JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form

Form for submitting the proposed methodology

Host Country	Kingdom of Thailand
Name of the methodology proponents submitting this form	Pacific Consultants Co., Ltd.
Sectoral scope(s) to which the Proposed Methodology applies	1. Energy industries (renewable-/non-renewable sources)
Title of the proposed methodology, and version number	Installation of Solar PV System, Ver 01.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☒Additional information
Date of completion	21/07/2016

History of the proposed methodology

Version	Date	Contents revised
01.0	21/07/2016	First Edition

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 using fossil fuel as power source by installation and operation of the 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 the conservative emission factor of grid electricity and captive electricity.
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 installs solar PV system(s).
Criterion 2	The solar PV system is connected to the internal power grid of the project site and/or to the grid for displacing grid electricity and/or captive electricity at the

	project site.
Criterion 3	The PV modules have obtained a certification of design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).
Criterion 4	The equipment to monitor output power of the solar PV system and irradiance is installed at the project site.

E. Emission Sources and GHG types

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

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

The emission factor of the Thai grid published by the Thailand Greenhouse Gas Management Organization (TGO) is 0.5661 tCO_2/MWh (combined margin, 2014).

Most of the grid power is derived from natural gas in Thailand (around 70%). The generation efficiency of major natural gas-fired power plants in Thailand ranges from 41 to 61%. The emission factors of these plants are in the range of 0.477 to 0.319 tCO_2/MWh.

Considering that it is difficult to identify which of the natural gas-fired power plants is displaced by solar PV system(s) installed in this project, the grid emission factor is established by assuming that the most efficient natural gas-fired power plant in Thailand is displaced in conservative manner, which will lead to ensuring net emission reductions. The grid emission factor is set to be 0.319 tCO_2/MWh which corresponds to the most efficient natural gas-fired power plant in Thailand (generation efficiency: 61.2%).

F.2. Calculation of reference emissions

$$RE_p = \sum_i EG_{i,p} \times EF_{RE}$$

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} : Reference CO_2 emission factor of grid electricity and captive electricity [tCO_2/MWh]

G. Calculation of project emissions

$$PE_p = 0$$

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}	Reference CO_2 emission factor of grid and captive electricity, calculated based on the power generation efficiency of 61.2% using natural gas as the power source.	Additional information The default emission factor is derived from the result of the survey on the generation

	The default value for EF_{RE} is set to be 0.319 tCO_2/MWh.	efficiency of major natural gas-fired power plants in Thailand. The default value should be revised if necessary from survey result which is conducted by the JC or project participants.