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TYPE I - RENEWABLE ENERGY PROJECT

Project participants shall apply the general guidelines to 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*.

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Technology/measure

1.   This methodology is applicable to electrification of a community achieved through the installation of new, renewable electricity generation systems[1] (e.g. solar photovoltaic systems) that displace fossil fuel use, such as in fuel-based lighting systems and stand-alone power generators.

2.   The applicability of this methodology is limited to facilities and energy consumers that do not have access to any electricity distribution system/network such as a national grid, regional grid before project implementation. Such (electricity) end-use facilities may include households; public buildings; and/or small, medium and micro enterprises (SMMEs). Electricity uses may include interior lighting, street lighting, refrigeration, or agricultural water pumps. At least 75% of the end-use facilities connected to the project renewable electricity generation system(s) must be households.

3.   The applicability of this methodology is limited to end-use facilities that, if they utilize electricity for lighting in the project activity, only utilize high efficient lighting equipment such as Compact Fluorescent Lamps (CFLs), Light Emitting Diode (LED) lamps, and/or fluorescent lamps.

4.   Project equipment shall comply with applicable international standards[2] or comparable national, regional or local standards/guidelines and the Project Design Document (PDD) shall indicate the standard(s) applied.

5.   The methodology is applicable to renewable electricity generation systems intended for permanent installation and is not applicable to portable systems, such as portable electricity generating systems or LED lanterns.

6.   The aggregate installed capacity of the renewable energy generating systems shall not exceed 15 MW.

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[1]   Facilities and consumers supplied electricity through an isolated mini-grid are also included. 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.

[2]   For example IEC 62124 PV stand-alone systems, design verification or another PVGAP recommended standard to verify system design and performance of stand-alone photovoltaic systems including functionality, the battery autonomy and solar fraction.

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Boundary

7.   The spatial extent of the project boundary includes the project renewable electricity generation systems, any project distribution (grid) systems, and the physical sites of the end-use facilities served by the project activity.

Baseline emissions

8.   Two parameters are required to be known to determine the baseline:

   (a)   The amount of renewable electricity consumed by the facilities served by the project renewable electricity generation systems;

   (b)   The number of facilities (e.g. households, SMMEs, public buildings) supplied with renewable electricity by the project activity.

9.   The following are the baseline emission factors for each tranche of annual amount of renewable electricity consumed per end-use facility during the crediting period.

   (a)   For the first 55 kWh of renewable electricity consumed by each facility the baseline emission factor is 6.8 (tCO_2/MWh);

   (b)   For the facility consumption greater than 55 kWh but equal to or less than 250 kWh, the baseline emission factor is 1.3 (tCO_2/MWh) for the tranche between 55 and 250 kWh;

   (c)   For the facility consumption beyond 250 kWh, the baseline emission factor is 1.0 (tCO_2/MWh) for the tranche beyond 250 kWh.

10.   Baseline emissions for the entire project activity are then calculated as:

$$BE_y = BE_{55,y} + BE_{250,y} + BE_{250\,plus,y}$$

   (1)

Where:

BE_y Baseline emissions in year y (tCO_2)

$BE_{55,y}$ Aggregate baseline emissions for facilities that consumed equal to or less than 55 kWh of renewable electricity from project renewable electricity systems in year y (tCO_2)

$BE_{250,y}$ Aggregate baseline emissions for facilities that consumed more than 55 kWh but equal to or less than 250 kWh of renewable electricity from project renewable electricity systems in year y (tCO_2)

$BE_{250\,plus,y}$ Aggregate baseline emissions for facilities that consumed greater than 250 kWh of renewable electricity from project renewable electricity systems in year y (tCO_2)

11.   For facilities that consumed equal to or less than 55 kWh, baseline emissions are calculated as:

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$$BE_{55,y} = \sum_{x}^{N} EG_{x,y} \times EF_{CO2,55} \qquad \textbf{(2)}$$

Where:

$EG_{x,y}$ Electricity delivered by project renewable electricity generation system to facility x, where the electricity delivered to that facility is equal to or less than 55 KWh in year y (MWh)

$EF_{CO_2,55}$ 6.8 (tCO$_2$/MWh)

x Facility supplied with renewable electricity from operating project renewable electricity generation systems consuming equal to or less than 55 kWh in year y

N Number of facilities in the project activity consuming equal to or less than 55 kWh/year

12.   For facilities that consumed more than 55 kWh but equal to or less than 250 kWh, baseline emissions are calculated as:

$$BE_{250,y} = \sum_{z}^{M} \left(\left(EG_{z,y} - 0.055 \right) \times EF_{CO2,250} + C \right) \qquad \textbf{(3)}$$

Where:

$EG_{z,y}$ Electricity delivered by project renewable electricity generation system to facility z in year y, where the electricity delivered to the facility is more than 55 kWh but equal to or less than 250 kWh in year y (MWh)

$EF_{CO_2,250}$ 1.3 (tCO$_2$/MWh)

z Facility supplied with renewable electricity from operating project renewable electricity generation systems consuming more than 55 kWh but equal to or less than 250 kWh in year y

C 0.374 (tCO$_2$), a constant calculated as (0.055 MWh x 6.8 tCO$_2$/MWh)

M Number of facilities in the project activity consuming more than 55 kWh but equal to or less than 250 kWh/year

13.   For facilities that consumed more than 250 kWh baseline emissions are calculated as:

$$BE_{250plus,y} = \sum_{w}^{P} \left(\left(EG_{w,y} - 0.250 \right) \times EF_{CO2,250plus} + D \right) \qquad \textbf{(4)}$$

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Where:

$EG_{w,y}$	Electricity delivered by project renewable electricity generation system to facility w in year y such that the electricity delivered to the facility is more than 250 kWh in year y (MWh)
$EF_{CO_2,250\,plus}$	1.0 (tCO$_2$/MWh)
w	Facility supplied with renewable electricity from operating project renewable electricity generation systems consuming more than 250 kWh in year y
D	0.6275 (tCO$_2$), a constant calculated as (0.055 MWh x 6.8 tCO$_2$/MWh + 0.195 MWh x 1.3 tCO$_2$/MWh)
P	Number of facilities in the project activity consuming more than 250 kWh/year

Project emissions

14.   Project emissions are considered zero (i.e. PE_y =0) except in the cases below where method indicated in the most recent version of ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" is applied to calculate project emissions.

(a)   Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, electricity/fossil fuel consumption);

(b)   Emissions from water reservoirs of hydro power plants.

Leakage

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

Emission reductions

16.   Emission reductions on annual basis (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \tag{5}$$

Where:

ER_y	Emission reductions in year y (tCO$_2$/y)
PE_y	Project emissions in year y (tCO$_2$/y)
LE_y	Leakage emissions in year y (tCO$_2$/y)

Monitoring

17.   Net annual amount of renewable electricity supplied to a facility is monitored using one of the options below:

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Option 1: Measure the net amount of renewable electricity delivered to all the end-use facilities connected to the project renewable electricity generation systems. Such measurements shall be made continuously and recorded at least on a monthly basis.

Option 2: Calculate the net amount of renewable electricity delivered to the facilities connected to the project renewable electricity generation systems as the installed capacity of the project renewable electricity generation systems times a default annual average value for availability.[3] Assume a twelve per cent (12%) availability[4] for solar photovoltaic electricity systems. This option can only be applied if the capacity of each project renewable electricity generation system is equal to or less than 1.0 kW.

18.   When option 2 in paragraph 17 above is applied, the number of operating project renewable electricity generation systems is determined on a sample basis either annually choosing 90/10 confidence/precision or biannually choosing 95/5 confidence/precision for the sample size estimation following the requirements under "Standard on sampling and surveys for CDM project activities and PoAs". This monitored value determines N/M/P (number of facilities) in equations 2, 3 and 4. Renewable electricity generation systems can be counted as operating only if they can be shown to be able to produce electricity by means of one of the following:

   (a)   The manufacturers warranty; or

   (b)   Regular maintenance arrangement (e.g. with suppliers/distributors/implementers); or

   (c)   Showing that the systems are procured following the standards/guidelines (local/national/international) to ensure that the systems are of adequate quality and provide the required performance; or

   (d)   By direct monitoring of systems, if necessary on sample basis.

In the absence of this demonstration, the system capacity shall be de-rated following manufacturers guidelines or as per a relevant international standards/guidelines.

Project activity under a programme of activities

19.   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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[3] This assumes that all of the renewable energy that is produced will be consumed by the facility.

[4] For example a 15 Wp Solar Home System would deliver 15.77 kWh annually (0.015 x 8760 x 0.12). Availability factors for other renewable energy systems may be proposed following the procedures for request for revision of small-scale CDM methodologies.

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History of the document

Version	Date	Nature of revision
01	EB 66, Annex # 02 March 2012	To be considered at EB 66.
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