CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG42-A01

Draft Small-scale Methodology

AMS-I.B: Mechanical energy for the user with or without electrical energy

Version 11.0

Sectoral scope(s): 01

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. At its seventy-fourth meeting, while discussing the draft “Procedure: development, revision clarification and update of standardized baselines”, the Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) requested the small-scale working group (SSC WG) to initiate the revision of small-scale methodology “AMS-I.B: Mechanical energy for the user with or without electrical energy", in order to include the section on project emissions and relevant monitoring parameters.

2. The SSC WG at its 41st meeting prepared a draft revised methodology and in accordance with paragraph 80 of the procedure “Development, revision and clarification of baseline and monitoring methodologies and methodological tools” (EB 70, annex 36), a call for public inputs on the draft revision of the methodology was launched. No inputs were received.

3. The SSC WG at its 42st meeting agreed to recommend the draft methodology for the Board’s approval.

2. Purpose

4. The purpose of the proposed revised methodology is to include the section on project emissions and relevant monitoring parameters. In addition, the revision improves consistency with other Type I SSC methodologies on baseline and monitoring requirements, uses a revised template including a document information box and thus enhances readability, transparency and consistency.

5. The revision also ensures the proposed revision covers the full range of methodological approaches and applicability conditions covered by the current version of the methodology.

3. Key issues and proposed solutions

6. The section on project emissions and relevant monitoring parameters is required so that it is possible to use this methodology in conjunction with proposed standardized baseline “PSB0004: Standardized baseline of energy use in rice mill sector of Cambodia”.

7. In parallel the SSC WG will continue the top-down work to address suppressed demand issues.

4. Impacts

8. The SSC WG considers that these changes are basically editorial in nature.

5. Proposed work and timelines

9. The draft revision of the methodology is recommended by the SSC WG to be considered by the Board at its seventy-sixth meeting.

6. Recommendations to the Board

7. The SSC WG recommends that the Board adopt this draft revised methodology, to be made effective at the time of the Board's approval.

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1. Introduction

1. The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical project(s)	Introduction of installation of renewable energy technologies such as hydropower, wind power and other technologies that provide mechanical energy that otherwise would have been supplied with fossil-fuel-based energy. Mechanical energy is used on-site by individual household(s) or user(s). Typical applications are wind-powered pumps, water mills and wind mills. The project may also produce electricity in addition to mechanical energy. While the pre-project can use any fossil fuel, the baseline scenario is assumed to be the use of diesel fuel consumed in an engine generator
Type of GHG emissions mitigation action	Renewable efficiency: Displacement of more GHG intensive fossil-fuel-based generation of mechanical power

2. Scope, applicability, and entry into force

2.1. Scope

2. This category comprises renewable energy generation units that supply individual households or users or groups of households or users with mechanical energy who otherwise would have been supplied with fossil fuel based energy. These units include technologies such as hydropower, wind power, renewable-biomass[1] based energy generation and other technologies that provide mechanical energy (with or without electrical energy), all of which is used on-site by the individual household(s) or user(s), such as wind-powered pumps, solar water pumps, water mills, agro processing mills and wind mills.

2.2. Applicability

3. The methodology is applicable under the following conditions:

(a) Replacement or retrofitting of existing facilities are eligible, only if the existing equipment used to generate the mechanical energy is a fossil fuel generator(s) or pump(s) without renewable component or co-firing of renewable biomass;

(b) Greenfield facilities and project activities involving capacity additions are eligible, only if the baseline scenario identified according to the related and relevant requirements in the “General guidelines for SSC CDM methodologies” is to generate the mechanical energy with a fossil fuel generator or pump without renewable component or co-firing of renewable biomass;

(c) Where generation capacity is specified, it shall be less than 15 MW. If the generation capacity is not specified, the estimated diesel-based electricity

[1] Refer to EB 23, annex 18 or the definition of renewable biomass.

generating capacity that would be required to provide the same service or mechanical energy shall be less than 15 MW. In the case of irrigation where diesel-fuelled pumps are used directly, the cumulative rating of diesel-fuelled pumps shall not exceed 15 MW. The size of a diesel-based generator or a diesel pump that would be required shall be justified;

(d) For irrigation applications involving replacement of the pump in addition to renewable energy use, the operating characteristics (head v/s discharge and efficiency) of the new pump should be similar to or better than the system being replaced or would have been replaced. In irrigation applications where the water distribution system is replaced or modified, the new system should have distribution efficiency similar to or better than the replaced system;

(e) If the project equipment includes renewable units and diesel fired units (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable units. For co-fired systems,[2] the total installed mechanical energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 15 MW;

(f) In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units;

(g) In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.

2.3. Entry into force

4. The date of entry into force is the date of the publication of the EB 76 meeting report on 8 November 2013.

3. Normative references

5. Project participants shall apply the “General guidelines for SSC CDM methodologies, information on additionality (attachment A to appendix B) and general guidance on leakage in biomass project activities (attachment C to appendix B) provided at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> mutatis mutandis.

6. This methodology refers to the latest version of the following methodological tools and guidelines[3] mutatis mutandis:

(a) “AMS-I.A: Electricity generation by the user”;

(b) “AMS-I.D: Grid connected renewable electricity generation”;

[2] A co-fired system uses both fossil and renewable fuels. For example, both biomass residues and fossil fuels are simultaneously combusted in a single agro-processing unit, or fossil fuel may be used during a period of time when the biomass is not available and due justifications are provided.

[3] Please refer to: <https://cdm.unfccc.int/Reference/index.html>.

(c) "AMS-I.F: Renewable electricity generation for captive use and mini-grid";

(d) "AM0042: Grid-connected electricity generation using biomass from newly developed dedicated plantations";

(e) "Tool to calculate baseline, project and/or leakage emissions from electricity consumption";

(f) "General guidelines for SSC CDM methodologies".

4. Definitions

7. The definitions contained in the Glossary of CDM terms shall apply.

5. Baseline methodology

5.1. Project boundary

8. The physical, geographical site of the renewable energy technology and the equipment that uses the mechanical energy produced delineates the project boundary.

5.2. Baseline emissions

9. The baseline emissions (*BEy*) are calculated as follows:

(a) For the fossil fuel consumption to produce mechanical power in the baseline scenario using either of the two approaches below:

(i) The power requirements times hours of operation per year times the emission factor for diesel generator systems, determined according to procedures specified in "AMS-I.A: Electricity generation by the user";

(ii) The fossil fuel consumption per hour, conservatively converted to diesel fuel hourly consumption rate, times hours of operation per year times the default value for the emission coefficient for diesel fuel (3.2 kg CO_2 per kg of diesel fuel);

(b) For the fossil fuel consumption to produce electricity in the baseline scenario, if the application involves generation of electricity in addition to mechanical energy, using either of the two approaches below:

(i) Where electricity production is on an off-grid/stand-alone mode or an isolated[4] mini-grid, the baseline emissions for the electricity use will be determined according to procedures specified in AMS-I.A or "AMS-I.F: Renewable electricity generation for captive use and mini-grid";

(ii) Where electricity production is on a grid connected mode, the baseline emissions for the electricity use will be determined according to procedures specified in "AMS-I.D: Grid connected renewable electricity generation".

[4] Not connected to the regional or national grids and not exporting and/or importing power from the national/regional grids.

5.3. Project activity emissions

10. Project emissions consist of:

    (a) CO_2 emissions from consumption of diesel;

    (b) CO_2 emissions from consumption of electricity not generated from the project activity (if applicable).

$$PE_y = FC_{diesel,y} \times 0.8439 \times 0.0032 + PE_{El,y} \quad \text{Equation (1)}$$

Where:

PE_y	=	Project emissions in year *y* (t CO_2)
$FC_{diesel,y}$	=	Quantity of diesel consumption in year *y* (l)
0.8439	=	Default value for diesel density[5] (kg/l)
0.0032	=	Default value for the CO_2 emission factor of diesel (t CO_2/kg diesel)
$PE_{El,y}$	=	Project emissions due to electricity consumption in rice mills in year *y* (t CO_2). This parameter shall be calculated as per the latest version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"

5.4. Leakage

11. If the energy generating equipment is transferred from another activity, leakage is to be considered.

12. General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues.

13. Capacity addition with renewable energy units other than solar, wind, wave and tidal plants: for project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, where the existing and new units share the use of common and limited renewable resources (e.g. biomass residues), the potential for the project activity to reduce the amount of renewable resource available to, and thus electricity generation by, existing units must be considered in the determination of baseline emissions, project emissions, and/or leakage, as relevant.

14. If the existing units shut down, are derated, or otherwise become limited in production, the project activity should not get credit for generating electricity from the same renewable resources that would have otherwise been used by the existing units (or their replacements).

5.5. Emission reductions

15. Emission reductions are calculated as follows:

[5] International Energy Agency and Organisation for Economic Co-operation and development. 2004. Energy statistic manual.

$$ER_y = BE_y - PE_y - LE_y$$ Equation (2)

Where:

ER_y = Emission reductions in year *y* (t CO_2)

BE_y = Baseline emissions in year *y* (t CO_2)

PE_y = Project emissions in year *y* (t CO_2)

LE_y = Leakage emissions in year *y* (t CO_2)

6. Monitoring methodology

16. Relevant parameters shall be monitored as indicated in the table below. The applicable requirements specified in the "General guidelines for SSC CDM methodologies" (e.g. calibration, sampling) are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participants.

6.1. Data and parameters monitored

Data / Parameter table 1.

Data / Parameter:	**-**
Data unit:	-
Description:	Continuous operation of the equipment/system
Source of data:	-
Measurement procedures (if any):	Recording annually the number of project systems operating (evidence of continuing operation, such as on-going rental/lease payments could be a substitute), if necessary using survey methods. Estimating the average annual hours of operation of an average system, if necessary using survey methods. Annual hours of operation can be estimated from total output (e.g. tonnes of grain dried) and output per hour if an accurate value of output per hour is available
Monitoring frequency:	Annual check of all appliances or a representative sample thereof to ensure that they are still operating or are replaced by an equivalent in service appliance
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	**-**
Data unit:	MWh
Description:	Quantity of electricity produced
Source of data:	-

Measurement procedures (if any):	Measurements are undertaken using energy meters
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	This parameter is applicable if the project generates mechanical and electrical energy

Data / Parameter table 3.

Data / Parameter:	**-**
Data unit:	Mass or volume
Description:	Net quantity of biomass consumed in year *y*
Source of data:	On-site measurements
Measurement procedures (if any):	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. The quantity of renewable biomass consumed shall be measured continuously or in batches. If more than one type of biomass fuel is consumed, each shall be monitored separately
Monitoring frequency:	Continuously and estimate using annual mass/energy balance
QA/QC procedures:	Cross-check the measurements with an annual energy balance that is based on purchased quantities (e.g. with sales receipts) and stock changes. In cases where emission reductions are calculated based on energy output, check the consistency of measurements ex post with annual data on energy generation, fossil fuels and biomass used and the efficiency of energy generation as determined ex ante
Any comment:	This parameter is applicable if renewable biomass are consumed in the project equipment

Data / Parameter table 4.

Data / Parameter:	**NCV**
Data unit:	GJ/mass or volume unit on dry-basis
Description:	Net calorific value of biomass residues
Source of data:	On-site measurements
Measurement procedures (if any):	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass
Monitoring frequency:	Determine once in the first year of the crediting period

QA/QC procedures:	Check the consistency of the measurements by comparing the measurement results with relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements
Any comment:	This parameter is applicable if biomass residues are consumed in the project equipment

Data / Parameter table 5.

Data / Parameter:	**-**
Data unit:	%
Description:	Moisture content of the biomass residues (wet basis)
Source of data:	On-site measurements
Measurement procedures (if any):	Ex ante estimates should be provided in the PDD and used during the crediting period, if the project continues to use same type of biomass during the rest of the crediting period. Alternatively, moisture content value provided by supplier of biomass should be used if it can be shown that it is reliable (e.g. the price paid for the biomass procured depends on its moisture content). In case of dry biomass, monitoring of this parameter is not necessary
Monitoring frequency:	The moisture content of biomass of homogeneous quality shall be determined ex ante. The weighted average should be calculated and used in the calculations
QA/QC procedures:	-
Any comment:	This parameter is applicable if biomass residues are consumed in the project equipment

Data / Parameter table 6.

Data / Parameter:	**$FC_{diesel,y}$**
Data unit:	Litre/yr
Description:	Quantity of diesel consumption in year *y*
Source of data:	Onsite measurements
Measurement procedures (if any):	Use volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift). Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance. In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions

Monitoring frequency:	Continuously
QA/QC procedures:	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically for the CDM project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records
Any comment:	This parameter is applicable if diesel is consumed in the project equipment

6.2. Project activity under a programme of activities

17. The following conditions apply for use of this methodology in a project activity under a programme of activities:

    (a) In the specific case of biomass project activities, the multiple types of biomass, (i.e. biomass residues and biomass from dedicated plantations) can be used for a PoA, provided all the other requirements in the methodology such as: (a) leakage emissions in case of biomass residues following the general guidance for leakage in small-scale biomass project activities (attachment C of appendix B) and (b) consistency with “AM0042: Grid-connected electricity generation using biomass from newly developed dedicated plantations” in case of dedicated plantation are satisfied.

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Document information*

Version	*Date*	*Description*
11.0	18 October 2013	SSC WG 42, Annex 1 To be considered by the Board at EB 76. The call for public input (open from 10 to 25 September 2013) did not receive any inputs. Revision to: • Include a section on project emissions and relevant monitoring parameters; • Improve consistency with other type (i) projects. Due to the overall modification of the document, no highlights of the changes are provided.
10	27 July 2007	EB 33, Annex 18 Revision provides guidance for situations where electricity is a co-product of the project activity, providing mechanical energy for the user.
9	22 June 2007	EB 32, Annex 26 To clarify monitoring of biomass in project activities that apply this methodology which is consistent with monitoring of biomass in the approved methodology AMS I.D
8	26 February 2006	EB 23, Annex 30 Amendments to include provisions for retrofit and renewable energy capacity additions as eligible activities.

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology
Keywords: Energy efficiency, renewable energy generation, simplified methodologies, type (i) projects

* This document, together with the 'General Guidance' and all other approved SSC methodologies, was part of a single document entitled: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities until version 07.

History of the document: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities

Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities contained both the General Guidance and Approved Methodologies until version 07. After version 07 the document was divided into separate documents: 'General Guidance' and separate approved small-scale methodologies (AMS).

Version	*Date*	*Description*
07	25 November 2005	EB 22, Para. 59 References to "non-renewable biomass" in Appendix B deleted.
06	20 September 2005	EB 21, Annex 22 Guidance on consideration of non-renewable biomass in Type *i* methodologies, thermal equivalence of Type II GWhe limits included.
05	25 February 2005	EB 18, Annex 6 Guidance on 'capacity addition' and 'cofiring' in Type *i* methodologies and monitoring of methane in AMS-III.D included.
04	22 October 2004	EB 16, Annex 2 AMS-II.F was adopted, leakage due to equipment transfer was included in all Type *i* and Type II methodologies.
03	30 June 2004	EB 14, Annex 2 New methodology AMS-III.E was adopted.
02	28 November 2003	EB 12, Annex 2 Definition of build margin included in AMS-I.D, minor revisions to AMS-I.A, AMS-III.D, AMS-II.E.
01	21 January 2003	EB 7, Annex 6 Initial adoption. The Board at its seventh meeting noted the adoption by the Conference of the Parties (COP), by its decision 21/CP.8, of simplified modalities and procedures for small-scale CDM project activities (SSC M&P).

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology

Keywords: Energy efficiency, renewable energy generation, simplified methodologies, type (i) projects