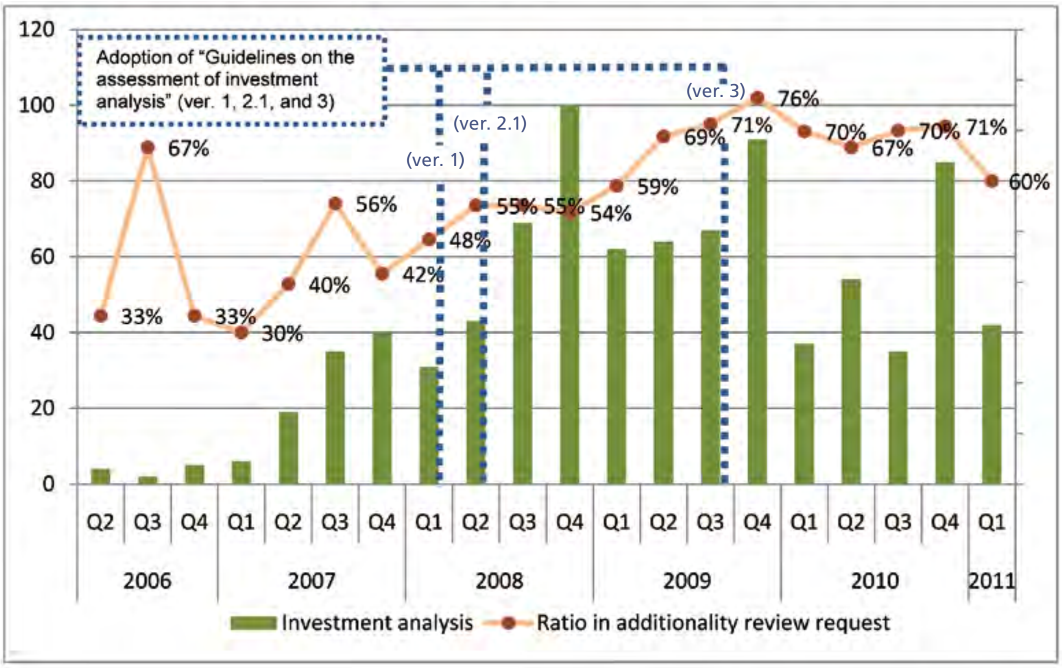
Figure 5. Reasons for review regarding additionality



Source: IGES (2011e)

As Figure 6 shows, the ratio of investment analysis of the reasons for reviews of additionality remains high even after the adoption of the guidelines, although the total number of cases fluctuates. The average ratio from the fourth quarter in 2009 to the first quarter in 2011 after the adoption of Version 3 remains high, at around 70%.

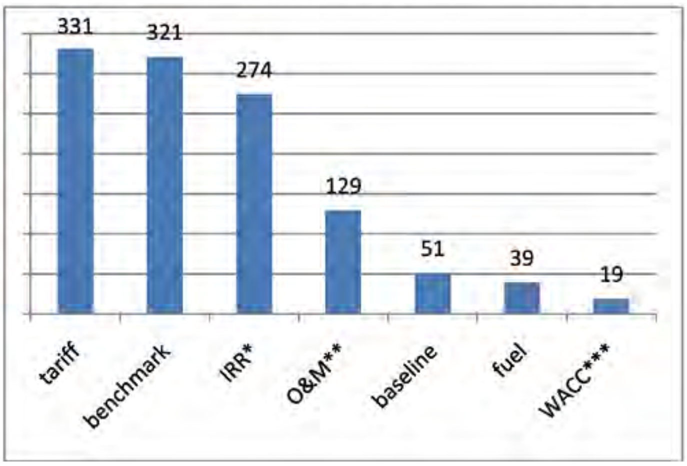
Figure 6. Numbers of review requests regarding investment analysis and guidelines



Source: IGES (2011e) and UNFCCC (2009b)

A breakdown of the reasons for the investment analysis review is shown in Figure 7. The major reasons are related to electricity tariff, benchmark, and IRR. As mentioned above, while the guideline of investment analysis was revised twice (UNFCCC, 2009b), no particular benchmark figure for these parameters was provided in the guideline. However, a new draft (Version 4) is under consideration[1]. The new draft includes a list of default parameters which show the benchmark of the rate of return on equity (UNFCCC, 2010c). While these figures differ by county and type of project, it would be more advisable to include values which PPs could easily select, according to the actual situation. Appropriate default values would increase predictability and transparency and help reduce the number of review requests, which would aid in project implementation.

Figure 7. Frequency of reasons cited within investment analysis



Number of cases review requested on investment analysis=903 IGES (2011e)

* Internal Rate of Return

** Operation & Maintenance Cost

*** Weighted Average Cost of Capital

1 The version 4 was adopted at the EB61 in June 2011.

In addition, aside from the additional guidelines on the investment analysis, simplification of additionality assessment can also be considered. Among about 3,000 registered CDM projects as of 30th April 2011, as much as 70% relied on investment analysis for their demonstration of additionality (IGES, 2011a). Furthermore, of these 70%, about 30% are based on the small scale methodologies (IGES, 2011a). Although other barriers can be an alternative rational for proving additionality for these small scale projects as it is determined in the rule for small scale methodologies , it seems that PP tends to select investment analysis. Although there can be several reasons for PP to choose investment analysis for proving additionality, one possible explanation can be that they prefer to proving additionality based on quantitative analysis which can be relatively accessible. Table 1 lists best practice for additionality demonstration of small scale CDM (SSC) projects. As it is seen from the table, while the use of a relevant financial indicator or application of benchmark analysis is mentioned as the investment barrier, demonstration of additionality based on other barriers tends to be more qualitative or requires extensive sources of data, such as technology dissemination rate—something difficult to procure in developing countries.

Table 1. Non-binding best practice examples to demonstrate additionality for SSC project activities

Investment barrier
· application of investment comparison analysis using a relevant financial indicator, application of a benchmark analysis or a simple cost analysis (where CDM is the only revenue stream such as end-use energy efficiency).
Access to finance barrier
· demonstration of limited access to capital in the absence of the CDM, such as a statement from the financing bank that the revenues from the CDM are critical in the approval of the loan.
Technological barrier
· demonstration of nonavailability of human capacity to operate and maintain the technology, lack of infrastructure to utilise the technology, unavailability of the technology and high level of technology risk.
Barrier due to prevailing practice
· demonstration that project is among the first of its kind in terms of technology, geography, sector, type of investment and investor, market etc.
Other barriers
· such as institutional barriers or limited information, managerial resources, organizational capacity, or capacity to absorb new technologies.

Source: UNFCCC (2007a)

However, as mentioned above, since Version 3 of the guidance of investment analysis does not provide specific parameters for those often cited in the review request, the risk of receiving a review through the registration process increases. Paradoxically, the tool for proving objective assessment might lead to subjectivity and ambiguity due to lack of specific parameters to refer to. In fact, many of the review reasons related to the parameters listed in Figure 7 questioned the applicability of the figures used in the investment analysis (IGES, 2011e). Further, proof documents are generally difficult to compile in developing countries. In this regard, further application of the positive listing approach would help, as this would enable projects that satisfy a certain condition to be automatically deemed 'additional' , as in *"Guidelines for demonstrating additionality of microscale project activities"* (UNFCCC, 2011b). Although the current guidelines allow each DNA to propose specific technologies which can be deemed additional in their country, there have been no such cases so far[2]. Whether to continue promulgating such in the guidelines is still being deliberated on (based on a decision at EB 60 in April 2011 (UNFCCC, 2011c)). A more specific proposal is that the EB compile a list of types of technologies or regions deemed additional, and use such in place of the current procedure, which would reduce the burden on the PPs during registration.

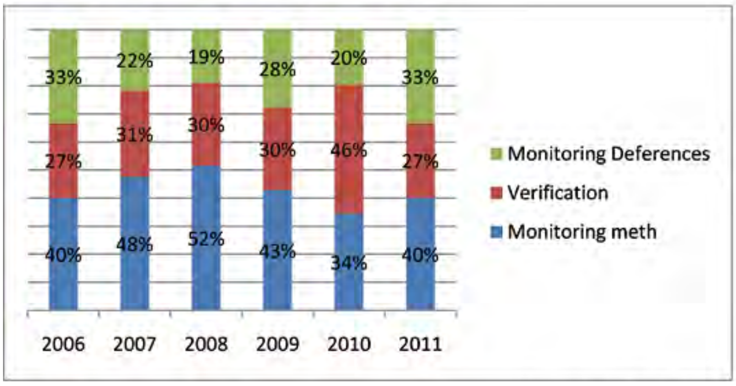
2 Chile, Cote d'Ivoire, India, Mongolia, Peru, Sri Lanka, and Thai DNA were the first to submit certain renewable energy technologies, as noted at EB 61 in June 2011. A Small Scale Working Group will conduct a technical assessment of the proposals.

3. CER issuance review request and guidelines

Figure 8 shows that the ratio of the reasons for CER issuance review requests remained steady from 2006 to 2011.

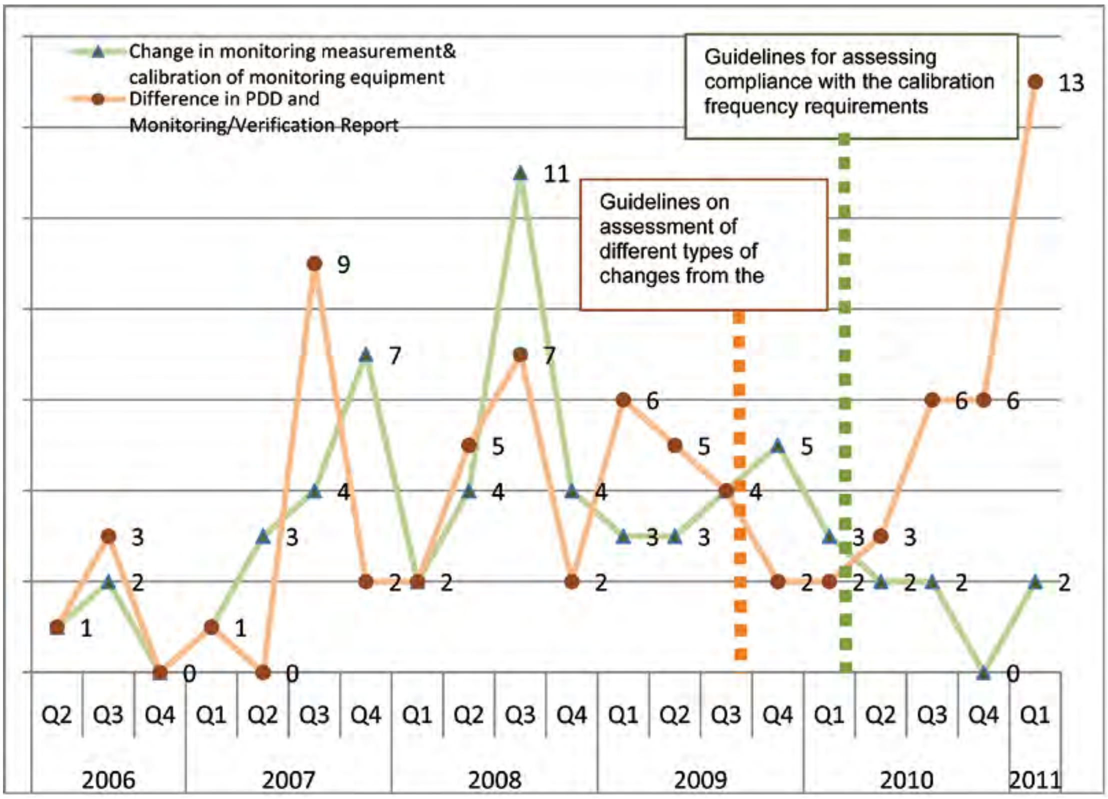
Of the guidelines regarding CER issuance requests, two are directly related to the reasons for review request: *"Guidelines on assessment of different types of changes from the project activity as described in the registered PDD"* (UNFCCC, 2009c) and *"Guidelines for assessing compliance with the calibration frequency requirements"* (UNFCCC, 2010d). The impact of these guidelines on the numbers of review requests is shown in Figure 9.

Figure 8. Reasons for CER issuance reviews



Source: IGES (2011e)

Figure 9. CER issuance review requests & introduction of guidelines



Source: IGES (2011e), UNFCCC (2009c) and UNFCCC (2010d)

Figure 9 shows that the numbers of review requests related to *"Change in monitoring measurement & calibration of monitoring equipment"* clearly decreased after the adoption of "Guidelines for assessing compliance with the calibration frequency requirements" in 2010 (UNFCCC, 2010d). As shown in Table 2, the guideline clearly defines the actions taken by DOEs listing the case where the frequency of calibration is determined but not followed as well as the case where the frequency is not determined. In addition, the appendix of the guidelines exemplifies the calculation of electricity transmission. This shows that specifying the cases and actions taken by DOEs increases the clarity of the procedures regarding calibration.

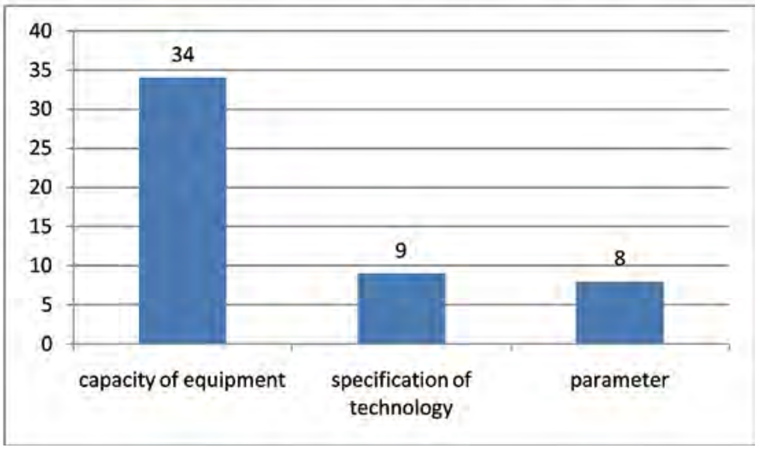
Table 2. Guidelines for assessing compliance with the calibration frequency requirements

Cases where calibration is not conducted at the frequency required
Applying the maximum permissible error specified by the respective manufactures as their technical specification.
Applying the error identified in the delayed calibration test if the error is safely beyond the maximum permissible error of the measuring equipment, which results in lower baseline emissions and higher project/leakage emissions.
Cases where calibration frequency is not specified
Applying the specifications of the local/national standards, or as per the manufacturer specification for the calibration of the equipments. If such standards are not available, international standards may be used.

Source: UNFCCC (2010d)

On the other hand, the number of cases of the review reason *"Difference in PDD and monitoring/verification report"* increased even after the adoption of *"Guidelines on assessment of different types of changes from the project activity as described in the registered PDD"* (UNFCCC, 2009c) in 2009. As shown in Figure 10, the main reason regarding the change from PDDs is the change in equipment capacity, which comprises changes in output, number of units of the equipment, and differences in operation time.

Figure 10. Frequency of the reasons of deference in PDD and monitoring/verification report



Source: IGES (2011e)

Table 3 shows the extent of actual changes from the figures mentioned in the PDDs. Although the effect on the emission reduction differs according to the factor related to the figure, the range of changes varies from less than 1% to 750% and the actions to be taken by DOEs when changes do occur are stipulated in published procedures and guidelines (specifically, *"Procedures for notifying and requesting approval of changes from the project activity as described in the registered Project Design Document"* (UNFCCC, 2009d) and *"Guidelines on assessment of different types of changes from the project activity as described in the registered PDD"* (UNFCCC, 2009c)). According to the above procedures and guidelines, DOEs have to notify the changes and obtain approval of the EB through the secretariat. This process can take time and cause delays, which in turn becomes a cost burden in project implementation. Since the size of projects varies, as well as the extent of the changes (as shown in the Table 3), it should be possible to define a range in which significant changes do not arise in the amount of emission reductions or in the status of additionality. Any procedure that is applied to all projects without regard to scale is not only inefficient but also leads to a regressive handicap for small-scale projects by increasing the percentage of transaction costs. Therefore, reducing the burden of process for notification of changes from PDDs, at least for small-scale projects in which a small percentage of changes occur, would increase the efficiency of the procedures and streamline project implementation.

As a more specific measure, a guideline should be developed to determine a threshold for the project size and the extent of changes from PDDs in which procedures for notification can be exemplified or simplified (e.g. within 1% changes happened in small scale projects). It has also been suggested to enable DOEs to notify of changes by simper measures (e.g., via a website) in cases which exceed the 1% threshold but are still within a higher limit.

Table 3. Difference between PDD and monitoring/verification

Description	Deference from the stated value in PDD (%)
emission reduction	750%
cement grinding capacity (t/year)	317%
installed capacity (MW)	200%
cement grinding capacity (t/year)	76%
steam (t)	76%
blended cement production (t/year)	52%
emission reduction	51%
surface area (km^2)	48%
plant capacity factor (%)	32%
installed capacity (MW)	30%
installed capacity (MW)	26%
emission reduction	24%
rated capacity of electricity generation (MW)	20%
overload capacity of the turbine (%)	20%
electricity generation (output)(GWh)	14%
installed capacity of urea production (t/year)	13%
installed capacity (MW)	12%
nitric acid production (t/day)	11%
installed capacity (MW)	11%
the capacity cane crushing (t/day)	10%
installed capacity (MW)	3%
installed capacity (MW)	2%
production of adipic acid (t/year)	1%
installed capacity (MW)	-1%
installed capacity (MW)	-1%
installed capacity (MW)	-9%
installed capacity (MW)	-19%

Source: IGES (2011e)

2.3 New approach for demonstrating additionality

Nozomi OKUBO

1. Background and aim of this chapter

Additionality is a crucial element of a baseline-and-crediting GHG emission reduction project such as a CDM project. Under the CDM, additionality has to be demonstrated and assessed by following a stepped approach provided by “Tool for demonstration and assessment of additionality” (hereafter referred to as “the additionality tool”). However, a number of project proponents and stakeholders have pointed out that this tool, due to its complexity, acts as a barrier to project development. Further, a number of other barriers to development of CDM projects, especially small-scale projects, exist. In May 2010, a new and significantly simplified approach of demonstrating additionality was adopted, targeted at very small-scale (microscale) projects. This chapter aims to show whether demonstration of additionality actually represented a major barrier to microscale CDM projects by examining the extent of effects of the new approach. It also aims to identify areas in which further improvements could be made, with the objective of simplifying how additionality is demonstrated.

2. Adoption of a new approach for demonstrating additionality

According to the additionality tool, project proponents need to identify all the alternatives and demonstrate that their project is less preferable to any of them without the CDM (UNFCCC, 2008c). Demonstration requires multi-factored analysis and collection of evidence, leading to protracted project development and uncertainty, thus represents one of the major obstacles to CDM project development, particularly for small-scale projects, and to a greater extent in least-developed countries (LDCs), where uncertainties are linked with greater risk. Whether to simplify the process of demonstrating additionality to promote project development or to maintain its rigidness to ensure environmental integrity has always remained a controversial topic. As for small-scale CDM project activities,[1] although modalities and procedures, including demonstration of additionality, were simplified in 2005 (UNFCCC, 2005a), discussions continued regarding further measures to be taken on microscale projects and projects in LDCs, which resulted in the adoption, on 28 May 2010 at EB 54, of "Guidelines for demonstrating additionality for renewable energy projects of less than 5 MW and energy efficiency projects with energy savings of less than 20 GWH per year (Version 01)", hereafter called “the guidelines” . Version 01 was then expanded in scope to embrace all other project types, including microscale, on 15 April 2011 at EB60, resulting in “Guidelines for demonstrating additionality of microscale project activities (Version 02)” . A project of eligible size is considered ‘additional’ if it satisfies any one of the conditions listed below in Table 1.

1 Definition of “small-scale CDM project activities” according to “simplified modalities and procedures for small-scale CDM project activities” is as follows: renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent), or energy efficiency improvement project activities which reduce energy consumption, on the supply and/or demand side, by up to the equivalent of 15 gigawatt hours per year, or other project activities that both reduce anthropogenic emissions by sources and directly emit less than 60 kilotonnes of carbon dioxide equivalent annually

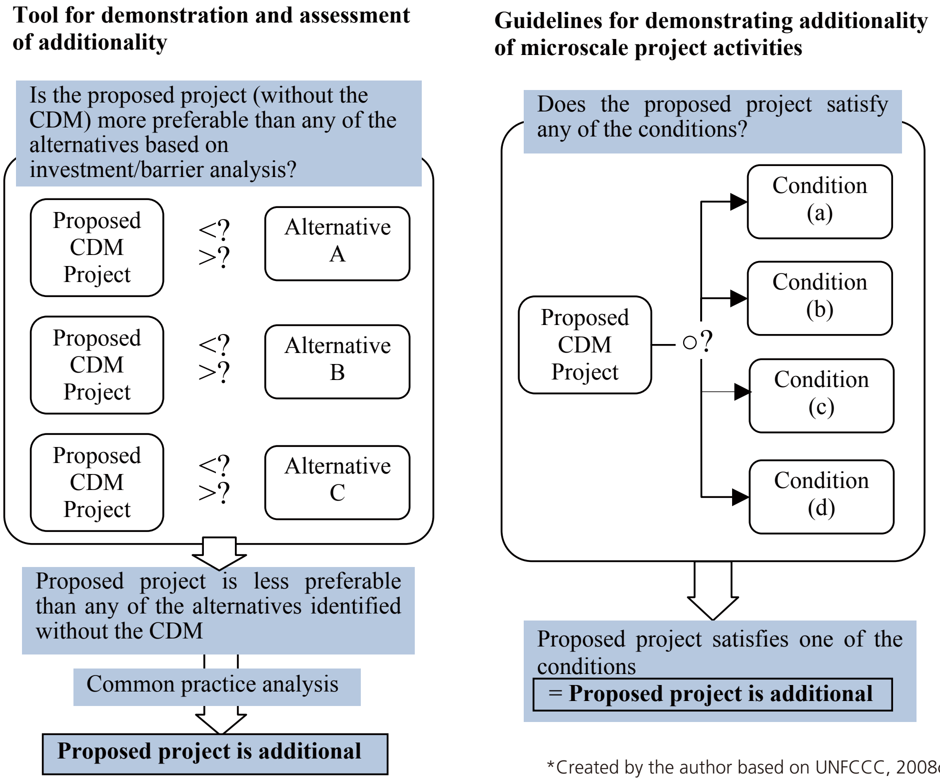
Table 1. Summary of conditions listed in "Guidelines for demonstrating additionality of microscale project activities"

		Renewable energy ≤ 5 MW	Energy efficiency ≤ 20 GWH per year	Other ≤ 20,000 t-CO2 ERs per year
Geographic location of project activity		(a) In one of the Least Developed Countries or the Small Island Countries (LDCs/SIDs) or in a special underdeveloped zone of the host country identified by the Government before 28 May 2010.		
Status of grid connection		(b) Offgrid activity supplying energy to households/ communities	-	-
Distributed energy generation*	Independent subsystems/ measures	(c) (i) ≤ 1,500kW electrical installed capacity	(b) (i) Achieves estimated annual energy savings ≤ 600 MWH	(b) (i) Achieves estimated annual emission reduction ≤ 600 tonnes
	End users of the systems or measures	(c) (ii) Households/ communities/SMEs SME= small or medium enterprise	(b) (ii) Households/ communities/SMEs	(b) (ii) Households/ communities/SMEs
Technology /measure		(d) Recommended by the host country DNA and approved by the Board to be additional in the host country	-	-

Source: UNFCCC (2011b). Modified by author for table form. * Both (i) and (ii) need to be satisfied.

Under the new (Version 02) guidelines, a CDM project can be considered 'additional' if it satisfies one of the conditions listed, where previously such project would have required proof that it couldn' t have been implemented without CDM in comparison with other projects. Figure 1 summarises the process to demonstrating additionality of the tool and the guidelines.

Figure 1. Different approaches to demonstrating additionality



*Created by the author based on UNFCCC, 2008c and UNFCCC, 2011b.

3. Microscale projects increase in LDCs under new approach

Since only about two months have passed since revision of the guidelines, the focus of this paper is on Version 01 (renewables up to 5 MW; energy efficiency with savings up to 20 GWH/yr) which are only applicable to renewable energy and energy efficiency project activities.

To provide a comparison with projects which use the guidelines, the status of development of microscale CDM projects before the adoption of the guidelines is reviewed first, and summarised in Figures 2 and 3 below. In the six years (2004 to 28 May 2010) since the start of CDM project development 253 microscale projects were registered, around 30% of which were in India and 10% in each of Mexico and China. LDCs account for only 2% with five projects in total. With regard to project type, most of the registered projects (about 80%) are grid-connected power generation projects, with off-grid power projects accounting for only 6% (only one energy efficiency microscale project has been registered). It is notable that some microscale projects of common types have already emerged in major CDM host countries, but few have appeared in LDCs.

Figure 2.
Breakdown of registered microscale CDM projects by host country

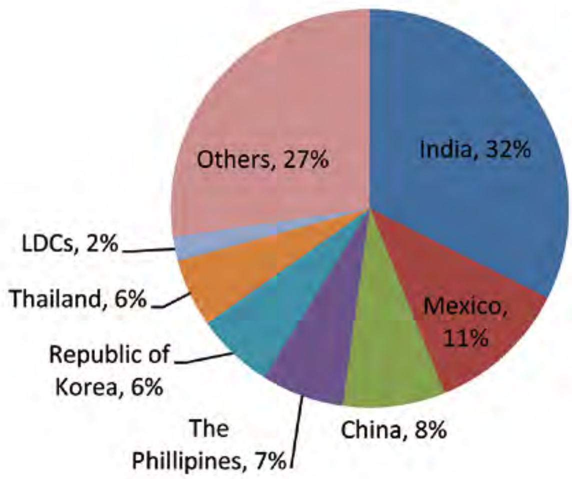
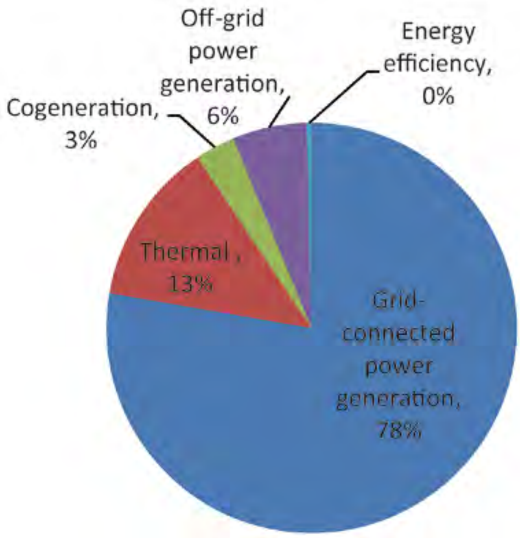


Figure 3.
Breakdown of registered microscale CDM projects by project type (number of projects)



Source: IGES (2011g).
*Including standalone mini-grid which is not connected to a national/regional grid

There has been only one renewable energy CDM project registered using the guidelines as of 30 June 2011. Considering the fact that it takes about a year and a half before registration of a small-scale renewable energy or energy efficiency project after the start of public comments (IGES, 2011g), an insufficient amount of time has passed since the adoption of the guidelines to evaluate the effects based on number of registered projects. Therefore, the projects that had entered validation after the adoption of the guidelines were examined in terms of tendency. There were 239 renewable energy projects of up to 5 MW[2] undergoing validated between 28 May 2010 and 30 June 2011, but there were no microscale energy efficiency projects in the same period. Of the 239 projects, 25 applied the guidelines. As shown in Table 2 which summarises these 25 projects, five projects were in LDCs. Compared to the number of registered projects in LDCs in the six years prior to the adoption of the guidelines, which was five, the fact that five projects were already undergoing validation within a year shows a clear tendency that the number of projects in LDCs has risen.

2 Excluding projects of validation terminated.nthropogenic emissions by sources and directly emit less than 60 kilotonnes of carbon dioxide equivalent annually

Table 2. Number and project type of sub-5 MW renewable energy CDM projects under validation using the guidelines, by host country

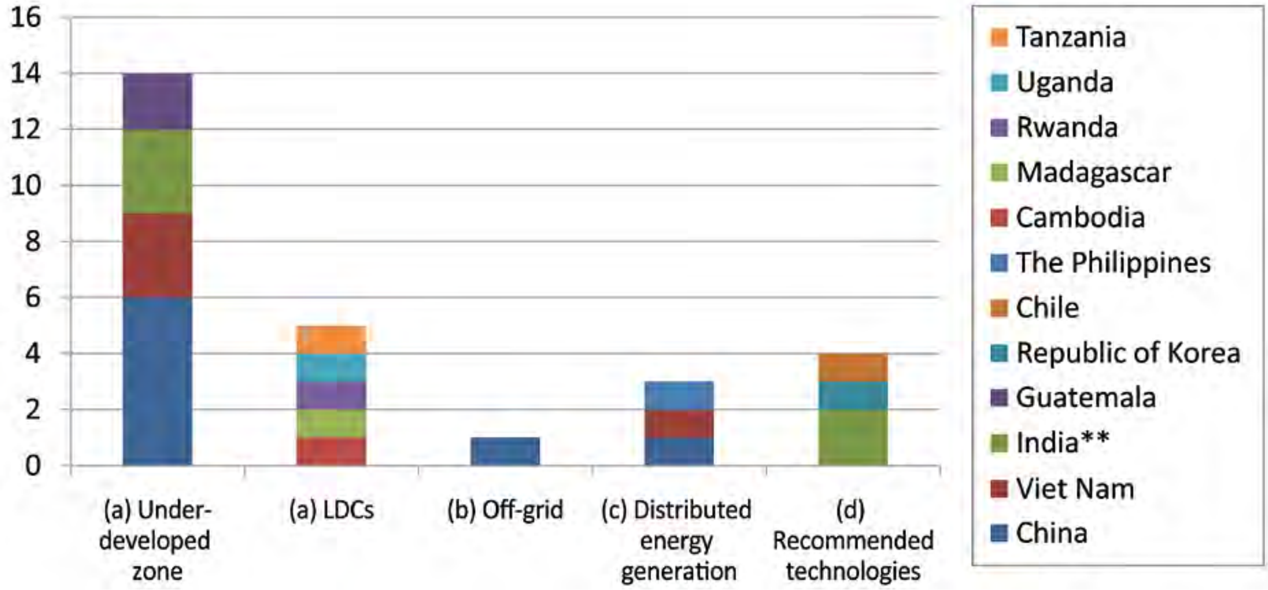
	Host country	Project type	Num. of projects
Non-LDC	China	Hydro power (grid-connected)	5
		Hydro power (grid-connected and/or captive use)	2
		Solar thermal	1
	Viet Nam	Hydro power (grid-connected)	3
		Biogas (thermal energy generation)	1
	India	Wind power (grid-connected)	1
		Wind power (captive use)	1
	Guatemala	Hydro power (grid-connected)	2
	Republic of Korea	Hydro power (grid-connected)	1
	Chile	Hydro power (grid-connected)	1
	The Philippines	Biogas power (captive use)	1
LDC	Cambodia	Biogas power (captive use)	1
	Madagascar	PV (off-grid)	1
	Rwanda	Other renewable energy (off-grid)	1
	Uganda	Biomass (thermal energy generation)	1
	Tanzania	Biomass (thermal energy generation)	1

Source: IGES (2011g), UNFCCC (2011e).

4. Caution as regards application of the guidelines

In terms of the conditions satisfied to apply the guidelines, the condition of "the geographic location is in a special underdeveloped zone of the host country identified by the Government before 28 May 2010 (UNFCCC, 2010e)" is most often used, as shown in Figure 4. As the information source, there were six different sources used for projects in China and only one source for all the projects in Viet Nam. In India, the government of the state in which the project is located is the source of information referred to in each project. What is considered as "underdeveloped" may vary among countries, with China defining it as meaning "a National Level poverty country" , Viet Nam as "in difficult socio-economic conditions" , and India as "a backward district of the state" . The word "underdeveloped zone" is left undefined in the guidelines and project proponents have so far interpreted this according to official governmental documentation to qualify their position.

Figure 4. Number of ≤5MW renewable energy CDM projects under validation by condition satisfied*



Source: UNFCCC (2011e).

* Conditions (a)-(d) correspond to those in the column of "Renewable energy ≤5 MW" in Table.1.

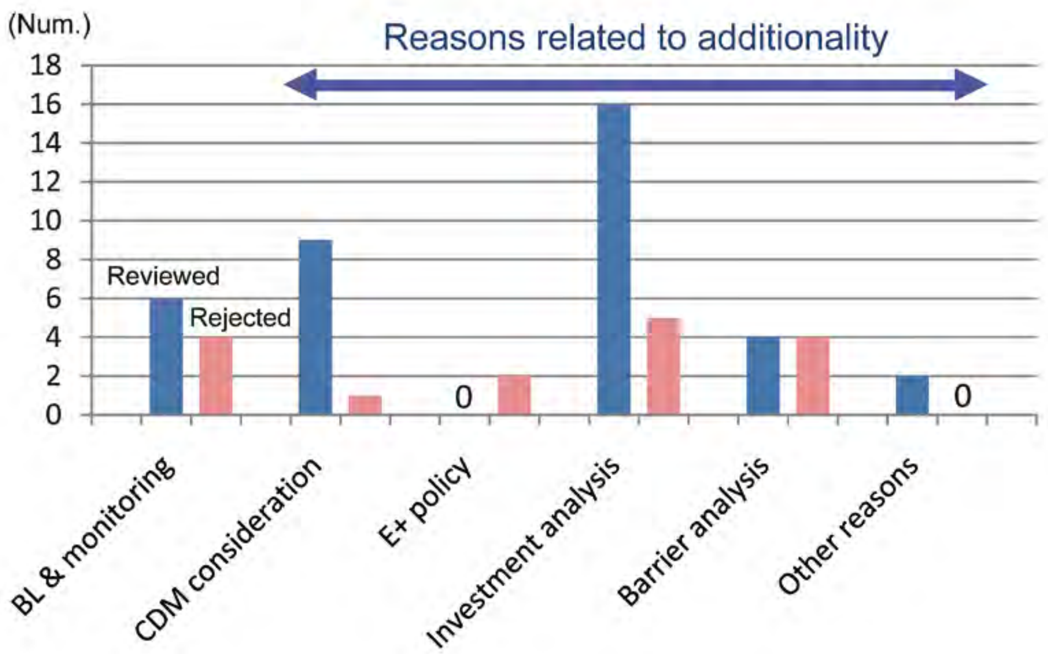
** There is one project in India which satisfies both (a) and (d), and counted in both conditions.

Eleven out of the 25 projects, while proving that they satisfy one of the conditions and thus already additional according to the guidelines, employ other approaches to demonstrate additionality, such as "Tool for demonstration and assessment of additionality" , "Non-binding best practice examples to demonstrate additionality for SSC project activities" , demonstration of prior consideration of the CDM, and investment analysis. The reasons for undertaking this additional work are described in the PDDs so as to avoid the risk of misinterpretation, which would otherwise lead to delays; i.e., it is a more conservative approach to demonstrating additionality. This shows that there are some project proponents who are not assured of demonstrating additionality by following the guidelines, which completely omit the process of demonstrating additionality according to the conventional approach. This could be partly attributed to the ambiguity of the conditions stated in the guidelines–conditions with undefined terms such as "special underdeveloped zone" , "small or medium enterprises (SMEs)" , and "communities" . Until a number of projects are successfully registered, such uncertainties regarding the applicability of the new guidelines are likely to remain.

5. Boosting microscale project development in major CDM host countries via the guidelines

To examine how the demonstration of additionality according to the conventional approach has been influencing microscale project development, below we review the status of review and rejection and its reasons, focusing on additionality. As of 30 June 2011, 29 renewable energy projects of up to 5 MW (and no energy efficiency CDM projects) had been reviewed or rejected, including those withdrawn after the review. None of these had been reviewed or rejected in LDCs, and none had applied the guidelines. Figure 5 shows the number of reviewed or rejected projects by category of reason. Most of the reasons for review or rejection include problems related to additionality. Of these, reasons related to investment analysis, all of which are benchmark analysis, are most common. Specific reasons include the low electricity tariff applied in the benchmark analysis and the suitability of the benchmark itself.

Figure 5. Number of reviewed and rejected ≤5MW renewable energy projects by category of reason*



Source: IGES (2011h).
* For a project reviewed or rejected for more than one reason, the project is counted for each of those reasons.

According to simplified modalities and procedures for small-scale project activities, project participants of such projects must demonstrate the existence of at least one barrier which prevents the implementation of a proposed project (UNFCCC, 2005a). In addition, "Non-binding best practice examples to demonstrate additionality for SSC project activities" is provided so that project proponents can refer to best practice examples of each type of barrier they confront. As regards best practice examples of the investment barrier, the application of investment analysis is recommended (UNFCCC, 2007a), which is often used by project proponents. But due to the fact that there is no common benchmark or financial indicators and parameters for calculation, it is difficult to evaluate demonstration of additionality by investment analysis, which itself very often becomes the reason for review or rejection. Therefore, if the guidelines were to clearly state that the conventional approach to demonstrating additionality is now obsolete, this would promote microscale projects.

6. Overcome a major barrier to microscale project development in LDCs through the guidelines

In the case of LDCs, there has been virtually no development of microscale projects (and no projects have been reviewed or rejected)—mainly due to the presence of financial and institutional barriers. As regards financial aspects, low profitability due to high transaction costs for small-scale projects has been cited as a disincentive to project development in LDCs, where most GHG emission reduction projects are small or micro scale. LDCs also face a barrier due to poor credit ratings and high sovereignty risks which limit the possibility for securing overseas finance. In this point the local banking sector—if it could overcome its trepidation into providing finance in the face of credit risk (i.e., due to the small size of the investment, lack of project developer expertise and lack of financial rating)—could play a vital role (Danish Ministry of Foreign Affairs, 2009). Regarding institutional barriers, there is a lack of specialised expertise and capacity in the institutional framework and the CDM enabling framework (Econ Pöyry, 2009). In addition, problems in CDM projects in general, such as non-availability of data and information required to calculate GHG emission reductions from a proposed CDM project, are considered more significant for LDCs.

However, the increase in the number of projects using the guidelines–five projects in a year after the adoption of the guidelines compared to five projects in six years before the adoption–showed firstly that microscale CDM project development had been hindered in LDCs mainly due to the difficulty of demonstrating additionality, and secondly that the guidelines have enhanced project development by removing this barrier. This can also be attributed to the simplicity of applying the guidelines to projects in LDCs, in that project proponents only need to state that it takes place in an LDC.

7. Clearer guidelines would provide more certainty

Based on the results and discussions above, possible improvements to the guidelines have been considered. The guidelines for microscale projects were adopted for the purpose of simplifying the process (clarifying the conditions) and thus should provide as much certainty of passing the additionality test as possible. Although it is clear that the guidelines are applicable for projects in LDCs, their applicability for projects in other host countries is a grey area, as assessment needs to be conducted on whether the proposed project satisfies the appropriate conditions, which could create uncertainty.

There have only been a few microscale off-grid distributed energy generation projects, which are designed for a certain category of end users using specific subsystems; most of the projects being developed are grid-connected renewable energy projects. To apply the guidelines to such projects in non-LDC host countries, the condition which needs to be satisfied is either (a) the geographical location of the project activity is in a special underdeveloped zone identified by the host country Government before 28 May 2010, or (d) the project activity employs specific renewable energy technologies/measures recommended by the host country DNA. The condition (a) is used for most of the projects under validation, but the stipulation of "underdeveloped zone" may vary depending on the host country. Also, different information sources are used for different projects even within a particular country.

Based on these facts, it is likely that application of this condition will need to be checked for appropriacy, project by project, which could be counter to the intent of the guidelines. In this regard, a list of indicators that could be used as proof of "underdeveloped zone" could provide clarity to project proponents. For example, it is now under consideration whether to allow Millennium Development Goal (MDG) indicators as proof of specific conditions, including that of "underdeveloped zone" (UNFCCC, 2011d). Decisions on which of the MDG indicators is to be used and the threshold value of each of the indicators could lead to a simpler assessment of whether the project site is considered an underdeveloped zone or not. At the same time, condition (d) should be made more easily applicable. For this purpose, clear guidance could be provided by the CDM Executive Board to host country DNAs on which renewable energy technologies and measures to recommend. For example, using "technologies or measures with a total installed capacity of less than or equal to 5%" in the definition would provide a certain level of clarity, and a list of projects which satisfy this condition by host country would help project proponents to choose which technologies or measures to use. With these clarifications, project proponents could easily judge the applicability of the guidelines to their project and be assured of passing the additionality test.

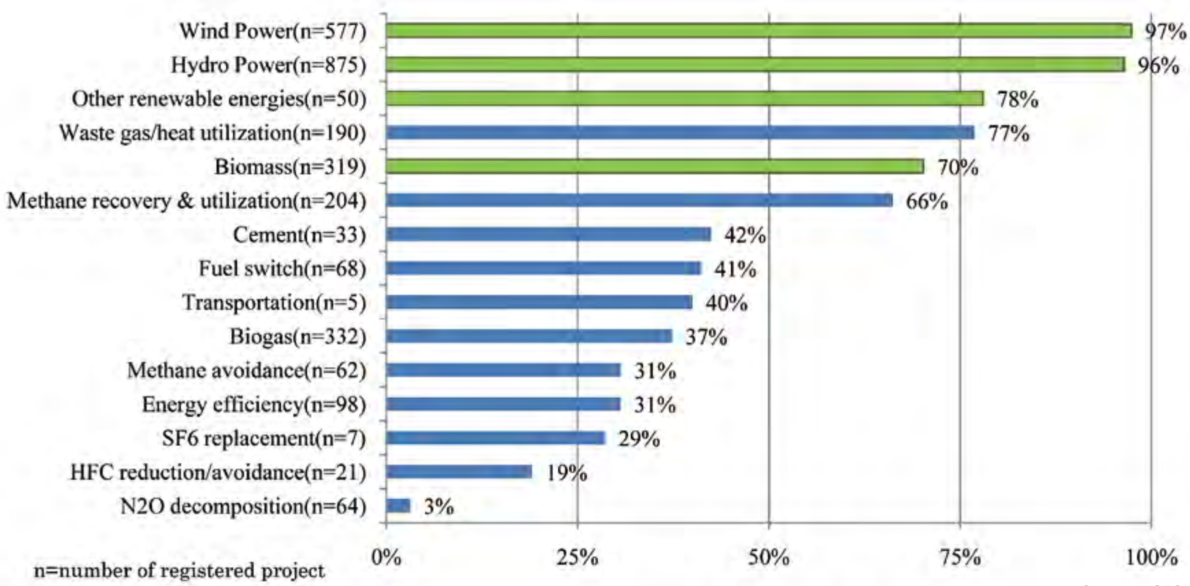
3.1 Standardization of grid emission factor for electricity access

Akiko FUKUI

1. Importance of grid emission factor in CDM

The term GEF is used to indicate how many tons of carbon dioxide a CDM project could theoretically prevent being emitted per megawatt-hour (i.e., t-CO_2/MWh) if power were otherwise to be generated by a conventional source. GEF is calculated by use of a CDM executive board-approved methodology entitled "Tool to calculate the emission factor for an electricity system" (UNFCCC, 2011i), hereafter referred to as "the tool" , and GEF is normally referred to as the *combined margin CO_2 emission factor* (CM). GEF is an important parameter since it determines the baseline emissions in CDM projects, which supply power to the grid. According to IGES data (CDM project database (IGES, 2011a)), 74.3% of registered projects and 15 out of 20 types of projects categorised the tool. As Figure 1 shows, the share of GEF utilisation in renewable energy projects is higher than others. Renewable energy projects include wind, hydro, biomass, solar, geothermal, wave and tidal power generation in this paper.

Figure 1. The share of the registered projects employing GEF by project type



Source: IGES (2011a)

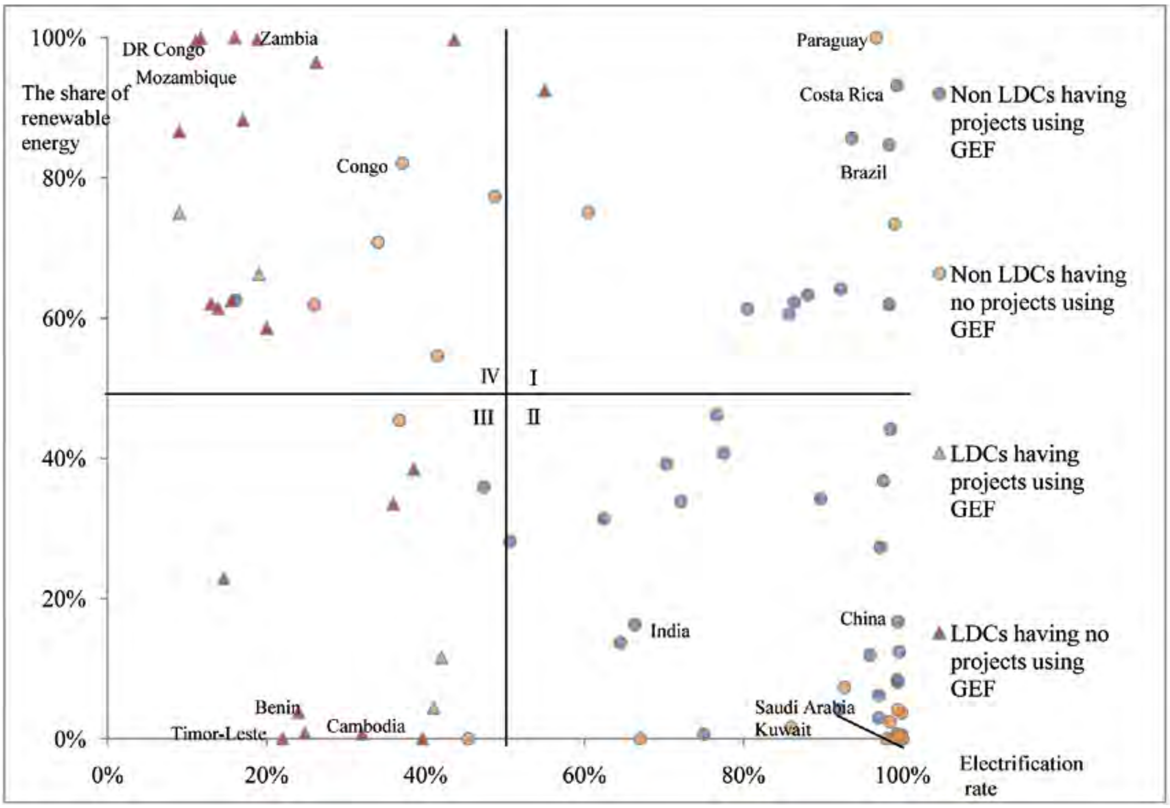
As GEF depends on the composition of existing power sources in the project activity area, there may be large differences in emission reductions within a certain type and scale of project activity. The average GEF of all the registered projects is 0.82 t-CO_2/MWh, and the figure is influenced to a large extent by China and India, which comprise two thirds of registered projects. If China and India are excluded the average value drops to 0.54 t-CO_2/MWh.

2. Low GEF in LDCs

Of particular note is that there are many countries with a low electrification rate (the percentage of population with electricity access), and such countries generate electricity mostly via renewable energy. Figure 2 shows that the 87 Non-Annex I countries[1], which are categorised into four groups based on the stage of country (whether LDC or not) and the use of GEF (whether projects use GEF or not), are distributed in accordance with the share of renewable energy (the quotient of total renewable electricity net generation divided by total electricity net generation) and electrification rate. As shown in Figure 2, the countries mostly from the LDCs whose electrification rate is less than 20% are plotted in the zone IV and reach 74.6% as regards average share of renewable energy. In these countries, it would be hard to develop a grid connected electricity generation project as a CDM project. Especially, based on the methodologies of renewable energy projects (approved consolidated methodology ACM0002 and approved methodologies for small-scales AMS.I.D), the emission factor directly results in the amount of the emission reductions of the project activity[2].

According to the IEA (2010b), 1.4 billion of the world' s population still lack electricity, which would require a minimum generating capacity of 250 GW in order to achieve universal access by 2030. Though there are official financing schemes, such as Official Development Assistance (ODA), which provide loans for electrification infrastructures in such countries, it is assumed that the private sector takes the initiative in implementing projects efficiently. Based on the above, the GEF needs to be examined in terms of whether the CDM can address the issue of electricity access.

Figure 2. Relationship between share of renewable energy, electrification rate and GEF in Non-Annex I countries[1]



Source: IGES (2011a), IEA (2010c) and EIA (2011)
IEA = International Energy Agency
EIA = Energy Information Administration, U.S.

1 The data covers 87 out of 152 Non-Annex I countries, which is available number of countries from the data sources.

2 The amount of emission reductions is difference between the baseline emissions and the project emissions. In the methodologies, the amount of baseline emissions is the product of electricity generation and the grid emission factor. The project emissions are 0 t-CO2 or small volume from the renewable energy generation (UNFCCC, 2010f and UNFCCC, 2010g).

3. Standardized baseline for LDCs and countries with low electrification rates

Most of the countries with an electrification rate of less than 50% in zones III and IV of Figure 2 do not have any registered projects. Reasons behind this are posited as relating to the problem of data collection for the tool (which was partially addressed by a revision in June 2011 exempting LDCs and countries with less than 10 registered projects from calculating BM (UNFCCC, 2011i)) and the fact that little room exists to actually reduce emissions.

Conventionally, the baseline emission figure is based on the current situation and past performance data. However, another concept, potentially dislodging the above assumption, takes into account future anthropogenic emissions from the basic services industry, which was previously overlooked (the future anthropogenic emissions are projected to rise above current levels due to specific circumstances, such as infrastructure and income constraints, in the host country (UNFCCC, 2010i, UNFCCC, 2010h, UNFCCC, 2011f)).

With the goal of raising electricity access in countries with low electrification rates, what is needed is a conceptual rethink—a revised GEF—the standardized baseline for which is set based on a practical and realistic value for renewables rather than the tool used for the current power source makeup in the project area. In 'resetting' the GEF baseline, therefore, the onus should fall on the local DNA, as investment efficiency of renewable energy projects strongly depends on the natural conditions and renewable energy policy in a country. Specifically, DNAs need to initiate feasibility studies to identify the type of project suitable for their area and provide information such as technology availability, suitable areas, load factors and electricity tariffs. Next, instead of calculating the GEF, the emission factor should be set as a default value, based on the level of investment, operating and maintenance costs and electricity tariff prevailing in the country in question. Even though a standardized baseline obviates the need for projects to demonstrate additionality (normally part of the investment analysis in the PDD), projects need to demonstrate that a reliable source of revenue is feasible, as this would provide more impetus for getting less financially attractive renewable energy projects off the ground. A standardized baseline would reduce the validation cost and time required for data collection and PDD preparation.

4. Making the GEF calculation tool more flexible

The tool cannot be used for all permutations due to inconsistencies in the rules; CM[3], which is used as the GEF, is based on the weighted average of OM[3] and BM[3]. Although the tool provides an option when power unit level data is not available[4], this option can only be used for OM and not for BM, meaning that project proponents who are not exempted from the BM calculation have to collect detailed data. In contradiction to this rule, based on a request posted to the CDM executive board to allow a deviation (see below) from the rule, many project proponents in China as well as China' s DNA calculate GEF without this data[5,6].

- *Use of capacity additions (of all the plants serving electricity to the system which is connected to the project plant) during last 1 - 3 years for estimating the build margin emission factor for grid electricity.*
- *Use of weights estimated using installed capacity in place of annual electricity generation.*

Hence, there is an option (approval by the CDM EB) for when data is not available to project participants, and this exception, granted to China, could be applied to other countries for the calculation of BM.

3 The combined margin (CM) is the result of a weighted average of two emission factors. The operating margin (OM) refers to the group of existing power plants whose current electricity generation would be affected by the proposed CDM project activity. The build margin (BM) refers to the group of prospective power plants whose construction and future operation would be affected by the proposed CDM project activity (UNFCCC, 2011i).

4 Several power units at one site comprise one power plant, whereby a power unit is characterized by the fact that it can operate independently of the other power units at the same site (UNFCCC, 2011i).

5 Designated operational entity shall notify the EB of deviation from approved methodologies and/or provisions of registered project documentation before requesting registration of a project or issuance of CERs (UNFCCC, 2005b).

6 The EB replied to the deviation request which was titled "Request for clarification on use of approved methodology AM0005 for several projects in China" and submitted by Det Norske Veritas (UNFCCC, 2005c).

5. Facilitation of an inter-regional GEF via publication

Publication of the GEF, authorised by the DNA, is an essential factor in reducing the burden on project proponents in the GEF calculation. Publication of the GEF is anticipated to address needs related to inter-regional grids, which are grids connecting power plants for transmission across borders. Before the revision made at the 60th EB meeting, the emission factor of imported electricity was set at a default value of 0 t-CO2/MWh, which in reality made the GEF lower than the prevailing value (UNFCCC, 2011h). The revision meant that electricity imported from other host countries could be calculated in three ways. Despite this revision, the collection of electricity generation data from other countries for this calculation is problematic as there are 72 Non-Annex I countries that export or import electricity (EIA, 2010). Therefore, in order to avoid using the default of 0 t-CO2/MWh in calculating the GEF, the GEFs of other countries should be made available for projects connected with different grids.

Presently, only 21 DNAs publish national or rural GEF (IGES, 2011j and Michaelowa, 2011), and China and India started theirs in 2006. Publishing GEFs is considered a good way to promote CDM projects. If the UNFCCC secretariat were to provide each country’ s GEF on their web page as soon as DNAs submit them, this would definitely help project proponents.

If a DNA-authorised GEF is not available, a ready-made excel-based spreadsheet, published by IGES (IGES, 2011i), is available. The sheet is customised for the tool and will automatically calculate GEF after entry of several key data items.

Appendix 1. Status of Electricity and CDM registration by country

Country	LDCs	The share of renewable energy in power generation	Electrification rate	Num. of registered projects	Num. of registered project using GEF	Ave. GEF of registered projects in PDD ($t\text{-}CO_2/MWh$)
Afghanistan	+	62.5%	15.6%	0	0	-
Albania		100%	-	1	0	-
Algeria		0.7%	99.3%	0	0	-
Angola	+	96.5%	26.2%	0	0	-
Antigua and Barbuda		0%	-	0	0	-
Argentina		27%	97.2%	21	10	0.47
Armenia		30.4%	-	5	3	0.44
Azerbaijan		9.8%	-	0	0	-
Bahamas		0%	-	0	0	-
Bahrain		0%	99.4%	0	0	-
Bangladesh	+	4.4%	41.0%	2	2	0.66
Barbados		0%	-	0	0	-
Belize		95%	-	0	0	-
Benin	+	0.8%	24.8%	0	0	-
Bhutan	+	100%	-	1	0	-
Bolivia		41%	77.5%	4	2	0.58
Bosnia and Herzegovina		36%	-	0	0	-
Botswana		0%	45.4%	0	0	-
Brazil		85%	98.3%	188	103	0.32
Brunei Darussalam		0%	99.7%	0	0	-
Burkina Faso	+	22.8%	14.6%	0	0	-
Burundi	+	99.0%	-	0	0	-
Cambodia	+	3.8%	24.0%	4	0	-
Cameroon		77.3%	48.7%	1	0	-
Cape Verde		2.5%	-	0	0	-
Central African Republic	+	81.3%	-	0	0	-
Chad	+	0%	-	0	0	-
Chile		44%	98.5%	43	28	0.49
China		16.7%	99.4%	1,291	1,220	0.94
Colombia		86%	93.6%	27	10	0.37
Comoros	+	3.8%	-	0	0	-
Congo		82.1%	37.1%	0	0	-
Cook Islands		0%	-	0	0	-
Costa Rica		93%	99.3%	7	5	0.25
Côte d'Ivoire		35.9%	47.3%	1	1	0.73
Cuba		3%	97.0%	2	2	0.87
Cyprus		0%	-	6	3	0.81
Democratic People's Republic of Korea		61.9%	26.0%	0	0	-
Democratic Republic of the Congo	+	99.4%	11.1%	1	0	-

Country	LDCs	The share of renewable energy in power generation	Electrification rate	Num. of registered projects	Num. of registered project using GEF	Ave. GEF of registered projects in PDD (t-CO_2/MWh)
Djibouti	+	0%	-	0	0	-
Dominica		37%	-	0	0	-
Dominican Republic		12%	95.9%	2	2	0.62
Ecuador		64%	92.2%	16	12	0.65
Egypt		12.4%	99.6%	7	4	0.54
El Salvador		62%	86.4%	6	6	0.69
Equatorial Guinea	+	2.2%	-	0	0	-
Eritrea	+	0.7%	32.0%	0	0	-
Ethiopia	+	88.2%	17.0%	1	0	-
Fiji		71.0%	-	1	1	0.66
Gabon		45.4%	36.7%	0	0	-
Gambia	+	0%	-	0	0	-
Georgia		85.5%	-	2	1	0.09
Ghana		75.1%	60.5%	0	0	-
Grenada		0%	-	0	0	-
Guatemala		61%	80.5%	11	8	0.68
Guinea	+	54.3%	-	0	0	-
Guinea-Bissau	+	0%	-	0	0	-
Guyana		0%	-	1	1	0.95
Haiti	+	38%	38.5%	0	0	-
Honduras		39%	70.3%	17	13	0.70
India		16.3%	66.3%	630	414	0.87
Indonesia		13.7%	64.5%	62	19	0.78
Iran (Islamic Republic of)		2.4%	98.4%	1	0	-
Iraq		1.6%	86.0%	0	0	-
Israel		0.4%	99.7%	19	6	0.80
Jamaica		4%	92.0%	1	1	0.83
Jordan		0.6%	99.9%	2	1	0.61
Kazakhstan		9.7%	-	0	0	-
Kenya		62.5%	16.1%	3	3	0.62
Kiribati	+	0%	-	0	0	-
Kuwait		0%	100%	0	0	-
Kyrgyzstan		90.9%	-	0	0	-
Lao People's Democratic Republic	+	92.5%	55.0%	1	0	-
Lebanon		3.7%	99.9%	0	0	-
Lesotho	+	100%	16.0%	0	0	-
Liberia	+	0%	-	1	0	-
Libyan Arab Jamahiriya		0%	99.8%	0	0	-
Madagascar	+	66.2%	19.0%	1	1	0.55
Malawi	+	86.6%	9.0%	0	0	-
Malaysia		8.0%	99.4%	90	17	0.68

Country	LDCs	The share of renewable energy in power generation	Electrification rate	Num. of registered projects	Num. of registered project using GEF	Ave. GEF of registered projects in PDD ($t\text{-}CO_2$/MWh)
Maldives		0%	-	0	0	-
Mali	+	56.1%	-	0	0	-
Marshall Islands		-	-	0	0	-
Mauritania	+	11.0%	-	0	0	-
Mauritius		4.2%	99.4%	0	0	-
Mexico		19%	-	125	57	0.55
Micronesia (Federated States of)		-	-	0	0	-
Mongolia		0%	67.0%	3	0	-
Montenegro		57.5%	-	0	0	-
Morocco		6.2%	97.0%	5	3	0.75
Mozambique	+	99.9%	11.7%	0	0	-
Myanmar	+	62.1%	13.0%	0	0	-
Namibia		70.8%	34.0%	0	0	-
Nauru		0%	-	0	0	-
Nepal	+	99.7%	43.6%	3	0	-
Nicaragua		34%	72.1%	4	4	0.72
Niger	+	0%	-	0	0	-
Nigeria		28.1%	50.6%	5	1	0.63
Niue		0%	-	0	0	-
Oman		0%	98.0%	0	0	-
Pakistan		31.4%	62.4%	11	5	0.48
Palau		-	-	0	0	-
Panama		63%	88.1%	6	6	0.69
Papua New Guinea		30.4%	-	1	1	0.68
Paraguay		100%	96.7%	2	0	-
Peru		61%	85.7%	23	16	0.54
Philippines		34.2%	89.7%	50	33	0.49
Qatar		0%	98.7%	1	0	-
Republic of Korea		1.0%	-	53	46	0.61
Republic of Moldova		2.4%	-	4	0	-
Rwanda	+	18.8%	-	1	1	0.65
Saint Kitts and Nevis		0%	-	0	0	-
Saint Lucia		0%	-	0	0	-
Saint Vincent and the Grenadines		18%	-	0	0	-
Samoa	+	45.3%	-	0	0	-
San Marino		-	-	0	0	-
Sao Tome and Principe	+	24.4%	-	0	0	-
Saudi Arabia		0%	99.0%	0	0	-
Senegal	+	11.5%	42.0%	1	1	0.68
Serbia		27.3%	-	0	0	-
Seychelles		0%	-	0	0	-

Country	LDCs	The share of renewable energy in power generation	Electrification rate	Num. of registered projects	Num. of registered project using GEF	Ave. GEF of registered projects in PDD ($t\text{-}CO_2$/MWh)
Sierra Leone	+	31.0%	-	0	0	-
Singapore		0%	100%	2	0	-
Solomon Islands	+	0%	-	0	0	-
Somalia	+	4.8%	-	0	0	-
South Africa		0.6%	75.0%	19	5	1.04
Sri Lanka		46.2%	76.6%	7	6	0.73
Sudan	+	33.5%	35.9%	0	0	-
Suriname		55%	-	0	0	-
Swaziland		42.6%	-	0	0	-
Syrian Arab Republic		7.3%	92.7%	2	0	-
Tajikistan		98.2%	-	0	0	-
Thailand		8.4%	99.3%	44	33	0.51
The former Yugoslav Republic of Macedonia		14%	-	1	1	0.89
Timor-Leste	+	0%	22.0%	0	0	-
Togo	+	58.6%	20.0%	0	0	-
Tonga		0%	-	0	0	-
Trinidad and Tobago		0%	99.0%	0	0	-
Tunisia		0.5%	99.5%	2	0	-
Turkmenistan		0%	-	0	0	-
Tuvalu	+	-	-	0	0	-
Uganda	+	75.0%	9.0%	3	1	0.62
United Arab Emirates		0%	100%	4	3	1.02
United Republic of Tanzania	+	61.4%	13.9%	1	0	-
Uruguay		62%	98.3%	5	3	0.60
Uzbekistan		23.9%	-	10	0	-
Vanuatu	+	0%	-	0	0	-
Venezuela (Bolivarian Republic of)		73%	99.0%	0	0	-
Viet Nam		36.8%	97.6%	55	53	0.56
Yemen	+	0%	39.6%	0	0	-
Zambia	+	99.7%	18.8%	1	0	-
Zimbabwe		54.6%	41.5%	0	0	-
Total / Average		32.1%	66.0%	2,934	2,178	0.65

Source:
The share of renewable energy in power generation = total renewable electricity net generation / total electricity net generation; EIA (2011)
Electrification rate; IEA (2010c)
Num. of registered projects, Num. of registered projects using GEF and average GEF in PDD; IGES (2011a) *2 projects having more than 2 host countries are excluded.

3.2 Development of Standardized Baseline: learning from a biogas project case study in the Philippines

Kazuhisa KOAKUTSU
Naoki TORII

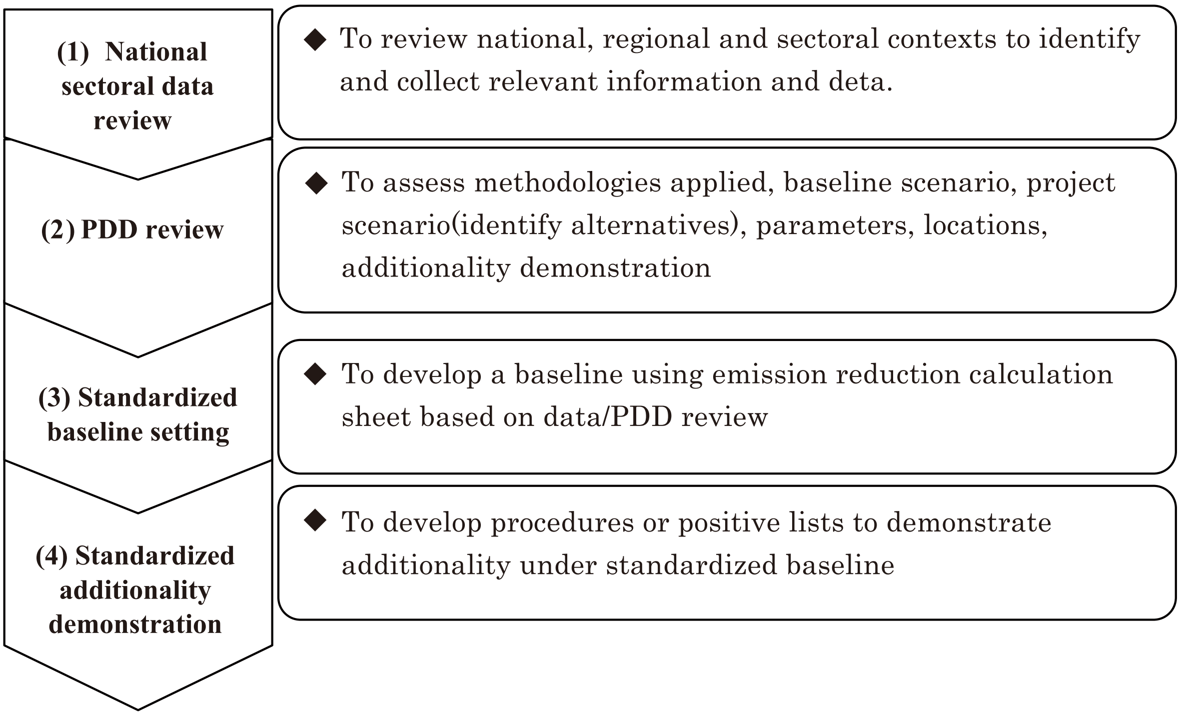
1. Definition of Standardized Baseline

According to the decision made at the 6th session of the CMP in Cancun, "standardized baseline" is defined as *"a baseline established for a Party or a group of Parties to facilitate the calculation of emission reduction and removals and/or the determination of additionality for clean development mechanism project activities, while providing assistance for assuring environmental integrity"* (UNFCCC, 2010j:6). Furthermore, it was decided that *"Parties, project participants, as well as international industry organizations or admitted observer organizations through the host country' s designated national authority, may submit proposals for standardized baselines applicable to new or existing methodologies, for consideration by the Executive Board"* (UNFCCC, 2010j:6). This paper offers a new approach to developing a standardized baseline under the CDM, based on a biogas project case study involving animal manure and the approved small scale methodologies of *Methane recovery in animal manure management systems and Renewable electricity generation for captive use and mini-grids* (or, AMS-III.D (UNFCCC, 2010k) and AMS-I.F. (UNFCCC, 2010l)).

2. Development of Standardized Baseline

A standardized baseline could be developed through empirical analysis of registered CDM projects for target sectors in the countries concerned, together with both, or either of, additional national and sector-specific data. Figure 1 summarizes the steps for establishment of a standardized baseline. Steps 1 and 2 aim at identifying key information, such as typical baseline scenario, parameters applied and variability of data and locations. Through steps 3 and 4, baseline and additionality are standardized under the specific conditions.

Figure 1. Steps for developing a standardized baseline

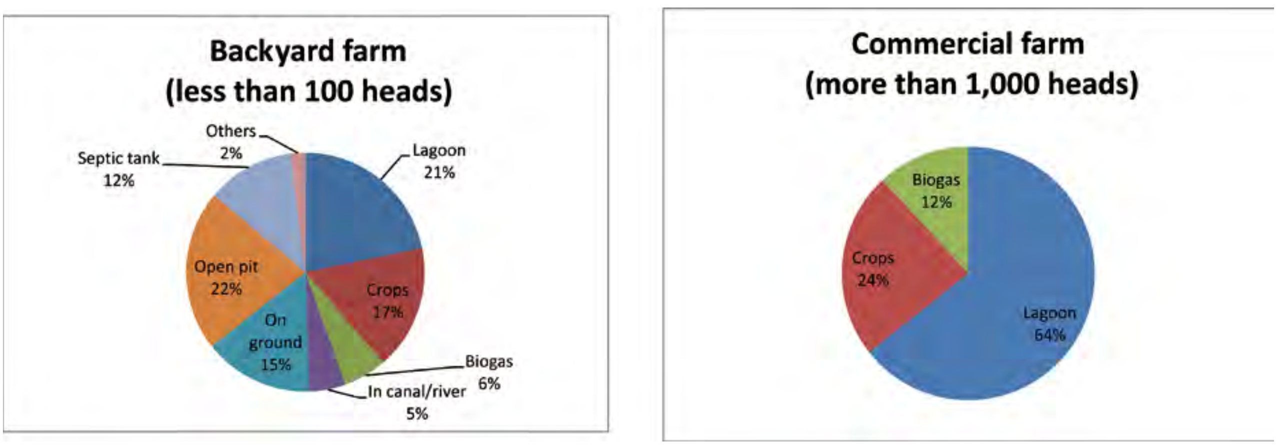


3. Commercial farms still have biogas potential—according to available data

The Philippines has a high potential to reduce emissions in its swine farm industry. According to the national GHG inventory report submitted to the UNFCCC secretariat by the government of the Philippines, the agricultural sector has been isolated as a major emitter—33% of total emissions—with swine farms accounting for nearly 80% of this figure (on a total-livestock-production-weight basis; as of 2007 (Department of Environment and Natural Resources, 1999)). In other words, pig farming creates over 26% of the country' s GHG emissions.

GHG emissions from the swine industry in the Philippines are mostly generated by lagoon-equipped farms, where animal manure is stored and methane is generated as a result of anaerobic digestion. In 2010 there were about 8.9 million swine (Bureau of Agricultural Statistics, 2011), with about 70% raised in backyard farms and 30% in commercial farms. Practices related to manure vary widely among backyard farms, though as can be seen from Figure 2, commercial (medium and large) farms mainly use lagoons, which represent the main source of emissions

Figure 2 Share of lagoons in backyard farms and commercial farms

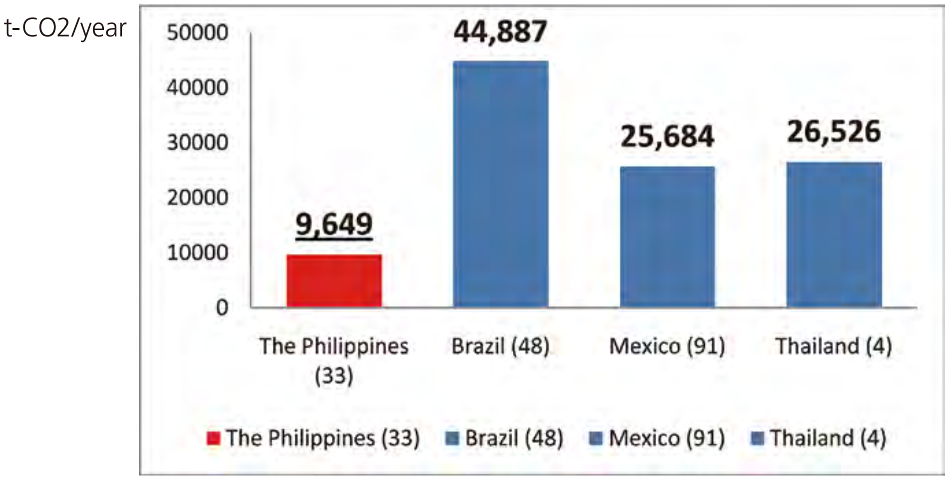


Source: US—EPA (2009)

4. PDD Review, identification of baseline scenario, and customisation of parameters

Extensive reviews of PDDs unearthed a rich body of information that helps develop standardised baselines, and identified typical baseline scenarios and parameters that reflect the actual situation within the country.
Of the 201 biogas projects registered as CDM projects as of 1st July 2011, the Philippines claim bottom place in terms of average emission reductions.

Figure 3 Expected emission reductions and number of projects, by country



Source: IGES (2011k)

Of the 33 biogas projects in the Philippines, all were based on the AMS-III.D. methodology ("project activities involving the replacement or modification of existing anaerobic manure management systems in livestock farms to achieve methane recovery and destruction by flaring/combustion or gainful use of the recovered methane"). The number of animals stated in current PDDs is estimated at 309,948[1], with average farm sizes of around 9,000 head. The largest farm has 22,811 head and the smallest 2,419. It was assumed that CDM projects were implemented on relatively large firms.

5. Setting the standardized baseline

The typical baseline and project scenario in the Philippines for animal waste-based biogas CDM projects are summarised in Table 1. The PDDs show that the same baseline and project scenario were applied for all registered projects in the Philippines (28 cases out of 28 projects) based on AMS-III.D.

Table 1 Baseline and project scenario for AMS-III.D. projects in the Philippines

Baseline Scenario
Organic matter from swine wastewater is left to decay anaerobically in open lagoons; Grid electricity as source of power.
Project Scenario
Installation of covered-in-ground anaerobic reactor that will promote rapid anaerobic decomposition of organic materials in the wastewater and capture the generated biogas for power generation.

Source: UNFCCC (2010k)

1 This is a preliminary estimate based on annual head counts of the projects regardless of project year.

Analysis of the 28 registered PDDs shows the extensive use of default values for the calculation of emission reductions, the values being taken from a number of published data; for example, Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), Philippine Department of Agriculture (PDA), and Intergovernmental Panel on Climate Change (IPCC) 2006 inventory report. Examples of these parameters are listed in Table 2.

Table 2 Default parameters

Parameters	Default values	Unit	Source
Average annual temperature	27	^oC	**PAGASA (Country Specific)**
Average mass of feed intake per head per day	2.33 or 2.66	kg/day	**PDA (Country Specific)**
Density of methane under normal conditions	0.00067	t/m^3	**Default values from (IPCC 2006)**
Maximum methane producing capacity for manure produced by livestock category	0.29	m^3CH_4/kg VS	
Methane Conversion Factor	80	%	
Urinary energy expressed as fraction of energy intake	2	%	
Digestibility	80	%	
Maximum methane producing potential of volatile solids generated	0.45	kg CH_4/kg VS	
Default value for volatile solid excretion per day on a dry-matter basis for a defined livestock (market)	0.3	kg VS/head*day	
Default value for the volatile solid excretion per day on a dry-matter basis for a defined livestock (breeding)	0.46	kg VS/head*day	
Average animal weight (breeding)	198	kg/head	
Average animal weight (market)	50	kg/head	
Global Warming Potential	21	-	

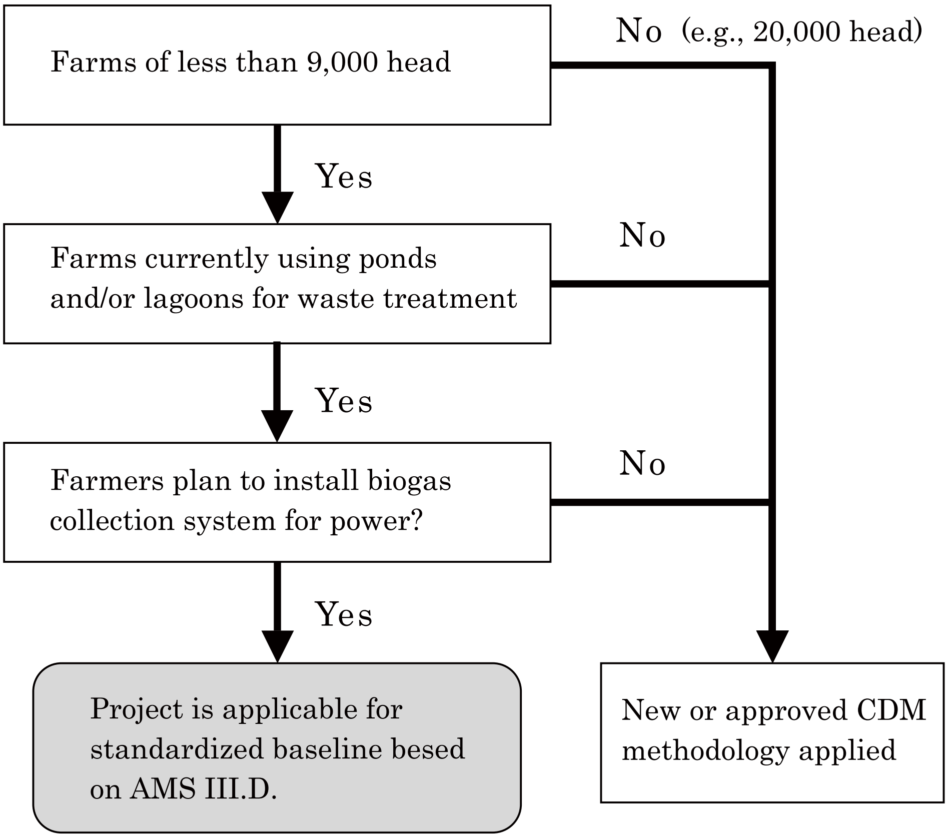
Source: PDDs from UNFCCC website

5. Standardised additionality demonstration

Analysis of PDDs revealed that registered biogas CDM projects in the Philippines apply the common baseline and project scenario, and that such projects also faced the same barriers for proving additionality. It is anticipated that the rate of dissemination of the technology for swine farms of less than 10,000 head will be quite low in the country, which will constitute the basis for establishing an additionality test for a standardised baseline for biogas projects in the Philippines. In this respect, a positive list, which automatically proves additionality, can be developed as the subsequent step.

Figure 5 shows the concept of an additionality test for standardised baseline. With respect to compatibility with the currently approved CDM methodology, for those farmers who do not have anaerobic lagoons, the methodology does not fit since emissions are absent in the baseline calculation.

Figure 4 Concept of Tool to Identify Standardised Baseline for Biogas Projects



The scenario for standardisation which is automatically deemed additional is:

• Farm size of less than 9,000 head

• Farmers who have not introduced a biogas collection and utilisation system

The figure of 9,000 was derived from the average animal population of registered CDM biogas projects in the Philippines[2]. Based on interviews with project developers, it was found that farmers prefer to introduce methane capture combined with utilisation technology. It was also observed that without utilisation of captured methane, the project would not be feasible even with the revenue from CDM. Considering the context of farms in the Philippines, the methodology of AMS-III.D (UNFCCC, 2010k) combined with AMS-I.F (UNFCCC, 2010l) for the captive use or mini-grid use of the electricity utilised by the captured methane[3] is considered an applicable model.

2 This figure was tentatively set as reference, however, the actual benchmark should be determined after the thorough consultation with stakeholders.

3 "Renewable electricity generation for captive use and mini-grid – Version 1.0"

6. Conclusion

The conditions for standardised baseline for biogas projects in the Philippines can be summarised as follows:

Methodology:
AMS-III.D. and AMS-I.F.: Methane recovery in animal manure management systems and electricity generation for captive use and mini-grids
Applicability:
Farms in the Philippines that satisfy the following conditions: ➢ Presence of lagoon deeper than 1 m and retention time of more than 1 month ➢ Lower than 9,000 head of market swine and 300 breeding swine
Baseline scenario:
Open lagoon treatment
Project scenario:
Collection and flaring of biogas for electricity generation

Any projects meeting the above criteria are automatically deemed additional and suitable for the CDM project, which simplifies the emission reduction calculation and enables automation. The standardized baseline can be based on the current CDM methodology, but its applicability is essentially limited to the extent of the requirement for the proposed standardized baseline. AMS-III.D would provide a good example of how the current methodology can fit into the framework of the standardised baseline. Based on a review of the 28 PDDs, the same baseline scenario and project scenario applied to all projects, which meant that common parameters are used to calculate emission reductions (for baseline emissions and project emissions); further, the barriers cited for the demonstration of additionality–technology and finance—were similar. In order to establish additionality for the standardised baseline, an additionality test tool based on the results of analysis of the PDDs and extensive analysis of pig farm data was developed for the country in which it was to be used.

In accordance with the concept of standardised baseline, which embraces the need to demonstrate additionality (as defined in the Decision of CMP.6 paragraph 44 (UNFCCC, 2010j)) the additionality of the current project was determined based on existing data and survey results on farm size and manure treatment practice in the Philippines. Based on current data, only 12% of farms, or those with more than 1,000 head, had installed the biogas system. According to the registered PDDs, the average farm size is 9,000 head, and the smallest is 2,400. Taking into the account the survey data (United States Environmental Protection Agency (US-EPA), 2009) and the biogas CDM-related knowledge in the country, it is concluded that if farms of less than 9,000 head implement the biogas system and flare the gas for generating electricity, this can be deemed as additional. If the figures of 9,000 for market swine and 300 for breeding swine are set as maximum numbers for this project, the emission reduction is estimated as 3,500t-CO2e per year with a generating capacity of 0.15 MW.

This additionality test will clearly enable project proponents to identify which types of project will qualify as additional biogas projects under the CDM, and subsequently decide whether the standardised baseline can be applied. In other words, any farmer in the Philippines who owns less than 9,000 head of swine will be automatically regarded as meeting the additionality requirement, and a spreadsheet prepared with default parameters tailored for the Philippines enables DNAs to verify values, which makes the process highly transparent.

From the project proponents' point of view, the approach proposed in this paper for calculating standardised baseline could be highly attractive because it provides a basic framework for use of the CDM (baseline emission calculation and demonstration of additionality). By simply inputting the number of pigs in a farm into the spreadsheet, the expected emission reduction (according to AMS-III.D,) is generated, which can be easily validated by the DOE. Determination of additionality is also facilitated as the additionality test for this standardised baseline will provide specific steps to identify additionality.

Other factors that bear influence on this whole proposal are data management and quality validation, and the need to control the manure treatment practice across the whole country. In addition, although a 9,000 cap was tentatively estimated as the threshold in this paper, country-wide stakeholder consultations will also be needed in practice in order to establish an appropriate range of farm sizes and to elucidate certain technological aspects of the methane avoidance system for application of the standardised baseline proposed in this paper.

04 Conclusion

1. Summary of this Report

This report examines the on-going progress of CDM reform from the three key themes for this year. They are, namely, efficiency and scale-up, regional distribution and standardization.

Chapter 2.1 (Current status and prospects for CER issuance) addresses the theme of efficiency. Based on an analysis provided by the IGES CDM database, the registration process has been made more efficient as the average number of days for registration was reduced after the introduction of the revised rule on "automatic registration", in which the registration date and starting date of the crediting period can be brought forward if there are no reviews requested in the registration process. This revision was one of the outcomes of the CMP6 decision (UNFCCC, 2010j) and it was verified that the revised procedure has resulted in a shortened registration time. However, the processes and procedures require further streamlining in order to reduce the time taken for the issuance process, where much room for improvement still remains.

Chapter 2.2 (Guidelines for registration and CER issuance process), which also addresses the theme of efficiency, analyses specifically the guidelines related to CER issuance. It was observed that there are many cases where changes are required from the originally registered PDDs at the time of request for CER issuance. Considering the transaction costs involved, exemptions or simplified rules should be developed for small-scale projects within certain limits. Therefore, setting thresholds based on project size and extent of changes from PDDs, in which procedures for notification can be omitted or simplified, was suggested. Clarification of current rules by adopting a guideline might improve efficiency.

In order to address CDM reform in terms of regional distribution, Chapter 2.3 (New approach for demonstrating additionality) assesses the impact of a new approach for demonstrating additionality. Based on an extensive review of all the projects which used the guideline, it was observed that the new guideline contributed to the enhancement of micro-scale project development, especially in LDCs. However, it concludes that the guideline should not contain any ambiguity so that project proponents can take full advantage of its application.

For the last theme of CDM reform, that of standardization, Chapter 3.1 (Standardization of grid emission factor for electricity access) raises the fact that a large share of renewable energy – a typical situation in LDCs – made the average GEF quite low. Due to this situation renewable energy projects cannot be promoted because of their low profitability as CDM projects. Therefore, it argues that a default value of the GEF for renewable energy projects for both LDCs and countries with low electrification rates should be introduced.

Chapter 3.2 (Development of standardized baseline: learning from a biogas project case study in the Philippines) reports on the experience of learning from the development standardization for a biogas project in the Philippines. It proposes that the approach for a standardized baseline should include specific procedures to identify baseline/project scenarios and conditions to meet the additionality criteria, which reflect country-specific circumstances (Standardization of process). It also argues that emission reduction calculations should be accompanied with an automatic calculation spreadsheet, while introducing default and/or country-specific values (Standardization of calculation). An empirical approach to utilise the approved methodology combined with information from registered CDM projects will facilitate the process for the development of a standardized baseline.

2. CDM reform beyond 2011

Based on the analysis and assessment in this report, the report concludes with the following future challenges for CDM reform:

- From "registration" to "issuance of CERs" process: There appears to be much room for improvement in the verification and request for issuance processes.
- From "universal standardization" to "country-level standardization" : The CDM has been developed based on the standardization of the process and rules (methodologies, tools, manuals, etc.); however, such standardization cannot be universally applied, especially for baseline and additionality. The CDM can be customised for particular countries based on the "learning-by-doing" approach.
- From "bottom-up" to "top-down" additionality demonstration: The new approach for the demonstration of additionality has proved to be effective and facilitative for the development of CDM projects. Based on the experiences gleaned in the operation of the CDM, further improvements in objectivity and transparency should be aimed for.

(Kazuhisa KOAKUTSU)

References

Danish Ministry of Foreign Affairs (2009). Study on the potential use of micro financing in support of CDM projects in LDC countries. Final Report.

DENR(1999) The Philippines' Initial National Communication on Climate Change, December, 1999.

DNV (2005). Request for guidance: Application of AM0005 and AMS-I.D in China.

Econ Pöyry (2009). Capacity Building for Tanzania, Uganda and Angola – Synthesis Report.

EIA (2011). International Energy Statistics.

Gillenwater and Seres (2011). The Clean Development Mechanism: the Review of the First International Offset Program. Pew Center on the Global Climate Change. March 2011.

IEA (2010a). CO2 emissions from fuel combustion highlights, 2010 Edition.

IEA (2010b). Energy poverty, How to make modern energy access universal?

IEA (2010c). The Electricity Access Database.

IEA (2009). The World Energy Outlook 2009.

IGES (2011a). IGES CDM Project Database (as of 30 April 2011).

IGES (2011b). IGES CDM Project Data Analysis & Forecasting CER Supply (as of 30 May 2011).

IGES (2011c). IGES CDM Monitoring and Issuance Database (as of 31 May 2011).

IGES (2011d). IGES CDM Review and Rejected Project Data Analysis (as of 31 March 2011).

IGES (2011e). IGES CDM Review and Reject project database (as of 30 April 2011).

IGES (2011f). IGES CDM Monitoring and Issuance database (as of 30 April 2011).

IGES (2011g). IGES CDM Project Database (as of 31 May 2011).

IGES (2011h). IGES CDM Review and Rejected Project Database (as of 31 May 2011).

IGES (2011i). IGES CDM Grid Emission Factor Calculation Sheet (Simple /Average OM, Option A, grid power plants version).

IGES (2011j). List of Grid Emission Factors (as of 31 May 2011).

IGES (2011k). CDM Project Database (as of 1st July 2011).

IGES (2010). "Towards CDM Reform: Report of the IGES Capacity Building Kyoto General Meeting" Hayama, Japan.

Michaelowa, A. (2011). Rule consistency of grid emission factors published by CDM host country authorities. Perspectives GmbH.

NDRC (2010). 2010 Baseline Emission Factors for Regional Power Grids in China.

Schneider, M, Schmidt, T and Hoffmann, V. (2010). Performance of renewable energy technologies under the CDM. Climate Policy. Vol.10, number 1 : 17-37.

UNFCCC (2011a). Procedure fore request for registration of proposed CDM project activities. Version 2. EB59 report. Annex 12.

UNFCCC (2011b). Guidelines for demonstrating additionality of microscale project activities. Version 02. EB60 Report. Annex 25.

UNFCCC (2011c). Executive board of the clean development mechanism, the 60th meeting Report.

UNFCCC (2011d). Small Scale CDM Working Group the 30th meeting external report.

UNFCCC (2011e). CDM Project Cycle Search.

UNFCCC (2011f). Executive board of the clean development mechanism, the 61st meeting report.

UNFCCC (2011g). Renewable electricity generation for captive use and mini-grid. AMS-I.F. Version 2.

UNFCCC (2011h). Methodological Tool. Tool to calculate the emission factor for an electricity system. Version 02.1.0. EB60 Report. Annex 8.

UNFCCC (2011i). Methodological Tool. Tool to calculate the emission factor for an electricity system. Version 02.2.0. EB61Report. Annex 12.

UNFCCC (2011j). UNFCCC CDM Website, accessed on 18 August 2011.

UNFCCC (2010a). Procedures for review of requests for registration. EB55 Report. Annex 40.

UNFCCC (2010b). Procedures for review of requests for issuance. EB55 Report, Annex 41.

UNFCCC (2010c). Draft revision to the Guidelines on the Assessment of Investment Analysis.

UNFCCC (2010d). Guidelines for assessing compliance with the calibration frequency requirements. EB52 report. Annex60.

UNFCCC (2010e). Guidelines for demonstrating additionality of renewable energy projects =<5 MW and energy efficiency projects with energy savings <=20 GWH per year. Version 01. EB54 Report. Annex15.

UNFCCC (2010f). Consolidated baseline methodology for grid-connected electricity generation from renewable sources. AMS-III.D. Version 12.1.0.

UNFCCC (2010g). Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories. AMS-I.D. Version 16.

UNFCCC (2010h). Treatment of increase in future anthropogenic emissions of host country. The 27th Small Scale Working Group meeting report. Annex 7.

UNFCCC (2010i). Report of the CMP.5, Part Two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its fifth session. FCCC/KP/CMP/2009/21/Add.1.

UNFCCC (2010j). Further guidance relating to the clean development mechanism. Decision 3/CMP.6. FCCC/KP/CMP/2010/12/Add.2, p2-21.

UNFCCC (2010k). Methane recovery in animal manure management systems.AMS-III.D. Version 17.0.

UNFCCC (2010l). Renewable electricity generation for captive use and mini-grid.AMS-I.F. Version 01.

UNFCCC (2010m). Annual Report of the EB to the CMP. FCCC/KP/CMP/2010/10.

UNFCCC (2009a). Further guidance relating to the clean development mechanism. Decision 2/CMP.5. FCCC/KP/CMP/2009/12/Add.1.

UNFCCC (2009b). Guidelines on the Assessment of Investment Analysis. EB51 report. Annex 58.

UNFCCC (2009c). Guidelines on assessment of different types of changes from the project activity as described in the registered PDD. EB48 report. Annex 67.

UNFCCC (2009d). Procedures for notifying and requesting approval of changes from the project activity as described in the registered PDD. EB48 report. Annex 66.

UNFCCC (2008a). Clarifications to facilitate the implementation of the procedures for review as referred to in paragraph 41 of the CDM modalities and procedures. EB38 report. Annex 20.

UNFCCC (2008b). Clarifications to facilitate the implementation of the procedures for review as referred to in paragraph 65 of the CDM modalities and procedures. EB38 report. Annex 22.

UNFCCC (2008c). Methodological tool. Tool for the demonstration and assessment of additionality. version 05.2. EB39 Report. Annex 10.

UNFCCC (2008d). Methodological tool. Combined tool to identify the baseline scenario and demonstrate additionality. Version 0.2.2. EB28 Report. Annex 14.

UNFCCC (2007a). Non-binding best practice examples to demonstrate additionality for SSC project activities. EB35 Report. Annex 34.

UNFCCC (2007b). Investment and financial flows to address climate change. UNFCCC. ISBN 92-9219-042-3.

UNFCCC (2005a). Simplified modalities and procedures for small-scale clean development mechanism project activities. Decision 4/CMP.1. Annex II. FCCC/KP/CMP/2005/8/Add.1.

UNFCCC (2005b). Executive board of the clean development mechanism, the 21st meeting report.

UNFCCC (2005c). Request for clarification on use of approved methodology AM0005 for several projects in China. Reference number M-DEV0004.

US-EPA (2009). Resource Assessment for Livestock and Agro-Industrial Wastes – Philippines.

World Bank (2009). 10 Years of Experience in Carbon Finance: Insights from working with the Kyoto mechanisms, Washington D.C.

Abbreviations

ACM	approved consolidated methodology
AM	approved methodology
AMS	approved methodologies for small-scales
BAS	Bureau of Agricultural Statistics
BM	build margin
CDM	clean development mechanism
CER	certified emission reduction
CM	combined margin
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
DENR	Department of Environment and Natural Resources
DNA	designated national authority
DNV	Det Norske Veritas
DOE	designated operational entity
EB	CDM executive board
EIA	Energy Information Administration, U.S.
GEF	grid emission factor
GHG	greenhouse gas
HFC	Hydro fluoro carbon
IEA	International Energy Agency
IGES	Institute for Global Environmental Strategies
IPCC	Intergovernmental Panel on Climate Change
IRR	internal rate of return
LDC	least developed country
MDG	millennium development goal
N2O	nitrous oxide
NDRC	National Development and Reform Commission
ODA	Official Development Assistance
OM	operating margin
O&M	operation and maintenance
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDA	Philippine Department of Agriculture
PDD	project design document
PoA	programme of activities
PP	project participant
SF6	sulfur hexafluoride
SID	small island countries
SME	small or medium enterprise
SSC	small scale CDM
UNFCCC	United Nations Framework Convention on Climate Change
US-EPA	United States Environmental Protection Agency

IGES Market Mechanism Group Publications

All the publications are downloadable from http://www.iges.or.jp/en/cdm/report.html

New Market Mechanisms

- Possible Elements of Market-based Mechanisms

Kyoto Protocol Related Information

- CDM in CHARTS
- GHG Emissions Data
- Registry Database
- Options on the Future Market Mechanisms under the International Negotiation

CDM Reform Reports & Papers

- Towards CDM Reform
- IGES-TERI CDM Reform Paper Series (Power and Cement)

CDM Country Fact Sheet

- Cambodia, China, India, Indonesia, Lao PDR, Mongolia, the Philippines, and Thailand

CDM/JI Project Database (Updated every month)

- CDM Project Database
- CDM Project Data Analysis and Forecasting CER Supply
- CDM Monitoring and Issuance Database
- CDM Review and Rejected Project Database
- CDM Review and Rejected Project Data Analysis
- CDM Investment Analysis Database
- CDM Programme of Activities (PoA) Database
- JI Project Database

Grid Emission Factors Data / Emission Reduction Calculation Sheet Series

- List of Grid Emission Factors
- CDM Grid Emission Factor Calculation Sheet
- Emission Reductions Calculation Sheet (ACM0010, ACM0012, ACM0014, AMS-III.H, AMS-III.D)

Ministry of the Environment

IGES Institute for Global Environmental Strategies

This copy is made as part of New Market Mechanism capacity building programme funded by the Ministry of the Environment, Japan, and published by the Institute for Global Environmental Strategies (IGES).