CLEAN DEVELOPMENT MECHANISM

CDM-MP88-A12

Draft Small-scale Methodology

AMS-III.BB.: Electrification of communities through grid extension or construction of new mini-grids

Version 03.0

Sectoral scope(s): 02

DRAFT

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at its 111th meeting (EB 111), considered the concept note "Improving clarity and consistency of methodological products" and requested the secretariat and the Methodologies Panel (MP) to:

   (a) Recommend a new methodological tool containing a repository of data/parameters that are common among different methodologies; and

   (b) Update the default values in methodologies that are found to be not conservative in accordance with the latest science.

2. The Board at its 113th meeting (EB113) approved the "TOOL33: Default values for common parameters" (hereinafter referred as TOOL33). TOOL33 contains default values for of (a) carbon dioxide (CO_2) emission factors for diesel generator systems used for off-grid power generation purposes and (b) CO_2 emission factor for kerosene usage by households and communities for lighting purposes.

3. Previously, values for above-mentioned parameters were included in a specific methodology for example, values for CO_2 emission factors for diesel generator system were contained in "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" (hereinafter referred as AMS-I.F.) and values for CO_2 emission factor for kerosene usage was included in "AMS-I.L.: Electrification of rural communities using renewable energy".

2. Purpose

4. The proposed revision introduces reference to TOOL33 for using a default value of CO_2 emission factor for diesel generator systems used for off-grid power generation purposes and minor editorial improvements and removes reference to AMS-I.F.

3. Key issues and proposed solutions

5. The proposed revision refers to TOOL33 that contains recently updated default values for CO_2 emission factors for diesel generator systems used for off-grid power generation purposes.

4. Impacts

6. The proposed default values as contained in TOOL33 will enhance the reliability of emission reductions estimates as they are based on recent studies and literature and are conservative when compared to the current values.

5. Subsequent work and timelines

7. The MP, at its 88th meeting, agreed to seek public inputs on the draft revised methodology, and any input will be discussed with the MP and forwarded to the Board for its consideration.

6. Recommendations to the Board

8. The MP recommends that the Board adopt this draft 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)	The project activity supplies electricity to consumers who prior to project implementation were not connected to a national/regional grid and were supplied by a high-carbon-intensive mini-grid or stand-alone power generators. Also, fuel-based lighting systems used before the project implementation is displaced by the project activity
Type of GHG emissions mitigation action	Displacement of more-GHG-intensive output: Low-carbon-intensive grid/mini-grid electricity displaces high-carbon-intensive electricity or lighting services

2. Scope, applicability, and entry into force

2.1. Scope and applicability

2. This methodology is applicable to project activities involving electrification of a community of consumers[1] through either:

(a) Extension of a grid (national, regional or mini-grid);~~[2]~~ or

(b) Construction of new mini-grid.

3. ~~Such~~ The project activities will displace fossil fuel use, such as in fuel-based lighting systems and stand-alone power generators.

4. Electricity consumers may include households, commercial facilities such as shops, public services/buildings and small, medium and micro enterprises (SMMEs). Applications may include lighting (interior, public street lighting), electrical appliances such as refrigerators, agricultural water pumps.

5. At least 75 per cent (by number) of the project consumers shall be households.

6. This methodology is applicable in situations where consumers that were not connected to a national/regional grid prior to project implementation are supplied with electricity from the project activity. It is also applicable to situations where a fraction of consumers that are supplied with electricity from a mini-grid prior to the implementation of the project are now supplied with electricity from the project activity (i.e. moving from carbon intensive mini-grid to less carbon intensive regional/national or mini grid).

[1] Consumers have a single electrical connection to a grid.

~~[2] For the purpose of this methodology, a mini-grid is defined as a small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.~~

7. This methodology is applicable for project activities associated with national grids, regional grids or mini-grids that utilize either fossil fuels or fossil fuels and renewable energy in the electricity generation system.

8. Project activities for electrification of a community through the installation of stand-alone renewable electricity generation systems or through the extension/construction of renewable based mini-grid systems shall explore “AMS-I.L.: Electrification of rural communities using renewable energy”.

9. This methodology is not applicable to portable systems, such as portable electricity generating systems.

10. In this methodology new consumers are those who did not have supply of electricity prior to project implementation. Existing consumers are those who were supplied electricity from the mini-grid system prior to project implementation. The new consumers are designated as either households (Type I consumers) or non-households (Type II consumers). This methodology requires metering of electricity consumption of each Type II consumers. Each Type I consumer expected to consume more than 1000 kWh per year shall also be metered. Prepaid devices for purchase of electricity is considered equivalent to metering under this methodology. Type I consumers whose consumption is individually required to be metered are designated as Type I-M and Type I consumers whose consumption is not required to be individually metered are designated as Type I-NM.

11. This methodology is applicable where the amount of project electricity delivered to consumers can be determined (e.g. through the use of meters that continuously measure electricity delivered by the project activity to consumers or through prepaid devices that enable purchase of electricity by the user). Specifically:

    (a) A master-meter should be implemented as part of the project activity to measure the gross electricity sent out to all connected consumers (both existing and new consumers) from the main distribution system. However, when consumption of the project consumers is determined through metering or prepaid devices, summation of individual metered consumptions will provide the data for the overall consumption and no master meter is required;

    (b) Sub-master-meters should be implemented as part of the project activity to measure the gross electricity sent out to existing and/or new consumers who are not metered individually (e.g. consumers who were supplied electricity with an existing mini-grid prior to project implementation). Such sub-master-meters will measure total electricity supply to these existing and/or new consumers (e.g. metering at substation). Sub-master-meter is not required if:

        (i) The project activity includes only metered consumers (i.e. Type I-M and Type II consumers); or

        (ii) A master meter is implemented as in paragraph 11(a) above and consumption of each of the non-metered consumer (new and/or existing) is determined through a sample-based survey (e.g. stratified random sampling);

    (c) Consumption of specific consumers as identified under paragraph 14 below shall be individually metered.

12. An ex ante census of project energy consumers that will be supplied with electricity from the project will be carried out to document the physical location of each consumer and the anticipated connected load and usage hours of each consumer. Optionally the anticipated load for individual households may be established based on the type of connection or payment arrangement provided (e.g. load limited, fee for service-based connection).

13. For household consumers not metered (Type I-NM), consumption is calculated as specified below:

    (a) A master-meter is implemented as described in paragraph 11(a); and

    (b) A sub master-meter is implemented as per paragraph 11(b) and its reading is divided by the number of connected consumers; or

    (c) A sample survey (e.g. stratified random sampling) is undertaken as per paragraph 11(b) to determine the average consumption or tiers/classes of average consumptions.

14. For household consumers metered (Type I-M) and non-household consumers (Type II), consumption is measured using one of the options below:

    (a) Option 1: Measurement is undertaken with standard electricity meters at all consumer locations;

    (b) Option 2: Billing records from pre-paid connections are used to determine the electricity purchased. Specifically:

        (i) A record of the electricity purchased by each project activity consumer is maintained;

        (ii) The total electricity consumed for each consumer is the summation of the pre-paid electricity purchased during the monitoring period, excluding the last purchase during the monitoring period but including the last purchase of the previous monitoring period. The total electricity delivered is the summation of the electricity purchased by consumers under the project activity.[3]

15. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.

2.2. Entry into force

16. The date of entry into force is the date of the publication of the EB ## meeting report on ## Month 2022.

2.3. Applicability of sectoral scopes

17. For validation and verification of CDM projects and programme of activities by a designated operational entity (DOE) using this methodology, application of sectoral scope 02 is mandatory.

[3] The electricity consumption supported by the last payment in the monitoring period is rolled over to the subsequent monitoring period to ensure an accurate estimation of consumption during the period.

3. Normative references

18. Project participants shall apply the "General guidelines for SSC CDM methodologies", TOOL21: Demonstration of additionality of small-scale project activities ~~information on additionality (attachment A to appendix B) provided at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> mutatis mutandis~~.

19. This methodology also refers to the latest approved versions of the following methodologies, guidelines and tools:

(a) "AMS-I.D.: Grid connected renewable electricity generation" (hereinafter referred as AMS-I.D.);

(b) "AMS-I.L.: Electrification of rural communities using renewable energy;

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

(d) "AM0045: Grid connection of isolated electricity systems" (hereinafter referred as AM0045);

(e) "AM0104: Interconnection of electricity grids in countries with economic merit order dispatch" (hereinafter referred as AM0104);

(f) "TOOL07: Tool to calculate the emission factor for an electricity system" (hereinafter referred as TOOL07);

(g) "TOOL33: Default values for common parameters" (hereinafter referred as TOOL33);

~~(h) "General guidelines for SSC CDM methodologies";~~

(i) "Standard on sampling and surveys for CDM project activities and programmes of activities".

4. Definitions

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

21. For the purpose of this methodology, the following definitions shall apply:

(a) **Mini-grid system** - small-scale power system with a total capacity not exceeding 15 MW (i.e. the sum of installed capacities of all electricity generating units connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid;

5. Baseline methodology

5.1. Project boundary

22. For project activities involving national or regional grids, the spatial extent of the project boundary includes all power plants within the host country physically connected through

transmission and distribution lines to the national or regional grid[4] which is being extended through the project activity. For project activities involving mini-grids, the spatial extent of the project boundary includes all power plants connected through transmission and/or distribution lines to the mini-grid which is being built or extended through the project activity. The spatial extent of the project boundary also includes the physical sites of the end-use consumers served by the project activity.

5.2. Baseline emissions

23. Baseline emissions are the sum of emissions associated with new consumers and where applicable existing consumers, calculated as follows:

$$BE_y = BE_{T1NM,y} + BE_{T1M,y} + BE_{T2,y} + BE_{exist,y} \quad \text{Equation (1)}$$

Where:

BE_y	=	Baseline emissions in year *y* (t CO_2)
$BE_{T1NM,y}$	=	Baseline emissions for Type I-NM consumers in year *y* (t CO_2)
$BE_{T1M,y}$	=	Baseline emissions for Type I-M consumers in year *y* (t CO_2)
$BE_{T2,y}$	=	Baseline emissions for Type II consumers in year *y* (t CO_2)
$BE_{exist,y}$	=	Baseline emissions of existing consumers, i.e. baseline emissions from displacement of electricity from an existing mini-grid (t CO_2) $BE_{exist,y}$ = 0, if there are no existing consumers or if the existing consumers are excluded from the project boundary

24. Baseline emissions of existing consumers are calculated as:

$$BE_{exist,y} = ED_{exist,y} \times EF_{mgrid} \quad \text{Equation (2)}$$

Where:

$ED_{exist,y}$	=	Total electricity delivered to existing $N_{exist,y}$ consumers (MWh)
EF_{mgrid}	=	Baseline emissions factor for the mini-grid (t CO_2/MWh). For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, emission factor can be determined per Table 1 of TOOL33 ~~the procedure provided in AMS-I.F.~~ For all other mini-grids it shall be calculated as the weighted average emissions for the current generation mix following the procedure provided in AMS-I.D.

25. Total electricity delivered to existing consumers $ED_{exist,y}$ is determined using one of the options below:

(a) As the summation of metered consumption of individual consumers;

(b) Using sub-master meters;

[4] Refer ~~to the most recent version of the~~ TOOL07 for the definition of electricity system.

(c) Determined using sample-based surveys (e.g. stratified random sampling) when the master meter as per paragraph 11(a) is implemented.

26. Where option (a) or (c)[5] of paragraph ~~23~~25 is used:

$$ED_{exist,y} = \sum_{x=1}^{N_{exist,y}} EC_{exist,x,y} \quad \text{Equation (3)}$$

Where:

$ED_{exist,y}$	=	Total electricity delivered to $N_{exist,y}$ consumers (MWh)
$EC_{exist,x,y}$	=	Annual electricity consumption of existing consumer *x* in year *y* (MWh)
x	=	Existing consumer (*x* = 1, 2, 3, …)
$N_{exist,y}$	=	Number of existing consumers receiving electricity from the project activity in year *y*

27. Where option (b) of paragraph ~~23~~25 is used:

$$ED_{exist,y} = \left(EC_{smm\_exist,y}\right) \times \left(1 - TL_p\right) \quad \text{Equation (4)}$$

Where:

$EC_{smm\_exist,y}$	=	Sub-master meter reading of total gross electricity delivered to all existing consumers in year *y* (MWh)
TL_p	=	Transmission and distribution losses within the project area (%), with 10 per cent as a default value

28. Baseline emissions of Type II consumers, $BE_{T2,y}$ are calculated as:

$$BE_{T2,y} = \sum_{i=1}^{N_y} EC_{T2,i,y} \times EF_{CO2,T2} \quad \text{Equation (5)}$$

Where:

$BE_{T2,y}$	=	Baseline emissions for Type II consumers in year *y* (t CO_2)
$EC_{T2,i,y}$	=	Metered annual electricity consumption of Type II consumer *i* in year *y* (MWh)
$EF_{CO2,T2}$	=	~~1.0~~ A default emission factor value as specified in Table 1 of TOOL33 based on the diesel generator capacity and the load (t CO_2/MWh)
N_y	=	Number of Type II consumers in year *y*
i	=	Type II consumer (*i* = 1, 2, 3, …)

[5] Consumption of each tier/class of consumers may be separately determined suitably adapting the equation 2.

29. Baseline emissions of Type I-M consumers, $BE_{T1M,y}$ are calculated as:

$$BE_{T1M,y} = \sum_{j=1}^{M_y} EC_{T1M,j,y} \times EF_{CO2,T1M} \quad \text{Equation (6)}$$

Where:

$BE_{T1M,y}$ = Baseline emissions for Type I-M consumers in year *y* (t CO_2)

$EC_{T1M,j,y}$ = Annual electricity consumption of Type I-M consumer *j* in year *y* (MWh)

$EF_{CO2,T1M}$ =
1. If $EC_{T1M,j,y}$ is equal to or less than 0.055 MWh/y, then use a default emission factor value as provided for first 55 kWh of electricity supplied under section 5.2 of TOOL33 ~~of 6.8~~ (t CO_2/MWh);
2. If $EC_{T1M,j,y}$ is ~~less than or equal to 0.250 MWh/y but greater~~ more than 0.055 MWh/y, then:
   (a) For the portion up to and including 0.055 MWh/y, use a default emission factor value as provided for first 55 kWh of electricity supplied under section 5.2 of TOOL33 ~~of 6.8~~ (t CO_2/MWh);
   (b) For the portion greater than 0.055 MWh/y, use a default value ~~of 1.3 (t CO_2/MWh)~~ as specified in Table 1 of TOOL33 based on the diesel generator capacity and the load;

~~3. If $EC_{T1M,j,y}$ is greater than 0.250 MWh/y but less than or equal to 0.500 MWh/y, then:~~
~~(a) For the portion up to and including 0.055 MWh/y use a default value of 6.8 (t CO_2/MWh);~~
~~(b) For the portion greater than 0.055 MWh/y and less than 0.25 MWh/y use a default value of 1.3 (t CO_2/MWh); and~~
~~(c) For the portion greater than 0.25 MWh/y use a default value of 1.0 (t CO_2/MWh);~~

~~4. If $EC_{T1M,j,y}$ is greater than 0.500 MWh/y then use a default value of 1.0 (t CO_2/MWh) for the entire portion (i.e. default values of 1.3 (t CO_2/MWh) or 6.8 (t CO_2/MWh) are not eligible for any of the portions)~~

M_y = Number of Type I-M consumers in year *y*

j = Type I-M consumer (j = 1, 2, 3, …)

30. For Type I-NM consumers, baseline emissions ($BE_{T1NM,y}$) are calculated as a function of electricity consumed by the Type I-NM consumers and a baseline emission factor chosen based on the annual electricity consumption of Type I-NM consumers:

$$BE_{T1NM,y} = \left(EC_{tot\_T1NM,y}\right) \times EF_{CO2,T1NM} \quad \text{Equation (7)}$$

Where:

$EC_{tot\_T1NM,y}$ = Total electricity delivered to all Type I-NM consumers, net of transmission and distribution losses (MWh)

$BE_{T1NM,y}$ = Baseline emissions for Type I-NM consumers in year *y* (t CO_2)

(a) When a sample survey is undertaken as per paragraph 13(c) to determine the consumption:

$$EC_{tot\_T1NM,y} = \sum_{k=1}^{NM_y} EC_{T1NM,k,y}$$ Equation (8)

Where:

$EC_{T1NM,k,y}$ = Annual electricity consumption of Type I-NM consumer *k* in year *y* (MWh)

NM_y = Number of Type I-NM consumers in year *y*

k = Type I-NM consumer (k = 1, 2, 3, …)

(b) When sub-master meter is used as per paragraph 13(b) to determine the consumption:

$$EC_{tot\_T1NM,y} = \left(EC_{smm\_T1NM,y}\right) \times \left(1 - TL_p\right)$$ Equation (9)

Where:

$EC_{smm\_T1NM,y}$ = Sub-master meter reading of total gross electricity delivered to all Type I-NM consumers in year *y* (MWh)

(c) When consumption (i.e. total electricity delivered to all Type I-NM consumers $EC_{tot\_T1NM,y}$) is calculated as the difference between master meter reading and sum of all other meter readings:

$$EC_{tot\_T1NM,y} = \left[\left(ED_{tot,y} - ED_{exist,y}\right) \times \left(1 - TL_p\right)\right] - \sum_{i}^{N_y} EC_{T2,i,y} - \sum_{j}^{M_y} EC_{T1M,j,y}$$ Equation (10)

31. When option ~~28~~ 30(b) and ~~28~~ 30 (c) are used:

$$EC_{T1NM,y} = \frac{\left(EC_{tot\_T1NM,y}\right)}{NM_y}$$ Equation (11)

Where:

$EC_{T1NM,y}$ = Average annual electricity consumption of all Type I-NM consumers in year *y* (MWh)

NM_y = Number of Type I-NM consumers in year *y*

$EF_{CO2,T1NM}$ = (a) If $EC_{T1NM,y}$ is equal to or less than 0.055 MWh/y, then use a default emission factor value as provided for first 55 kWh of

electricity supplied under section 5.2 of TOOL33 ~~of 6.8~~ (t CO_2/MWh);

(b) If $EC_{T1NM,y}$ ~~less than or equal to 0.250 MWh/y but~~ more than 0.055 MWh/y, then:

(i) For the portion up to and including 0.055 MWh/y, use a default emission factor value as provided for first 55 kWh of electricity supplied under section 5.2 of TOOL33 ~~of 6.8~~ (t CO_2/MWh);

(ii) For the portion greater than 0.055 MWh/y, use a default value ~~of 1.3 (t CO_2/MWh)~~ as specified in Table 1 of TOOL33 based on the diesel generator capacity and the load;

~~(c) If $EC_{T1NM,y}$ is greater than 0.250 MWh/y but less than or equal to 0.500 MWh/y, then:~~

~~(i) For the portion up to and including 0.055 MWh/y use a default value of 6.8 (t CO_2/MWh);~~

~~(ii) For the portion greater than 0.055 MWh/y and less than 0.25 MWh/y use a default value of 1.3 (t CO_2/MWh);~~

~~(iii) For the portion greater than 0.25 MWh/y use a default value of 1.0 (t CO_2/MWh);~~

~~(d) If $EC_{T1NM,y}$ is greater than 0.500 MWh/y, then use a default value of 1.0 (t CO_2/MWh) for the entire portion, i.e. default values of 1.3 (t CO_2/MWh) or 6.8 (t CO_2/MWh) are not eligible for any of the portions~~

$ED_{tot,y}$ = Total electricity delivered to all new and existing consumers (MWh)

32. $ED_{tot,y}$ is determined by measurement at the master meter as in equation (10) above.

33. Alternatively when $ED_{tot,y}$ is determined as the sum of metered consumption of all consumers as per paragraph 11(a) the below equation shall be used:

$$ED_{tot,y} = ED_{exist,y} + \sum_{j}^{M_y} EC_{T1M,j,y} + \left(EC_{tot\_T1NM,y}\right) + \sum_{i}^{N_y} EC_{T2,i,y} \quad \text{Equation (12)}$$

Where:

$ED_{tot,y}$ = Total electricity delivered to new and existing consumers (MWh)

$ED_{exist,y}$ = Total electricity delivered to existing consumers (MWh), if there are any existing consumers included in the project activity

$EC_{T1M,j,y}$ = Annual electricity consumption of Type I-M consumer *j* in year *y* (MWh)

M_y = Number of Type I-M consumers in year *y*

$EC_{T2,i,y}$ = Annual electricity consumption of Type II consumer *i* in year *y* (MWh)

N_y = Number of Type II consumers in year *y*

5.3. Leakage

34. Leakage on account of construction of new transmission/distribution lines (e.g. carbon stock loss due to deforestation) shall be calculated using the method indicated in baseline and monitoring methodology AM0045 or AM0104. If the estimated leakage is within 5 per cent of the estimated emission reductions of the project, then this leakage source may be neglected, otherwise the leakage shall be deducted from the emissions reductions.

35. If any energy generating equipment (e.g. for a mini-grid) is transferred from another activity, leakage is to be considered.

5.4. Project ~~activity~~ emissions

36. Project emissions are emissions associated with the generation of electricity supplied to the project activity end use facilities.

$$PE_y = \frac{\left(ED_{tot,y} \times EF_{grid,CO2,y}\right)}{\left(1 - TL_{grid}\right)}$$ Equation (13)

Where:

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

$ED_{tot,y}$ = Total electricity delivered to all new and existing consumers (MWh)

$EF_{grid,CO2,y}$ = Emissions factor for the project electricity system in year *y* (t CO_2/MWh).

If the project activity involves connection to an existing national or regional grid the emissions factor is determined by ranking all the power units in the national or regional grid in the decreasing order of GHG intensity. The emissions factor is the weighted average emissions factor of the top 10 per cent most GHG intensive plants in the grid.[6] ~~If the grid associated with the project imports electricity from other countries the emission factor shall be the higher among the following two: (i) the weighted average emissions factor of the top 10 per cent most GHG intensive plants in the grid of the host country; and (ii) the weighted average emissions factor of the top 10 per cent most GHG intensive plants in the grid of the exporting country.~~ The emissions factors of the plants shall be calculated based on default plant efficiency provided in the TOOL07.

If the project activity involves connection to an existing mini-grid or construction of new mini-grid the emissions factor is determined as either: (a) for a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel per table 1 of TOOL33 ~~the procedure for such mini-grids provided in AMS-I.F.~~; or (b) for all other mini-grids per the weighted average emissions for the current generation mix following the procedure provided in AMS-I.D.

TL_{grid} = Transmission and distribution losses in the project electricity system supplying the project activity (%), with 10 per cent as the default value

[6] ~~If the grid associated with the project imports electricity from other countries the emission factor shall be the higher among the following two: (i) the weighted average emissions factor of the top 10 per cent most GHG intensive plants in the grid of the host country; and (ii) the weighted average emissions factor of the top 10 per cent most GHG intensive plants in the grid of the exporting country.~~

5.5. Emission reduction

37. Emission reductions (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad \text{Equation (14)}$$

6. Monitoring methodology

6.1. Parameters monitored

Data / Parameter table 1.

Data / Parameter:	$ED_{tot,y}$
Data unit:	MWh
Description:	Electricity delivered to consumers from the grid/mini-grid system
Source of data:	-
Measurement procedures (if any):	Measurements are undertaken either using master meters or the summation of metered consumption of all consumers is used. If the master meter options is used, the measurement should be taken at the nearest pre-existing substation from which the electrification project is supplied
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	$EC_{T2,i,y}$
Data unit:	MWh
Description:	Electricity metered at Type II consumer *i*
Source of data:	-
Measurement procedures (if any):	Option 1: Standard electricity meters (a) Measurements are undertaken using electricity meters at each of the facilities Option 2: Pre-paid devices (a) Sum all recorded purchases during a monitoring period as indicated in paragraph 14
Monitoring frequency:	Option 1: Standard electricity meters (a) Continuous monitoring, hourly measurement and at least monthly recording. Option 2: Pre-paid devices (a) All purchases throughout the monitoring period will be recorded
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 3.

Data / Parameter:	$EC_{T1M,j,y}$
Data unit:	MWh
Description:	Electricity metered at Type I-M consumer *j*
Source of data:	-
Measurement procedures (if any):	Option 1: Standard electricity meters (a) Measurements are undertaken using electricity meters at each of the facilities. Option 2: Pre-paid devices (a) Sum all recorded purchases during a monitoring period as indicated in paragraph 14
Monitoring frequency:	Option 1: Standard electricity meters (a) Continuous monitoring, hourly measurement and at least monthly recording. Option 2: Pre-paid devices (a) All purchases throughout the monitoring period will be recorded
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 4.

Data / Parameter:	$ED_{exist,y}$
Data unit:	MWh
Description:	Total electricity delivered in year *y* to the existing consumers
Source of data:	-
Measurement procedures (if any):	If all existing consumers are metered, then individual consumptions are summed up. Otherwise, measurements are undertaken using sub-master-meters. The measurement should be taken at the nearest pre-existing substation from which the electrification project is supplied. When master meter is implemented then sample-based survey (e.g. stratified random sampling) may be undertaken
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 5.

Data / Parameter:	$EC_{exist,x,y}$
Data unit:	MWh
Description:	Annual electricity consumption of existing consumer *x*
Source of data:	

Measurement procedures (if any):	Where existing consumers are metered, refer to metering options in Data / Parameter table 2 and 3. When master meter is implemented then sample-based survey (e.g. stratified random sampling) may be undertaken
Monitoring frequency:	Where existing consumers are metered, then as per the options in Data / Parameter table 2 and 3
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 6.

Data / Parameter:	$EC_{smm\_exist,y}$
Data unit:	MWh
Description:	Sub-master meter reading of total gross electricity delivered to all existing consumers in year *y* (MWh)
Source of data:	-
Measurement procedures (if any):	As per option (b) of paragraph ~~23~~25 a sub-master meter may be used
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 7.

Data / Parameter:	$EC_{T1NM,k,y}$
Data unit:	MWh
Description:	Annual electricity consumption of Type I-NM consumer *k* in year *y* (MWh)
Source of data:	-
Measurement procedures (if any):	As per paragraph 13(c) and ~~28~~30(a), a sample-based survey (e.g. stratified random sampling) may be undertaken
Monitoring frequency:	-
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 8.

Data / Parameter:	$EC_{smm\_T1NM,y}$
Data unit:	MWh
Description:	Sub-master meter reading of total gross electricity delivered to all Type I-NM consumers in year *y*
Source of data:	-
Measurement procedures (if any):	As per paragraph 13(b) and ~~28~~ 30(b), a sub-master meter may be used

Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
QA/QC procedures:	-
Any comment:	-

Data / Parameter table 9.

Data / Parameter:	*Proportion of N_y, NM_y $N_{exist,y}$ and M_y having access to grid*
Data unit:	-
Description:	Check for continued access to electricity
Source of data:	-
Measurement procedures (if any):	Annual/biennial check that grid connections are still working, done for a statistically significant sample of consumers. Where project participant has regular billing processes, these records may be used in place of on-site checks. Use 90/10 and 95/10 precision for annual and biennial checks, respectively
Monitoring frequency:	Annual/biennial
QA/QC procedures:	-
Any comment:	-

38. The applicable requirements specified in the "General Guidelines for SSC CDM methodologies" and the "Standard on sampling and surveys for CDM project activities and PoAs" are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participant.

~~6.2. Project activity under a programme of activities~~

~~39. The methodology is applicable to a programme of activities, no additional leakage estimations are necessary other than that indicated under leakage section above.~~

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Document information

Version	*Date*	*Description*
03.0	13 July 2022	MP 88, Annex 12 To be considered by the Board at EB 115. A call for public input will be issued for this draft document. Any input will be discussed with the MP and forwarded to the Board for consideration. Revision to: • Introduce reference to "TOOL33: Default values for common parameters"; • Make minor editorial improvements; and

Version	*Date*	*Description*
		• Remove reference to "AMS-I.F.: Renewable electricity generation for captive use and mini-grid".
02.0	28 November 2014	EB 81, Annex 20 Revision to simplify the monitoring procedures for consumers under grid extensions (e.g. using prepaid electricity purchase devices) in response to the request for revision SSC_714.
01.0	11 May 2012	EB 67, Annex 17 Initial adoption.

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