Note on tools and guidance on energy efficiency methodologies

The Board, at its fortieth meeting, requested the secretariat to prepare a proposal to develop tools and guidance on methodological issues pertaining to energy efficiency (EE) to facilitate project development in the area in consultation with Meth Panel.

The proposals below are based on recommendations of two scoping papers prepared by experienced energy efficiency and CDM methodology experts commissioned by the secretariat.

A report prepared by a monitoring & verification (M&V) expert discusses the current international practices for measuring and documenting energy savings and the resultant avoided emissions with particular reference to lessons learned from long lived end-use energy efficiency efforts. It also discusses the opportunities and options to translate the rules of these efforts to suit the requirements of the CDM.

A second report prepared by a CDM methodology expert analyses the features of various demand-side energy efficiency methodologies, approved as well as rejected, including related Meth Panel's recommendations. It identifies the key challenges associated with energy efficiency methodologies and discusses potential options to address these. It also lists potential measures, taking into account the recommendations of the M&V expert, that the Board may undertake to facilitate rapid progress in making available an array of approved EE methodologies .

The secretariat, based on the key recommendations in the above scoping papers and its understanding of the discussions by the Board on the EE issues, has shortlised the following actionable items for the consideration of the Board:

(1) Focus on areas[1] such as demand-side EE methodology development in selected sectors/ technology areas, rather than focusing on many technologies/ sectors at a time. Due to the nature of majority of the demand-side energy efficiency projects, i.e. numerous identical small actions in distributed locations, it is expected that project proponents will more frequently use small-scale methodologies, and therefore it may be prudent to focus more attention on further development of small-scale methodologies in EE for distributed demand-side measures. The Small-scale working group has recently engaged in work in this area and recommended methodologies for approval, including a simplified methodology for efficient lighting technologies.

(2) Most of the approved EE methodologies require direct measurement of energy consumption or related parameters. However, in some situations it may not be feasible to implement such a monitoring approach to continuously measure the energy consumption of all equipment included in the project, for example for a project activity replacing existing lamps with more efficient lamps in a defined geographical area. An approach based on measurement of a representative sample of equipment is a practical option to establish the emission levels in the baseline and project scenarios. Therefore, further guidance on appropriate methods for sampling and conducting surveys, for project activities involving numerous small emission reduction actions in a defined geographic area, may be necessary to build on the guidance in existing methodologies taking into account costs of measurement and reporting as compared to the level of error in the reported results.

[1] (E.g. single dimension retrofit rather than multiple retrofits, as when multiple retrofits are applied to the same class of equipment, like CFLs, the interactions are complex and energy savings are more difficult to quantify).

(3) Further guidance on the following key methodological issues is required:

- Signal-to-noise-ratio (energy savings clearly attributable to the project activity as opposed to exogenous factors (such as climatic conditions) and other factors (such as changes in output mix, service levels, or system characteristics), influencing the savings);
- Consideration of lifetime of equipment;
- Rebound effect due to reduced operational cost caused by energy efficiency projects.

Recent developments in energy efficiency methodologies

Over the course of this year since the Board's request to facilitate EE project activities, the Meth panel and SSC WG have recommended a few methodologies for energy efficiency project activities. The Meth panel has also proposed expanded applicability of existing EE methodologies as listed below.

List of EE methodologies recommended for approval by the Meth Panel subsequent to the finalisation of the scope for expert analysis:

(1) AM0059: Reduction in GHGs emission from primary aluminum smelters (Demand side).

(2) AM0060: Power saving through replacement by energy efficient chillers (Demand side).

(3) AM0066: GHG emission reductions through waste heat utilisation for pre-heating of raw materials in sponge iron manufacturing process (Demand side).

(4) AM0067: Methodology for installation of energy efficient transformers in a power distribution grid (Demand side).

(5) AM0068: Methodology for improved energy efficiency by modifying ferroalloy production facility (Demand side).

(6) Recommended a new methodology "Manufacturing of energy efficient domestic refrigerators" based on the case NM0235 for the consideration of EB 41.

The Meth Panel has also worked in the following areas to encourage energy efficiency project activities:

(1) Expanded the applicability of ACM0012 for energy efficiency project activities, which result into waste energy recovery (e.g. waste pressure recovery of high pressure steam, or any other fluid). Also, the applicability of ACM0012 is extended to cover the cases of waste energy recovery, where the baseline mechanical energy drives (e.g. steam turbines) are replaced by waste energy driven electrical or mechanical drives.

(2) The tool on baseline load-efficiency function is under preparation to facilitate project activities, which use existing EE methodologies requiring determination of efficiency of baseline equipment at the prevailing load of project equipment.

List of EE methodologies recently recommended by SSCWG

(1) II.G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass.

(2) II.H. Energy efficiency measures through centralization of utility provisions of an industrial facility.

(3) II.I. Efficient utilization of waste energy in industrial facilities.

(4) Recommended methodology "II.J. Demand-side activities for efficient lighting technologies" for consideration of EB 41.

Guidance and tools planned for energy efficiency methodologies

(1) **Best-practices guidance on sampling and surveys for energy efficiency project activities:** This guidance will facilitate the development of methodologies for mass-scale implementation of energy efficient technologies. The guidance will cover for example.

- Surveys for baseline determination;
- Surveys to determine equipment failures or determination of continued operation of project equipment during crediting period;
- Surveys to map the progress in manufacturing technologies of energy efficiency appliances to account for autonomous energy efficiency improvement (AEEI);
- Surveys to account for factors such as free-riders, leakages, spillovers etc.;
- Regular monitoring surveys of sample groups in the crediting period.

(2) **Tool on Baseline Load-Efficiency Function:** This tool helps in estimating the efficiency of baseline equipment pertaining to the load at which project equipment operates. The tool is already under consideration of the Meth Panel.

(3) **Tool on Energy Benchmarking:** In many industrial and technological sectors, it is difficult to establish a fixed baseline as the technology keeps on progressing, requiring shifting of baseline to adjust the energy saving resulting from a CDM project activity. This tool can be created based on the approach proposed in NM0235 to determine the energy consumption benchmark of available technologies in the market.

(4) **The guidance on determination of equipment lifetime:** This guidance will build on the guidance already available in the text of methodologies The guidance provides the procedure for estimation of lifetime of baseline equipment to ensure the conservative length of the crediting period.

Other possible guidance for the future consideration of the Board

Apart from the guidance and tools listed above further work is needed to assess the following issues and, if needed, provide guidance or tools:

(1) The existing approaches used for estimation of transmission and distribution losses can be standardised to form guidance and can be consistently used in the relevant methodologies.

(2) Further analysis on methodological issues of signal-to-noise ratio and the impact of rebound effect in context of EE methodologies. The analysis will also focus on whether such guidance be provided in the context of specific methodologies or as a generic stand-alone guidance for energy efficiency methodology.

(3) Analysis of modelling approaches to calculate the energy efficiency and their implications on the principle of CDM "real and measurable" reductions.

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