Joint Crediting Mechanism Approved Methodology MN_AM003

"Installation of Solar PV System"

A. Title of the methodology

Installation of Solar PV System, Ver. 01.0

B. Terms and definitions

Terms	Definitions
Solar photovoltaic (PV) system	An electricity generation system which converts sunlight into electricity by the use of photovoltaic (PV) modules. The system also includes ancillary equipment such as inverters required to change the electrical current from direct current (DC) to alternating current (AC).

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	Displacement of grid electricity and/or captive electricity by installation and operation of solar PV system(s).
Calculation of reference emissions	Reference emissions are calculated on the basis of the AC output of the solar PV system(s) multiplied by either; 1) the conservative emission factor of the grid, or 2) conservative emission factor of diesel power generator.
Calculation of project emissions	Project emissions are the emissions from the solar PV system(s), which are assumed to be zero.
Monitoring parameters	The quantity of the electricity generated by the project solar PV system(s).

D. Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	The project newly installs solar PV system(s).

Criterion 2	The PV modules obtained a certification of design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).
Criterion 3	The equipment used to monitor output power of the solar PV system(s) and irradiance is installed at the project site.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Consumption of grid electricity and/or captive electricity	CO_2
Project emissions	
Emission sources	GHG types
Generation of electricity from the solar PV system(s)	N/A

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

The default emission factors are set in a conservative manner based on the Mongolian national grid which consists of Central Energy System (CES), Altai-Uliastai Energy System (AUES), Western Energy System (WES), Eastern Energy System (EES), and Southern (Gobi) Energy System (SES) and based on the most efficient heat efficiency of a diesel power generator.

In order to identify the emission factor based on the national grid simplistically and secure net emission reductions, this methodology applies the lowest emission factor of coal-fired power plant supplying electricity to the national grid, which is set to be 0.797 tCO_2/MWh. This value is lower than the grid emission factor for CES, which is 1.154 tCO_2/MWh (combined margin, 2012) published by Mongolian government, and it ensures net emission reductions.

In addition, the conservative emission factor based on a captive diesel power generator is calculated by applying the default heat efficiency of 49%, an efficiency level which is above the value of the world's leading diesel power generator, and set to 0.533 tCO_2/MWh.

F.2. Calculation of reference emissions

$$RE_p = \sum_i \left(EG_{i,p} \times EF_{RE,i}\right)$$

RE_p : Reference emissions during the period *p* [tCO_2/p]
$EG_{i,p}$: Quantity of the electricity generated by the project solar PV system *i* during the period *p* [MWh/p]
$EF_{RE,i}$: Reference CO_2 emission factor for the project solar PV system *i* [tCO_2/MWh]

G. Calculation of project emissions

Project emissions are not assumed in the methodology as electricity consumption by any PV system is negligible.

$PE_p = 0$

PE_p : Project emissions during the period *p* [tCO_2/p]

H. Calculation of emissions reductions

$$ER_p = RE_p - PE_p$$
$$= RE_p$$

ER_p : Emission reductions during the period *p* [tCO_2/p]
RE_p : Reference emissions during the period *p* [tCO_2/p]
PE_p : Project emissions during the period *p* [tCO_2/p]

I. Data and parameters fixed *ex ante*

The source of each data and parameter fixed *ex ante* is listed as below.

Parameter	Description of data	Source
$EF_{RE,i}$	Reference CO_2 emission factor for the project solar PV system *i*. The value for $EF_{RE,i}$ is selected from the emission factor based on the national grid ($EF_{RE,grid}$) or based on	Additional information The default emission factors are derived from a study of electricity systems in

	captive diesel power generator ($EF_{RE,cap}$) in the following manner: In case the PV system in a proposed project activity is connected to the national grid (CES, WES, AUES, EES, and/or SES) including internal grid which is not connected to a captive power generator, $EF_{RE,grid}$, 0.797 tCO_2/MWh is applied. In case the PV system in a proposed project activity is connected to internal grid which is connected to both the national grid (CES, WES, AUES, EES, and/or SES) and a captive power generator, $EF_{RE,cap}$, 0.533 tCO_2/MWh is applied. In case the PV system in a proposed project activity is connected to internal grid which is not connected to the national grid, $EF_{RE,cap}$, 0.533 tCO_2/MWh is applied.	Mongolia and the default heat efficiency of 49% which is set above the value of the most efficient diesel power generator. The default value is revised if deemed necessary by the JC.

History of the document

Version	Date	Contents revised
01.0	29 September 2016	JC4, annex 1 Initial approval.