



**Project design document form for
small-scale CDM project activities**

(Version 06.0)

Complete this form in accordance with the Attachment "Instructions for filling out the project design document form for small-scale CDM project activities" at the end of this form.

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Solar Power Project by Rishabh Renergy (EKIESL-CDM.May-15-02)
Version number of the PDD	01
Completion date of the PDD	15/05/2015
Project participant(s)	Rishabh Renergy Pvt. Ltd.
Host Party	India
Sectoral scope and selected methodology(ies), and where applicable, selected standardized baseline(s)	Sectoral Scope 1: Energy Industries (renewable - /non renewable sources) Methodology: - AMS-I.D "Grid connected renewable electricity generation" (EB 81, Version 18)
Estimated amount of annual average GHG emission reductions	16,629 tCO ₂ e / annum

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Rishabh Renergy Pvt. Ltd. is the promoter of the proposed project activity. The project activity involves installation of 10 MW solar power project at Bikaner, Rajasthan. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 16,629 tCO₂e per year, thereon displacing 17,020 MWh/year amount of electricity from the generation-mix of power plants connected to the NEWNE regional grid, which is mainly dominated by thermal/fossil fuel based power plant.

The details of the WTGs and the state of installation are mentioned in the table:-

Project Promoters' Name	Capacity in MW	Connection with Grid	State
Rishabh Renergy Pvt. Ltd.	10 MW	NEWNE	Rajasthan

Sectoral Scope: 01 : "Grid connected renewable electricity generation", AMS I.D. (Version 18)
 Project Type: (i) : Renewable energy projects

Scenario existing prior to the implementation of project activity:

The scenario existing prior to the implementation of the project activity, is electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Baseline Scenario:

As per the applicable methodology, a Greenfield power plant is defined as "a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity".

As the project activity falls under the definition of a Greenfield power plant, the baseline scenario as per applied methodology is the following:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

Hence, pre-project scenario and baseline scenario are the same.

Sustainable development indicators

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment and Forests (MoEF), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India¹. Thus the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

¹ http://www.cdmindia.gov.in/approval_process.php

Social well being

The project activity provided / provides job opportunity to local people during erection, commissioning and maintenance of the solar project. Frequency of visiting villages and nearby areas by skilled, technical and industrialist increase due to installation /site visit/operation and maintenance work related to solar plant. This directly and indirectly positively effects the economy of villages and nearby area.

Environmental well being

Solar power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

Economic well being

The CDM project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

Technological well being

The project activity is step forward in harnessing the untapped solar potential and further diffusion of the solar technology in the region. The project activity leads to the promotion and demonstrates the success of solar projects in the region which further motivate more investors to invest in solar power projects. Hence, the project activity leads to technological well-being.

The Host County Approval issued by Indian DNA declaring acceptability of the Sustainable Indicators by the project activity shall be submitted to DOE.

A.2. Location of project activity**A.2.1. Host Party**

India

A.2.2. Region/State/Province etc.

Rajasthan

A.2.3. City/Town/Community etc.

Village : Sarahbhiyanmani
Tehsil : Kolayat
District : Bikaner

A.2.4. Physical/Geographical location

Project Promoters' Name	Latitude	Longitude	Date of Commissioning
Rishabh Renergy Pvt. Ltd.	N 27.89	E 72.94	25/03/2015



A.3. Technologies and/or measures

Sectoral Scope : 01 - Energy industries (renewable / non renewable sources)
 Project Type : I - Renewable Energy Projects
 Project Category : I.D. - Grid connected renewable electricity generation (Version 18, EB 81)

The project activity aims to harness solar energy through installation of PV with total installed capacity of 10 MW.

For Plant Load Factor, please refer Section B.6.3.

Baseline Scenario:

As the project activity is the installation of a Greenfield power plant, the baseline scenario is the following as per applied methodology:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

Hence, pre-project scenario and baseline scenario are the same.

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	Rishabh Renergy Pvt. Ltd. (Private Entity)	No

A.5. Public funding of project activity

There is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) involved in the project activity.

A.6. Debundling for project activity

As per the provisions prescribed in “Clean development mechanism project standard” and further referring to “Guidelines on assessment of de-bundling for SSC project activities” according to which EB 54, Annex 13, Para 2, “A small project activity shall be deemed to be a de-bundled component of large scale project activity, if there is a registered small scale CDM project activity or an application to register another small scale CDM project activity.

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small scale activity”

The project participant hereby confirms that they have not registered any small scale CDM activity or applied to register another small scale CDM project activity within 1 km of the project boundary, in the same project category and technology/measure in previous 2 years.

This means that the project activity does not fall under the de-bundled category and qualifies for small scale CDM Project.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline**B.1. Reference of methodology and standardized baseline**

Title: Grid connected renewable electricity generation²

Reference: The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the “Appendix B of the simplified modalities and procedure for small scale CDM project activities”.

Methodology : AMS-I.D Grid Connected Renewable Electricity Generation (Version 18)³

Type I : Renewable Energy Project (Small Scale)

² <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>

³ <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK>

Category : I. "D", Grid Connected Renewable Electricity Generation

Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Tools referred with above methodology are:

Tool to calculate the emission factor for an electricity system⁴ - Version 04.0 (EB 75, Annex 15)

Tool for the demonstration and assessment of additionality⁵ - Version 07.0.0 (EB 70, Annex 8)

B.2. Project activity eligibility

The project activity involves generation of grid connected electricity from renewable solar energy. The project activity has an installed capacity of 10 MW which will remain less than the maximum qualifying capacity of 15 MW for a small scale CDM project activity under Type-I of the small scale methodologies. The installed capacity will not increase throughout and even after the crediting period therefore the project activity will remain within the limit of small scale in each year of the crediting period. The project status is corresponding to the methodology AMS-I.D and applicability of methodology AMS-I.D are discussed below:

Applicability Criterion (with Para number reference)	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid. (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is a Renewable Energy Project i.e. Solar Power Project which falls under applicability criteria option 1(a) i.e., "Supplying electricity to a national or a regional grid". Hence the project activity meets the given applicability criterion.
2. Illustration of respective situations under which each of the methodology (i.e. "AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user) applies is included in the appendix ⁶ .	The 1 st option of Table 2 of AMS I.D. Version 18, EB 61 is applicable (please refer footnote) as project supplies electricity to an identified consumer.

⁴ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf>

⁵ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

⁶

	Project type	AMS-I.A	AMS-I.D	AMS-I.F
1	Project supplies electricity to a national/regional grid		√	
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			√
3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		√	
4	Project supplies electricity to a mini grid ^b system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			√
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	√		

3. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The project is installation of new solar based electricity generation plants (not addition to existing system). Option a is applicable.
4. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: <ul style="list-style-type: none"> • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m². 	The project is solar power project and thus the criterion is not applicable to this project activity.
5. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity is a 10 MW solar electricity generation. Unit does not co-fire fossil fuels. Hence the criterion is not applicable to the project activity.
6. Combined heat and power (co-generation) systems are not eligible under this category.	The Project activity is a renewable solar energy project and is not a combined heat and power system. Hence the criteria is not applicable to the project activity
7. 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 ⁷ from the existing units.	The project activity is Greenfield and there is no existing power generation facility at the site. Hence the criteria is not applicable to the project activity
8. 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.	Not applicable, the solar project is a Green field project activity and this project is not the enhancement or up gradation project.

The project activity qualifies as Type I during every year of the crediting period in accordance with applicable provisions for project activity eligibility as discussed above. Also the total installed capacity of project activity is 5 MW which is less than 15 MW threshold limit for small scale project activities as per **AMS-I.D.: Grid connected renewable electricity generation, version 18**. The

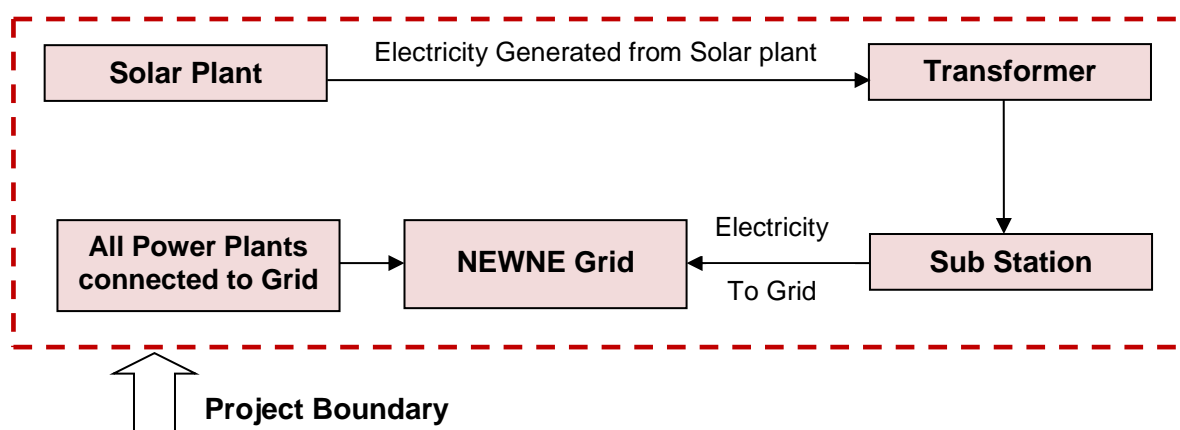
⁷ Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

project capacity will be always remain the same and hence the project activity will always be under the threshold limit of small scale project activities throughout the crediting period and thereafter.

B.3. Project boundary

As per AMS-I.D Version 18, EB 81 - "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to".

The project boundary includes the solar project, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the NEWNE grid. Therefore the entire NEWNE grid and all connected power plants have been considered in the project boundary for the proposed CDM project activity.



B.4. Establishment and description of baseline scenario

As the project activity is the installation of a Greenfield power plant, the baseline scenario is the following as per applied methodology:

The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.

The project activity involved setting up of a solar plant to harness the power of sunlight to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the state grid (part of NEWNE grid), which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the state grid. Hence, the baseline for the project activity is the equivalent amount of power from the NEWNE grid.

The combined margin ($EF_{grid,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source⁸ (where available) and made publically available.

The combined margin of the NEWNE grid used for the project activity is as follows:

⁸http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver9.pdf

Parameter	Value	Nomenclature	Source
EF _{grid,y}	0.9770 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (.25) values, sourced from Baseline CO ₂ Emission Database, Version 10.0 published by Central Electricity Authority (CEA), Government of India
EF _{grid,OM,y}	0.9862 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2011-12, 2012-13, 2013-14) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 10.0, published by Central Electricity Authority (CEA), Government of India
EF _{grid,BM,y}	0.9495 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 10.0, published by Central Electricity Authority (CEA), Government of India

B.5. Demonstration of additionality

Annexure 3 of the EB 22 states that national and/or sectoral policies and circumstances have to be accounted for when considering the baseline scenario.

Para 7(a) of the same states that, only those national and/or sectoral policies or regulations under paragraph 6(a) i.e. type E+ policy that increase GHG emissions, that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997), shall be taken into account when developing a baseline scenario. The Electricity Act of 2003 promoted cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity (Refer Section 86(1) of Electricity Act 2003). Therefore, it could be seen that the provincial and sectoral policies are E- i.e., policies that decrease GHG emissions and are after November 2001. Hence the baseline scenario is the electricity generation by grid connected fossil fuel dominated power plants conforming to Annex 3 of EB 22.

Further, the baseline alternative mentioned above is in compliance with all the applicable regulatory policies and laws. Additionally, the project participant is under no compulsion to opt for any particular technology or even a renewable mode of power generation. There is no governmental body or EB policy which requires a particular kind of fuel to be chosen and there is no legal requirement to which the above alternative does not conform.

Prior Consideration of CDM

CDM Project Standard Version 09.0, Section 6.5 states that “*For a proposed CDM project activity with a start date on or after 2 August 2008, project participants shall inform the host Party’s designated national authority (DNA) and the secretariat of their intention to seek CDM status in accordance with the Project cycle procedure*”.

In line with the above guidance, Rishabh Renenergy Pvt. Ltd. intimated the UNFCCC and host party DNA i.e. National CDM Authority (NCDMA) of its intention to seek CDM for the proposed project activity in a defined F-CDM form on 24/01/2015, which is within six months of the project activity start date (as mentioned in section C.1.1). Hence from the above it can be clearly established that CDM was seriously considered in the decision to proceed with the proposed project activity.

Additionality Assessment

As per the 'Guidance on demonstration of Additionality of small scale Project Activity' (version 09), a positive list of grid-connected renewable electricity generation technologies are listed that are automatically defined as additional, without further documentation of barriers. The positive list comprises of the following grid-connected renewable electricity generation technologies of installed capacity up to 15 MW:

- 1) Solar technologies (photovoltaic and solar thermal electricity generation);
- 2) Off-shore wind technologies;
- 3) Marine technologies (wave, tidal).
- 4) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW;

Since the project activity is a solar photovoltaic electricity generation project of capacity 10 MW, it can be concluded from the above list that the project activity is automatically additional and does not require demonstration of barriers.

Thus, it is well established that the proposed project activity is additional.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

Applied Methodology: AMS - I.D, version 18, EB 81

Baseline emissions:

The baseline emission calculation for the project activity is attributable to the CO₂ Emission that could have been produced by the fossil fuel based power plants in absence of the proposed project activity. Therefore the amount electricity supplied to the NEWNE grid will be multiplied by the grid emission factor to calculate the baseline emissions reduced by the proposed project activity.

$$BE_y = EG_{PJ,y} \times EF_{grid,y}$$

Where,

BE_y	=	Baseline emissions in year y (t CO ₂)
EG_{PJ,y}	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
EF_{grid,y}	=	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO ₂ /MWh)

The methodology provides following approaches for emission factor calculations:

- (a) *Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology "Tool to calculate the emission factor for an electricity system".*

OR

- (b) *The weighted average emissions (in t CO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.*

Option (a) has been considered to calculate the grid emission factor as per the 'Tool to calculate the emission factor for an electricity system' since data is available from an official source.

CO₂ Baseline Database for the Indian Power Sector, Version 10.0, December 2014⁹, published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

As per the "Tool to calculate the emission factor for an electricity system" Version 04.0, EB 75, Annex 15, the following steps have been followed.

- STEP 1: Identify the relevant electricity systems;
 STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional);
 STEP 3: Select a method to determine the operating margin (OM);
 STEP 4: Calculate the operating margin emission factor according to the selected method;
 STEP 5: Calculate the build margin (BM) emission factor;
 STEP 6: Calculate the combined margin (CM) emission factor.

STEP 1: Identify the relevant electricity power systems

The tool defines that “for determining the electricity emission factors, identify the relevant electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”. Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However since 2007-08 as the four regional grids except the Southern grid has been synchronized, they are now being considered as one and named as NEWNE grid. Since the project supplies electricity to the NEWNE grid, emissions generated due to the electricity generated by the NEWNE grid as per CM calculations will serve as the baseline for this project.

Table: Grid Classification

NEWNE				Southern
Northern	Eastern	Western	North-Eastern	
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Kerala
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Tamil Nadu
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Andhra Pradesh
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telangana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)

⁹ http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf

Project participants have the option of choosing between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

The Project Participant has chosen only grid power plants in the calculation.

STEP 3: Select a method to determine the operating margin (OM) method

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

- (a) Simple OM, or
- (b) Simple adjusted OM, or
- (c) Dispatch data analysis OM, or
- (d) Average OM.

The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2009-10	2010-11	2011-12	2012-13	2013-14
NEWNE	15.9%	17.6%	19.0%	17.2%	18.0%
India	17.1%	18.4%	19.6%	16.9%	18.6%

Data Source: Central Electricity Authority (CEA) database Version 10, Dec'2014

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of three most recent years) for the NEWNE grid is less than 50% of the total generation. Thus the average emission rate method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The "Simple operating margin" has been calculated as per the weighted average emissions (in tCO_2/MWh) of all generating sources serving the system, excluding hydro, geo-thermal, wind, low-cost biomass, nuclear and solar generation;

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- **Ex ante option:** If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. **Or**
- **Ex post option:** If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of CDM-PDD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method

The operating margin emission factor has been calculated using a 3 year data vintage:

Net Generation in Operating Margin (MWh) (incl. Imports)			
	2011-12	2012-13	2013-14
NEWNE	508,004,381	546,941,372	569,215,756

Simple Operating Margin (tCO₂/MWh) (incl. Imports)			
	2011-12	2012-13	2013-14
NEWNE	0.9699	0.9919	0.9953

Weighted Generation Operating Margin	
NEWNE	0.9862

STEP 5: Calculate the build margin emission factor (EF_{BM,y})

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

Build Margin (tCO₂/MWh) (not adjusted for imports)	
	2013-14
NEWNE	0.9495

(With sample group constituting most recent capacity additions to the grid comprising 20% of the system generation)

STEP 6: Calculate the combined margin (CM) emissions factor

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 04.0.0, EB 75, Annex 15, allows to weigh the operating margin and Build margin at 75% and 25%, respectively.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:

Calculation of Baseline Emission Factor EF_y

The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor (EF_{OM,y}) and the Build Margin emission factor (EF_{BM,y}):

$$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$$

Where,

w_{OM}	75% weight for solar energy projects
w_{BM}	25% weight for solar energy projects
$EF_{OM,y}$	calculated as described in Steps 3&4 above (tCO ₂ /MWh)
$EF_{BM,y}$	calculated as described in Steps 5 above (tCO ₂ /MWh)

$$\text{Baseline Emission factor (NEWNE Grid)} = 0.75*0.9862 + 0.25*0.9495 \\ = 0.9770 \text{ tCO}_2/\text{MW}$$

Project Emissions: For most renewable power generation projects activities $PE_y = 0$. As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a solar power project,

Hence $PE_y = 0$

Leakage Emissions: No Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Hence, $LE_y = 0$

Emission reduction (ER_y): The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plant by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between Baseline emission and Project emission & Leakage emission.

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

B.6.2. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014 ¹⁰
Value(s) applied	0.9862

¹⁰ http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf

Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0" as 3-year generation weighted average using data for the years 2011-2012, 2012-2013, & 2013-2014. The data are obtained from "CO2 Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{grid,BM,y}
Unit	tCO2/MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014
Value(s) applied	0.9495
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0" for the year 2013-2014. The data is obtained from "CO2 Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{grid,y}
Unit	tCO2/MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014
Value(s) applied	0.9770
Choice of data or Measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0". The data is obtained from "CO2 Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

B.6.3. Ex ante calculation of emission reductions

Formula used to calculate the net emission reduction for the project activity is

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

Baseline Emission (BE_y)

The baseline emissions are the product of electrical energy baseline EG_{PJ,y} expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$$BE_y = EG_{PJ,y} * EF_{grid,y}$$

Where,

$EG_{PJ,y}$ = Total quantity of net electricity delivered to the NEWNE grid

Project Investors' Name	PLF (%)	Grid	Generated Power (MWh) p.a	Baseline Emission Factor (tCO ₂ /MWh)	Baseline emissions (tCO ₂ / year)
Rishabh Renergy Pvt. Ltd.	19.43%	NEWNE	17,020	0.9770	16,629

$EF_{grid,y}$ = Baseline emission factor
= 0.9770 tCO₂/MWh

BE_y = 17,020 * 0.9770
= 16,629

As per Section B.6.1:

$PE_y = LE_y = 0$

Thus,

$ER_y = BE_y - PE_y - LE_y$

$ER_y = BE_y - 0 - 0$

$ER_y = BE_y$

Therefore,

$ER_y = BE_y = 16,629$

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	16,629	0	0	16,629
Year 2	16,629	0	0	16,629
Year 3	16,629	0	0	16,629
Year 4	16,629	0	0	16,629
Year 5	16,629	0	0	16,629
Year 6	16,629	0	0	16,629
Year 7	16,629	0	0	16,629
Total	116,400	0	0	116,400
Total number of crediting years	7			
Annual average over the crediting period	16,629	0	0	16,629

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{PJ,y}$
Unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

Source of data	Credit Report as per Monthly Generation Report
Value(s) applied	17,020 (Estimated Value)
Measurement methods and procedures	<p>Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: Once in 5 years¹¹</p> <p>The electricity is exported to the grid by the project activity by a feeder line to the sub-station. The net electricity is measured by a two-way electronic meters of accuracy class 0.2s. There is a main meter and check meter on the feeder line. Net electricity supplied to the grid would be calculated based on export & import data:</p> $EG_{PJ,y} = EG_{Export} - EG_{Import}$ <p>The export and import energy will be measured continuously using above mentioned Main & Check meters at the switchyard. Export & Import readings of Main meter shall be taken on monthly basis at appointed day and hour (time) by authorized officer of Jodhpur Discom in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the Jodhpur Discom and PP. Based on the readings, invoices for net electricity exported will be raised by PP.</p> <p>Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project proponent.</p>
Monitoring frequency	Monthly
QA/QC procedures	Calibration of all the meters will be undertaken once in 5 years and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2.
Purpose of data	The Data/Parameter is required to calculate the baseline emission
Additional comment	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

B.7.2. Sampling plan

Sampling is not required for the given project activity.

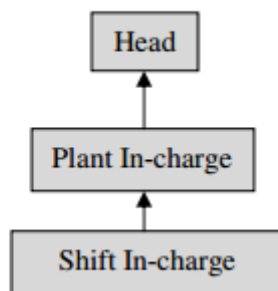
B.7.3. Other elements of monitoring plan

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project being implemented in Rajasthan, India. The monitoring plan, which will be implemented by the project proponent describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project proponent. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity. The team comprises of the following members:

¹¹ http://powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf, page 12

Organisational Structure for Monitoring



Responsibilities of Head: Overall functioning and maintenance of the project activity.

Responsibilities of Plant In-charge: Responsibility for Maintains the data records, ensures completeness of data, and reliability of data (calibration of equipments).

Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day log book for monitored data.

Data Measurement

The export and import energy will be measured continuously using above mentioned Main & Check meters. Export & Import readings of Main & Check meters shall be taken on monthly basis by authorized officer of Jodhpur Discom in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the Jodhpur Discom and Rishabh Renergy Pvt. Ltd. Based on the readings, invoices will be raised by Rishabh Renergy Pvt. Ltd. These invoices can be used for cross checking the meter readings taken for the project activity.

Data collection and archiving

Export & Import readings from main & check meter will be collected under the supervision of the plant in-charge. The net electricity supplied to grid would be calculated based on export & import readings. Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

B.8. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

15/05/2015 is the date of completion of study on application of the selected methodology (AMS I.D - version 18.0). Further, the standardized baseline is not applicable for this project activity.

EKI Energy Services Limited is the entity responsible for the application of the selected methodology for this project activity. The details of the Project Participant are mentioned in Appendix 1 below.

SECTION C. Duration and crediting period**C.1. Duration of project activity****C.1.1. Start date of project activity**

Start date of the project activity is the date of purchase order as on 31/07/2014.

C.1.2. Expected operational lifetime of project activity

20 Years 00 Months

C.2. Crediting period of project activity**C.2.1. Type of crediting period**

Renewable crediting period of 7 years 00 Months have been opted for the project activity. This is the first crediting period of the project activity.

C.2.2. Start date of crediting period

30/09/2015 or Date of submission of complete request for registration by the DOE whichever is later.

C.2.3. Length of crediting period

07 Years 00 Months

SECTION D. Environmental impacts**D.1. Analysis of environmental impacts**

The project activity has no significant impact on the environment. Solar PV projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006¹² and thus an EIA is not required. Ministry of Environment & forests vide their OM J-11013/41/2006 - IA II (I) dated 13th May 2011¹³ has re-affirmed this and exempted Solar PV power plants from EIA and EC requirement.

SECTION E. Local stakeholder consultation**E.1. Solicitation of comments from local stakeholders**

The Local Stakeholder Meetings were organized for local stakeholder consultation and informed local stakeholder regarding the meeting. The following are the stakeholders for the project activity:

- Local community
- Local village administration

¹² <http://envfor.nic.in/legis/eia/so1533.pdf>

¹³ <http://moef.nic.in/downloads/public-information/OM-SolarPV.pdf>

- Technology suppliers
- Local vendors

All the stakeholders have been invited through invitation letters (delivered in hand) and public notice to attend the stakeholders meeting.

In the introductory speech, the representatives of EKI Energy Services Limited (CDM consultant) welcomed the gathering and given a brief about the CDM project activity. Subsequent to the introductory speech, stakeholders were explained about the electricity generation from solar project is an environmental friendly power generation technology contributing to reduction in GHG emissions. They were also explained about the benefits of the solar power projects like, increasing energy availability and improving quality of power and its assistance to the local population by providing employment opportunities to both skilled & unskilled labours.

The Minutes of meeting with commenting sheet from LSH, invitation letter receipt copy shall be submitted to the DOE.

E.2. Summary of comments received

Meeting started with opening speech by representative of project participant. He introduced all guests on dais. The representative of project participant explained Technical aspects of project to stakeholders. He also explained about social, environmental & economical benefits of the project. He also elaborated about CDM & its requirement for the current project. After the presentation, the session was open for questions/feedback from stakeholders.

The villagers raised various queries as summarised below:

- Does the project provide employment opportunities or improve economic development of area?
- Will the project help in improving the electricity supply to the villagers or the neighbourhood areas?
- How will the project activity benefit the villages around the project site and their residents?

All the above queries have been suitably and satisfactorily replied / clarified by project participant's representatives. Local stakeholders welcomed and expressed their support to the project. The meeting was concluded by vote of thanks to all the participants.

E.3. Report on consideration of comments received

There were no comments raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.

SECTION F. Approval and authorization

The letter of approval from the party involved in the project activity is not available at the time of submitting the PDD to the validating DOE.

Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Rishabh Renergy Pvt. Ltd.
Street/P.O. Box	196, GF
Building	Ram Vihar
City	Delhi
State/Region	Delhi
Postcode	110092
Country	India
Telephone	+91-11-22375508
Fax	
E-mail	
Website	www.rishabhrenergy.com
Contact person	Mr. Vipin Gupta
Title	Executive Director
Salutation	Mr.
Last name	Gupta
Middle name	
First name	Vipin
Department	
Mobile	+91-98188-66105
Direct fax	
Direct tel.	
Personal e-mail	

Project participant and/or responsible person/ entity	<input type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	EKI Energy Services Limited
Street/P.O. Box	Maharani Road
Building	325- Block C, Prem trade Centre
City	Indore
State/Region	Madhya Pradesh
Postcode	452 007
Country	INDIA
Telephone	0731-4289086
Fax	0731-4289086
E-mail	business@enkingint.org
Website	www.enkingint.org
Contact person	Mr. Manish Dabkara
Title	Director

Salutation	Mr.
Last name	Dabkara
Middle name	-
First name	Manish
Department	CDM Services Dept.
Mobile	+91-9907534900
Direct fax	+91-0731-4289086
Direct tel.	+91-0731-4289086
Personal e-mail	manish@enkingint.org

Appendix 2. Affirmation regarding public funding

No public funding for this project activity was received from annex 1 parties.

Appendix 3. Applicability of methodology and standardized baseline

Please refer section B of the PDD for the same.

Appendix 4. Further background information on ex ante calculation of emission reductions

From CO2 database of CEA, Version 09 published by Government of India, Ministry of Power Central Electricity Authority, Government of India.

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE			
VERSION			10
DATE			December'14
BASELINE METHODOLOGY	ACM0002 / Ver 14.0 and "Tool to Calculate the Emission Factor for an Electricity System", Version 4.0		

Net Generation in Operating Margin (GWH) (incl. Imports)			
	2011-12	2012-13	2013-14
NEWNE	508,004	546,941	569,216
Southern	153,155	155,892	162,397

Simple Operating Margin (tCO2/MWh) (incl. Imports) (1) (2)			
	2011-12	2012-13	2013-14
NEWNE	0.9699	0.9919	0.9953
Southern	0.9524	0.9937	1.0182

Weighted Generation Operating Margin	
NEWNE	0.9862
Southern	0.9887

Build Margin (tCO2/MWh) (not adjusted for imports)			
	2011-12	2012-13	2013-14
NEWNE	0.9331	0.9813	0.9495
Southern	0.8678	0.9473	0.9609

Combined Margin Emission Factor	
NEWNE	0.9770
Southern	0.9817

Appendix 5. Further background information on monitoring plan

Please refer section B.7.1 and B.7.2 for information on monitoring.

Appendix 6. Summary of post registration changes

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Document information

Version	Date	Description
06.0	9 March 2015	Revisions to: <ul style="list-style-type: none"> • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Editorial improvement.
05.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the project design document form for small-scale CDM project activities (these instructions supersede the "Guidelines for completing the project design document form for small-scale CDM project activities" (Version 01.1)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Error! Reference source not found.; • Change the reference number from <i>F-CDM-SSC-PDD</i> to <i>CDM-SSC-PDD-FORM</i>; • Editorial improvement.
04.1	11 April 2012	Editorial revision to change history box by adding EB meeting and annex numbers in the Date column.
04.0	13 March 2012	EB 66, Annex 9 Revision required to ensure consistency with the "Guidelines for completing the project design document form for small-scale CDM project activities"
03.0	15 December 2006	EB 28, Annex 34 <ul style="list-style-type: none"> • The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.
02.0	08 July 2005	EB 20, Annex 14 <ul style="list-style-type: none"> • The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.
01.0	21 January 2003	EB 07, Annex 05 Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: project design document, SSC project activities