



**Component project activity design document form for
CDM component project activities
(Version 05.0)**

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

COMPONENT PROJECT DESIGN DOCUMENT (CPA-DD)

| | |
|---|--|
| Title of the CPA | Grid Connected Solar PV project (EKIESL-CPA01.June-16-01) |
| Version number of the CPA-DD | 01 |
| Completion date of the CPA-DD | 16/09/2016 |
| Title of the PoA to which the CPA is included | EnKing International Renewable Energy POA |
| Host Party | India |
| Estimated amount of annual average GHG emission reductions | 1,845 tCO ₂ |
| Applied methodology(ies) and, where applicable, applied standardized baseline(s) | AMS-I.D.- Grid connected renewable electricity generation --- Version 18.0 |
| Sectoral scope(s) linked to the applied methodology(ies) | 1 : Energy industries (renewable - / non-renewable sources) |

SECTION A. General description of CPA**A.1. Title of the proposed or registered PoA**

EnKing International Renewable Energy POA
Version 01 dated 16/09/2016

A.2. Title of the CPA

Grid Connected Solar PV project (EKIESL-CPA01.June-16-01)
Version 01 dated 16/09/2016
Unique I.D number – Enking- CPA-001

A.3. Description of the CPA

The proposed CPA is the installation of a new grid-connected 1 MW solar power plant/unit at a site where no renewable power plant was operating prior to the implementation of the project activity (green-field plant). The project is being implemented in Dhabla Sondhiya village, Barod tehsil, Agar District, Madhya Pradesh state by “EnKing International PoA ”.

The electricity generated from CPA would be exported to third party through the Indian grid of India there by displacing the consumption of electricity from the Indian grid electricity distribution system.

The electricity generated by the CPA will thus replace the equivalent amount of electricity generated by the operation of existing/ grid connected power plants (mostly fossil fuel based power plants) and by addition of new generation sources into the grid. The CPA thus reduces the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation from the existing grid connected power plants (mostly fossil fuel) and by addition of new generation sources into the grid

This project activity is included under POA “EnKing International Renewable Energy POA” for which “EnKing International POA” is the coordinating/managing entity (“CME”) and same entity is acting as CPA implementer for implementing the CPA. The crediting period chosen for the CPA is Renewable Crediting Period. The annual estimated emission reductions from CPA is 1,845 tCO₂e/annum.

The CPA contributions to the sustainable development of the local area as well as the host country are as follows:

Ministry of Environment and Forests (MoEF), Government of India, has stipulated the following indicators for sustainable development in the interim approval guidelines¹ for CDM projects.

1. Social well-being;
2. Economic-well being;
3. Environmental - well being; and
4. Technological-well being

Social well being

- The CPA will result in creating job opportunities for the local population on temporary and permanent basis. Manpower is required both during erection and operation of the renewable energy projects. This would result in the improvement in living standards of the local community.
- The installation of the renewable energy projects also led to development of basic infrastructure like roads, communication with the nearby cities etc. which also improved in

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

living standards of the local population.

Economic well being

- The CPA will create direct and indirect job opportunities to the local community during installation and operation of the renewable energy projects.
- The investment for the CPA would lead to the improvement in the economic activity in the local area.

Environmental well being

- The CPA utilizes renewable energy for generating electricity which otherwise would have been generated through alternate fuel (most likely - fossil fuel) based power plants, contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions. As renewable energy projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power. Being a renewable resource, to generate electricity contributes to resource conservation. Thus the CPA causes no negative impact on the surrounding environment.

Technological well being:

- Clean technology transfer in renewable energy generation and optimal use of renewable energy in the industry.

A.4. Entity/individual responsible for the operation of CPA

EnKing International PoA is the entity responsible for the operation of CPA

A.5. Technical description of the CPA

The proposed project activity falls under Sectoral Scope I: “Energy industries (renewable-/non-renewable sources)”.

The component project activity will be grid connected and will install a new 1 MW solar PV power plant at a site where no renewable power plant was operating prior to the implementation of the project activity (greenfield plant). In the absence of this project, similar quantum of electricity would have been generated through fossil fuel fired power plants that dominate the regional grid and emit greenhouse gases. Hence, the project activity would displace the greenhouse gases released due to combustion of fossil fuels in the Indian electricity grid.

It would use poly-crystalline technology based solar photo voltaic modules to generate direct current from solar radiation. This direct current would be converted into alternating current using inverters and the voltage would be stepped up for export to the Indian grid.

The technical specifications of solar plant are as below

| | |
|----------------------------------|---------------------------------|
| No. of Modules | 4656 |
| Type of the PV Modules | Polycrystalline |
| Make of the PV Modules | Vikram Solar |
| Rated Capacity of the PV Modules | 245 Wp |
| No. of Transformers | 1 |
| Type of the Transformer | Power Xmer, Outdoor/indoor type |
| Make of the Transformer | M&B Switchgear |

| | |
|-----------------------------------|----------------|
| Rated capacity of the Transformer | 1250 KVA |
| No of Inverters | 2 |
| Make of the Inverters | AEG |
| Type of the Inverters | Solar inverter |
| Rated Capacity of the Inverter | 0.5 MW (each) |

The technical lifetime of solar plant is 25 years.

A.6. Party(ies)

| Name of Party involved (host) indicates host Party | Private and/or public entity(ies) CPA implementer(s) (as applicable) | Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No) |
|--|--|--|
| India (host) | EnKing International PoA (Private entity) | No |

A.7. Geographic reference or other means of identification

The CPA includes in the Dhabla Sondhiya village, Barod tehsil, Agar District, Madhya Pradesh state of India. The physical boundary for CPA confines to the physical boundary and geographical area of the renewable energy projects covered in the CPA. The co-ordinates for the project activity site are Latitude N 23.84⁰ and E75.90⁰ .



A.8. Duration of the CPA

A.8.1. Start date of the CPA

The start date of CPA is 02/07/2016 which is the date on which purchase order is placed to EPC contractor for implementation of Solar power plant.

A.8.2. Expected operational lifetime of the CPA

25 years 00 months

A.9. Choice of the crediting period and related information

Renewable crediting period

A.9.1. Start date of the crediting period

01/12/2016

A.9.2. Length of the crediting period

7 years and 00 months (first crediting period).

Number of renewable periods - 2

The crediting period for the CPA will be limited to the end date of the PoA.

A.10. Estimated amount of GHG emission reductions

| Emission reductions during the crediting period | |
|---|--|
| Years | Annual GHG emission reductions (in tonnes of CO ₂ e) for each year |
| Year 1 | 1,845 |
| Year 2 | 1,845 |
| Year 3 | 1,845 |
| Year 4 | 1,845 |
| Year 5 | 1,845 |
| Year 6 | 1,845 |
| Year 7 | 1,845 |
| Total number of crediting years | 7 |
| Annual average GHG emission reductions over the crediting period | 1,845 |
| Total estimated reductions (tonnes of CO₂e) | 12,915 |

A.11. Public funding of the CPA

EnKing International PoA confirm that there would be no divergence of Official Development Assistance (ODA) in CPA. This is confirmed through undertaking / declaration from the CPA owner submitted to EnKing International PoA

A.12. Confirmation for CPA

EnKing International PoA, the owner of project activity confirms that the project activity is neither registered as an individual CDM project activity nor is part of another registered PoA. An undertaking to this effect has also been submitted to DOE.

EnKing International PoA confirms that the proposed CPA is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs

Also CPA Implementer owner and CME are same.

A.13. Contact information of responsible persons/ entities for completing the CDM-CPA-DD-FORM

16/09/2016 is the date of completion of study on application of the selected methodologies. Further, the standardized baseline is not applicable for this project activity.

EKI Energy Services Ltd. is the entity responsible for the application of the selected methodology for this project activity. This entity is not acting as CME as mentioned in Appendix 1 below.

SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

According to Indian regulation, the implementation of the renewable energy power project does not require an Environmental Impact Assessment (EIA). As all the CPA's involved in the PoA involves installation of the renewable energy power project and as the Indian regulation on the Environmental Impact Assessment is the same for all the renewable energy Power Projects, it is decided to analyze the environmental impacts at the PoA Level.

As per the Ministry of Environment and Forests (Government of India) notification dated September 14, 2006 regarding the requirement of environmental Impact Assessment (EIA) studies as per the Environmental Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) Ministry of Environment and Forests), any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The renewable energy power Projects are not included in this list and thus an EIA is not required. Hence, environmental impact analysis is not required for the PoA and also for the CPA.

Proposed POA is using renewable energy generation technology which is free from any kind of anthropogenic emission. POA is not having any negative environmental impact.

There are no negative environmental effects envisaged for the POA. Renewable energy projects are considered as zero GHG emission projects, so there will be no pollution caused by the POA. Hence the proposed POA doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts. Thus no EIA study was conducted

B.2. Environmental impact assessment

As per the notification from MoEF dated September 14, 2006 and its amendment notification S.O.-3067(E) dated 1/12/2009, the list of project activities which require prior environmental clearance is stipulated. This does not include the proposed POA type as it involves renewable energy power generation. Hence the proposed project activity does not require any Environmental impact analysis. POA has no significant emissions. Hence no environmental impact analysis was conducted.

SECTION C. Local stakeholder consultation

C.1. Solicitation of comments from local stakeholders

The Local Stakeholder Meetings were organized for local stakeholder consultation and informed local stakeholder regarding the meeting at Project Site at Dhabla Sondhiya village in the state of Madhya Pradesh. The following are the stakeholders for the project activity:

- Local community
- Local village administration
- Technology suppliers
- Local vendors

All the relevant stakeholders have been invited through Public Notice dated 18/06/2016 for the local stakeholder meeting on 28/06/2016.

The names of LSHM Participants are as follows:

1. Rajesh - Villager
2. Durgesh Kumar- Villager
3. Mahesh- Villager
4. Jagdeesh Pandey- Sarpanch
5. Naman- Farmer

6. Tarun Kumar- Vegetable seller
7. Vinod Kumar - Villagers
8. Vijendra Kumar – Shopkeeper
9. Narendra Patel - Villagers

The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by Mr. Vaibhav Gupta from EKI Energy Services Limited with welcome remark; it was attended by the attendees depicted above. The meeting was outlined towards making aware stakeholder & local community people, about the CDM project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed CDM project cycle & also the role of local stakeholders in the project have been outlined.

He explained to the stakeholders about how the project will be beneficial to the people in the surrounding areas. He invited and described the technical aspects of the project activity. He informed the stakeholders present at the meeting about the capacity of the Solar PV Project and the technology proposed to be employed for the power generation. He further pointed out the benefits of renewable power generation as compared to conventional sources of power based on fossil fuels such as Coal and Oil. CDM Consultant present at meeting briefed the stakeholders on the possible threats of climate change caused due to increased concentration of Green House gases in the atmosphere. He further briefed the gathering about Kyoto protocol, Clean Development Mechanism and its associated benefits. He described the project activity in relation to CDM and discussed the benefits of implementation of the project activity. He described that the project if implemented, would result in reduction of greenhouse gases in the atmosphere by feeding power to the fossil fuel based grid system. Thus he concluded that the project activity will be beneficial to the society and environment as a whole.

Mr Gupta then invited the stakeholders to share their queries, suggestions and concerns with respect to the proposed CDM Project activity and replied to the questions raised.

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

C.2. Summary of comments received

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The stakeholders gathered at the venue, as per the scheduled time. The meeting was opened by Mr. Vaibhav Gupta from EKI Energy Services Limited with welcome remark; it was attended by the attendees depicted above. The meeting was outlined towards making aware stakeholder & local community people, about the CDM project activity & how does it leads to reduction of the GHG gases emission. Details regarding the proposed CDM project cycle & also the role of local stakeholders in the project have been outlined.

Explanation about the main purpose of the project activity i.e. 'to generate electrical energy through green energy generation resource & to utilize the generated output for selling it to the state electricity utility' was narrated. Furthermore it was elaborated that the said project also conceives the following:-

- Indian economy is highly dominated by generation of electricity using fossil fuel, & coal is majorly used in thermal power plants to generate energy & for production processes, yet the basic necessity of large section is not being met. Use of renewable form of energy generation will change consumption pattern & will mitigating the immense stress on the environment.
- Spread of the commercialization of the solar projects in the region.

- Contribute to sustainable development of the region, socially, environmentally & economically.

After the detailed presentation some of the stakeholders raised questions on the solar power project to clear their doubts. Following questions were asked which were adequately explained and answered:

Q: Will there be free supply of power to the local people?

A: The generated power will be fed in the grid. Project promoter can't supply directly power to the local people. They have to get authorized connection from Govt. body. But due to the project activity the supply of power in the area will increase.

Q: The stakeholders of the project wanted to know if there could be employment generation due to the project activity for youth from the adjoining areas.

A: Responding about the increased possibilities for employment of local youth due to the project activity, it was pointed out that preference would be given for locals in the employment opportunities. Also project will lead to various indirect employment generation due to implementation of project activity.

Q: Are there any safety practices to be adopted for this project?

A: Yes, all the risk associated mitigation measures will be implemented.

Q: Will it affect rainfall due to implementation of this project?

A: No, the solar projects do not have any impact on rainfall.

Q: Will the project release pollutants or hazardous, toxic or noxious substances to air?

A: No, not from what we know, there is no project emissions associated to the project & does not have any negative impacts.

The participants expressed their positive feedback on the initiative taken up by project promoter. They also expressed their goodwill for the environment friendly initiative.

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

C.3. Report on consideration of comments received

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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 D. Eligibility of CPA and estimation of emissions reductions

D.1. Reference of methodology(ies) and standardized baseline(s)

Title:

AMS-I.D.- Grid connected renewable electricity generation --- Version 18.0

Tools applied for the CPA

Tool to calculate the emission factor for an electricity system, version 05

D.2. Applicability of methodology(ies) and standardized baseline(s)

The CPA under POA meets the applicability conditions of the approved consolidated baseline and monitoring methodology AMS I.D, Version 18.0, Sectoral Scope 1, as described below:

The applicability of AMS I.D version 18 is discussed below

| Applicability Criterion | Project Case |
|---|--|
| <p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <ul style="list-style-type: none"> (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. | <p>The CPA under POA is a solar Renewable Energy Project which falls under below applicability criteria options</p> <p>“Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling”</p> <p>The project activity is planned to sell the generated electricity to third party through grid network and contractual arrangement with third party.</p> <p>Hence the CPA under POA meets the given applicability criterion.</p> |
| <p>2. Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2²</p> | <p>The 3rd option of Table 2 of AMS I.D. Version 18, EB 61 is applicable (please refer footnote).</p> |
| <p>3. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).</p> | <p>The CPA under POA will be an installation of new renewable energy based electricity generation plants (not addition to existing system). Option a is applicable for current CPA.</p> |

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| | 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 ² 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 | √ | | |

| | |
|--|---|
| <p>4. Hydro power plants with reservoirs³ that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <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 ⁴, 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. | <p>This criteria is not applicable for CPA as current CPA involves solar power plant and not a hydro power plant.</p> |
| <p>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.</p> | <p>CPA under PoA will have capacity within eligibility limit of 15 MW and will involve only renewable component. Unit does not co-fire fossil fuels. Hence the criterion is not applicable to the CPA.</p> |
| <p>6. Combined heat and power (co-generation) systems are not eligible under this category.</p> | <p>The PoA is a renewable energy project and is not a combined heat and power system. Hence the criteria is not applicable to the PoA or CPA.</p> |
| <p>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 from the existing units.</p> | <p>The CPA under PoA will be Greenfield project and there is no existing power generation facility at the site. Hence the criteria is not applicable to the PoA or CPA.</p> |
| <p>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.</p> | <p>Not applicable, the renewable energy project is a Green field project activity and this CPA under PoA is not the enhancement or up gradation project. Hence the criteria is not applicable to the PoA or CPA</p> |
| <p>9. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.</p> | <p>The PoA is a renewable energy power project and is not a landfill gas, waste gas, waste water treatment and agro-industries projects or recovered methane emissions project. Hence the criteria is not applicable to the PoA or CPA.</p> |

³ A reservoir is a water body created in valleys to store water generally made by the construction of a dam.

⁴ A reservoir is to be considered as an “existing reservoir” if it has been in operation for at least three years before the implementation of the project activity.

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|---|---|
| <p>10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.</p> | <p>The PoA is a renewable energy power project which involves only wind/solar/hydro and is not a biomass project. Hence the criteria is not applicable to the POA or CPA.</p> |
|---|---|

D.3. Sources and GHGs

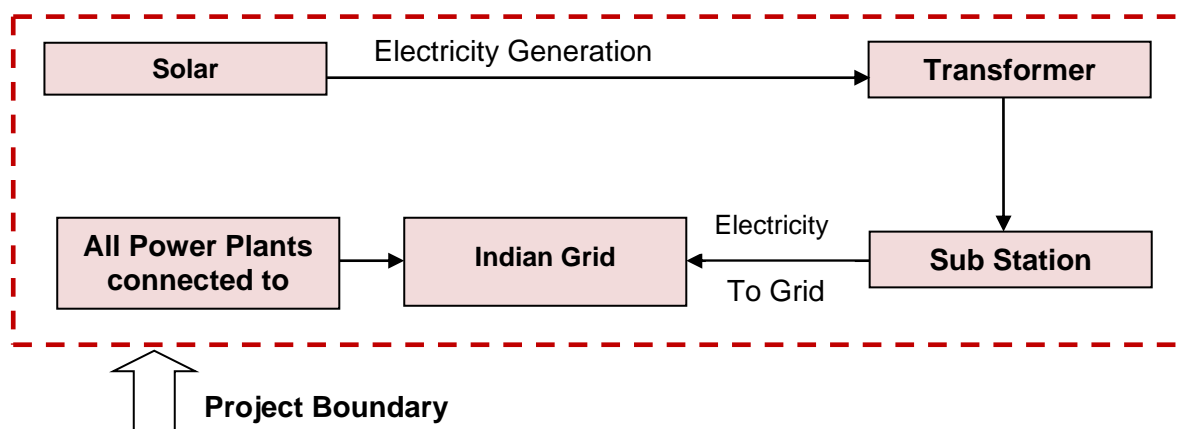
Project boundary has been ascertained using para 18 of AMS I.D (Version 18.0) – “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

Hence the project boundary includes the renewable energy power turbine generator, sub-stations, grid and all power plants connected to grid. The proposed CPA will evacuate power to the grid.

For CPAs that have independent electricity meters installed for measurement of net electricity supplied to grid i.e. the meters installed at the grid inter-connection point measure the electricity generation from the CPA only, the project boundary would consists of dedicated meters.

The calculation of net electricity supplied to grid is under purview of state electricity board and CPA Owner or CPA Implementer does not have any control on it. Thus for CPA, net electricity supplied to grid is the monitoring parameter which is used for ER calculations.

The schematic representation of project boundary for grid connected CPAs is represented as below



The sources and GHG gases involved for proposed CPA are as below

| Source | | Gas | Included | Justification/Explanation |
|------------------|---|------------------|----------|---|
| Baseline | CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. | CO ₂ | Yes | Major emission sources. |
| | | CH ₄ | No | Excluded for simplification. This is conservative |
| | | N ₂ O | No | Excluded for simplification. This is conservative |
| Project activity | For geothermal power plants, fugitive emissions of CH ₄ and CO ₂ from non-condensable gases | CO ₂ | No | CPA does not involve any Geothermal Power plant. Hence not applicable |
| | | CH ₄ | No | CPA does not involve any Geothermal Power plant. Hence not applicable |

| Source | Gas | Included | Justification/Explanation |
|--|------------------|----------|---|
| contained in geothermal steam | N ₂ O | No | CPA does not involve any Geothermal Power plant. Hence not applicable |
| CO ₂ emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants | CO ₂ | No | CPA does not involve solar thermal or geothermal power plants. Hence not applicable |
| | CH ₄ | No | CPA does not involve solar thermal or geothermal power plants. Hence not applicable |
| | N ₂ O | No | CPA does not involve solar thermal or geothermal power plants. Hence not applicable |
| For hydro power plants, emissions of CH ₄ from the reservoir | CO ₂ | No | CPA does not involve Hydro power plants. Hence not applicable |
| | CH ₄ | No | CPA does not involve Hydro power plants. Hence not applicable |
| | N ₂ O | No | CPA does not involve Hydro power plants. Hence not applicable |

D.4. Description of the baseline scenario

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As per the approved consolidated methodology AMS I.D, Version 18, para 19

If the project activity is the installation of a Greenfield power plant, the baseline scenario is the following:

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, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”

The CPA involved setting up of renewable energy technology to produce electricity and supply to third party through grid network. In the absence of the project activity, the equivalent amount of electricity would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

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

The baseline emissions are to be calculated as follows

$$BE_y = EGP_{J,y} \times EF_{grid,y}$$

Where:

BE_y = Baseline emissions in year y (t CO₂)

$EGP_{J,y}$ = 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 CO₂ emission factor ($EF_{grid,CM,y}$) 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 CO₂/MWh)

Since CPA is the installation of a Greenfield power plant, then:

$$EGPJ,y=EGfacility,y$$

Where:

$EGPJ,y$ = 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/yr)

$EGfacility,y$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

The combined margin ($EF_{grid,CM,y}$) 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 Baseline CO2 Emission Database, Version 11.0 Dated April 2016 published by Central Electricity Authority (CEA), Government of India . The calculation of combined margin emission factor is represented in below section of POA-DD.

D.5. Demonstration of eligibility for a CPA

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The project activity is eligible to be included in the PoA because it fulfils the following criteria defined for inclusion of a CPA in the PoA

General criteria (to be fulfilled by all CPAs for inclusion in the PoA)

| Sr. No | Criteria | Response required for eligibility for inclusion in PoA | Means of Verification / Documentary Evidence |
|--------|---|--|---|
| 1 | The geographical boundary of the CPA area is uniquely defined and located in India. For Emission factor for electricity generation, the boundary will be Indian Grid. | Yes | The below documents indicate that CPA is located in Madhya Pradesh state of India <ul style="list-style-type: none"> • DPR • Purchase Order |
| 2 | The CPA is not part of any other PoA or will not be registered as individual project activity. The installed technology (ies) of the CPA will constitute unique geographical location to avoid double counting. The proposed CPA will be located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed CPA (Greenfield plant) | Yes | Based on UNFCCC project cycle, the CPA is not a part of any other PoA or will not be registered as individual project activity. The same can verified through Undertaking from the CPA implementing body confirming that project activity is not an individual CDM project or part of any other PoA. CPA provided with the unique geographical location in terms of latitude and longitude. The unique geographical location can be cross verified by any one document mentioned for geographical boundary confirm that the proposed CPA will be located at a site where there was no renewable energy power plant operating prior to the implementation of the proposed CPA (Greenfield plant) |
| 3 | Does the proposed CPA comprise of only one type of methodology - either AMS I.D, AMS I.F or ACM0002? | Yes | The CPA follows AMS I.D methodology . |

CDM-CPA-DD-FORM

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|----|---|-----|--|
| 4 | <p>Technology Employed by the CPA: Wind or Hydro or Solar or combination of two or more Energy Technology Installed Capacity size – either small scale or large scale or microscale Level of Implementation: Greenfield Power Plant and new equipment Type of Service: The renewable energy project installed as part of the CPA should be connected to the grid. In absence of POA/CPA, the electricity would have been generated from grid connected power plants (fossil fuel dominated) Performance Specification: The CPA should install renewable energy technology that have Approval / certification from the relevant designated authority</p> | Yes | <p>DPR and Purchase order proving that the CPA is greenfield project activity of solar technology. The project activity is planned to sell the generated electricity to third party through grid network and contractual arrangement with third party. The Power Purchase Agreement (PPA) is yet to finalise.</p> |
| 5 | <p>Does the CPA supply electricity to the national/regional grid? Or uses national grid for captive or third party sale</p> | Yes | <p>The project activity is planned to sell the generated electricity to third party through grid network and contractual arrangement with third party. The Power Purchase Agreement (PPA) is yet to finalise.</p> |
| 6 | <p>Has the CPA owner entered into a contractual agreement with CME at the CPA level?</p> | Yes | <p>CPA Owner and CME are same, thus no any agreement required.</p> |
| 7 | <p>Is the proposed CPA a voluntary initiative, not mandated by any policy and/or regulation in the host country?</p> | Yes | <p>Public or regulatory sources to demonstrate that project is not mandated by laws and regulations in host country.</p> |
| 8 | <p>Is the CPA in conformance with mandatory laws and regulations?</p> | Yes | <p>Public or regulatory sources or clearances/approvals from state/central Govt. regulatory bodies to demonstrate that project is in compliance with laws and regulations in host country</p> |
| 9 | <p>Is the start date of the proposed CPA prior to the commencement of the validation of the PoA, i.e. the date on which the PoA-DD is first published for global stakeholder consultation The start date of the PoA is considered as 24/05/2016 which is the intimation of prior CDM consideration to UNFCCC & NCDMA.</p> | No | <p>Purchase orders /contracts for equipment or construction/operation services indicates start date as 02/07/2016. This start date of CPA is after PoA start date and not prior to PoA start date, hence criteria is fulfilled.</p> |
| 10 | <p>Can the electricity generated from the individual CPA be accurately measured and recorded to calculate actual</p> | Yes | <p>Yes, The electricity generated from the CPA will be accurately measured and recorded to calculate actual emission reductions</p> |

CDM-CPA-DD-FORM

| | | | |
|----|--|--|--|
| | emission reductions according to the applied baseline and monitoring methodology? | | according to the applied baseline and monitoring methodology. Please refer Monitoring plan of CPA DD, Procedure or measurement of net electricity supplied by project activity |
| 11 | Has the CPA conducted an environmental impact assessment and achieved clearance / approval from the environmental agency, if required by host country regulations? | Yes if required by host country regulations, else not applicable | EIA is not required for current CPA |
| 12 | Has the CPA conducted a local stakeholder consultation? | Yes | Yes, Minutes of meeting of local stakeholder consultation, attendance records, photographs, invitation letters, newspaper advertisements etc are submitted to DOE. |
| 13 | Does the CPA involve funding from Annex I parties that results in a diversion of official development assistance? | No | Undertaking from CPA Owner or CPA Implementor is submitted. |
| 14 | Does the CPA have a Plant Load Factor available as per the "Guidelines for the reporting and validation of plant load factors"? | Yes | Third Party DPR prepared for project activity. |
| 15 | Will the CPA conduct calibration of energy meters at least once every five years? | Yes | Yes, Please refer Monitoring plan of CPA, Calibration certificates. In case of delay in calibration, ER will be calculated as per guidance of CDM EB by applying error factor |

Micro Scale CPA Criteria:

Being CPA capacity of 1 MW, CPA falls under micro scale category. In line with methodological tool of Demonstration of additionality of microscale project activities version 7 (Annex 14 of EB86)⁵, the eligibility criteria is discussed below

| Sr. No | Criteria | Response required for eligibility for inclusion in PoA | Means of Verification / Documentary Evidence |
|--------|---|--|--|
| 1 | Will the aggregate installed capacity of the CPA remain less than the 5 MW threshold throughout the crediting period of the CPA in accordance with the "Guidelines for demonstrating additionality of microscale project activities"? | Yes | Current CPA is of 1 MW which is less than 5 MW and can be verified by below documents <ul style="list-style-type: none"> • Detailed Project Report • Purchase Order |
| 2 | Does the CPA comply with the applicability conditions of AMS I.D Version 18 or AMS I.F Version 3? | | Current CPA follows applicability criteria of AMS I.D version 18 as discussed above. The below are supporting documents for the same <ul style="list-style-type: none"> • Detailed Project Report |

⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-19-v7.0.pdf>

| | | | |
|---|--|-----|--|
| | | | <ul style="list-style-type: none"> • Purchase Order, • |
| 3 | <p>In order to determine the occurrence of debundling in accordance with the “Guidelines on assessment of debundling for SSC project activities”⁶ Version 04, does the CPA satisfy both of the following conditions?</p> <p>(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;</p> <p>(b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.</p> | No | <p>Though CME have large scale POA and this is first CPA for CPA implementer/CME.</p> <ul style="list-style-type: none"> • Detailed Project Report prepared by third party • Purchase Order, |
| 4 | <p>Does the CPA fulfill one of the following criteria:</p> <p>(a)The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country</p> <p>(b) form part of positive list of grid-connected renewable electricity generation technologies in the “Guidelines on the demonstration of additionality of small-scale project activities”; or</p> <p>(c) face investment barrier demonstrated as per the “Guidelines on the assessment of investment analysis”; or</p> <p>(d) face barriers other than investment barrier that are demonstrated as per the “Guidelines for objective demonstration and assessment of barriers”.</p> | Yes | <p>The CPA employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country. Also CPA form a part of positive list of grid-connected renewable electricity generation technologies in the “Guidelines on the demonstration of additionality of small-scale project activities” Please refer below documents for the same.</p> <p>(a) Detailed Project Report prepared by third party</p> <p>(b) Documents required as per the “Guidelines on the demonstration of additionality of small-scale project activities”</p> |

Small Scale CPA Criteria:

Since CPA follows micro scale CPA criteria, small scale criteria will be automatically fulfilled.

| Sr. No | Criteria | Response required for eligibility for | Means of Verification / Documentary Evidence |
|--------|----------|---------------------------------------|--|
|--------|----------|---------------------------------------|--|

⁶ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf>

| | | inclusion in PoA | |
|---|--|------------------|--|
| 1 | Will the aggregate installed capacity of the CPA remain less than the 15 MW threshold throughout the crediting period of the CPA in accordance with the “General Guidelines to SSC CDM methodologies”? | Yes | Current CPA is of 1 MW which is less than 15 MW and can be verified by below documents <ul style="list-style-type: none"> • Detailed Project Report Prepared by third party • Purchase Order |
| 2 | Does the CPA comply with the applicability conditions of AMS I.D Version 18 or AMS I.F version 03? | Yes | Current CPA follows applicability criteria of AMS I.D version 18 as discussed above. The below are supporting documents for the same <ul style="list-style-type: none"> • Detailed Project Report • Prepared by third party • Purchase Order, • |
| 3 | In order to determine the occurrence of debundling in accordance with the “Guidelines on assessment of debundling for SSC project activities” ⁷ Version 04, does the CPA satisfy both of the following conditions? (a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and; (b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point. | No | Though CME have large scale POA and this is first CPA for CPA implementer/CME. <ul style="list-style-type: none"> • Detailed Project Report prepared by third party • Purchase Order, |
| 4 | Is the CPA additional as per the “Guidelines on the demonstration of additionality of small-scale project activities” ⁸ version 10 by fulfilling one of the following criteria: (a) forms part of positive list of grid connected renewable electricity generation technologies; or (b) faces investment barrier demonstrated as per the “Guidelines on the assessment of investment analysis”;or (c) faces barriers other than investment barrier that are demonstrated as per the “Guidelines for objective | Yes | The CPA employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country. Also CPA form a part of positive list of grid-connected renewable electricity generation technologies in the “Guidelines on the demonstration of additionality of small-scale project activities” Please refer below documents for the same. (a) Detailed Project Report prepared by third party, Purchase Order (b) Documents required as per the |

⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf>

⁸ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v1.pdf>

| | | |
|--|--|--|
| demonstration and assessment of barriers". | | "Guidelines on the demonstration of additionality of small-scale project activities" |
|--|--|--|

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

According to the approved baseline methodology AMS I.D Version 18

Baseline emissions:

The baseline emission calculation for the CPA 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 Indian grid will be multiplied by the grid emission factor of Indian grid to calculate the baseline emissions reduced by the proposed project activity.

$$BE_y = EG_{\text{facility},y} \times EF_{\text{grid},CM,y}$$

Where,

| | | |
|--------------------------------|---|--|
| BE_y | = | Baseline Emissions in year y; tCO ₂ |
| EG_{facility,y} | = | Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh) |
| EF_{grid,CM,y} | = | CO ₂ emission factor of the grid in year y; tCO 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 11, April 2016⁹, 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 05.0, EB 87, Annex 9, 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;

⁹ http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver11.pdf

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 Since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

| Northern | Eastern | Western | North-Eastern | Southern |
|------------------|-------------------|-----------------------|----------------------|-----------------|
| 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 | Puducherry |
| Rajasthan | | Goa | Tripura | Lakshadweep |
| Uttar Pradesh | | | | |
| Uttarakhand | | | | |

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

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)

| | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
|-------|----------------|----------------|----------------|----------------|----------------|
| India | 18.4% | 19.6% | 16.9% | 18.6% | 16.8% |

Data Source: Central Electricity Authority (CEA) database Version 11, April'2016

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 INDIAN 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 (GWh) (excl. Imports) | | | |
|--|----------|----------|----------|
| | 2012-13 | 2013-14 | 2014-15 |
| INDIAN Grid | 6,97,187 | 7,21,632 | 8,08,417 |

| Simple Operating Margin (tCO ₂ /MWh) (incl. Imports) | | | |
|---|---------|---------|---------|
| | 2012-13 | 2013-14 | 2014-15 |
| INDIAN Grid | 0.99 | 1.00 | 0.99 |

| Weighted Generation Operating Margin | |
|--------------------------------------|--------|
| INDIAN Grid | 0.9941 |

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 (tCO ₂ /MWh) (not adjusted for imports) | |
|---|---------|
| | 2014-15 |
| INDIAN Grid | 0.9285 |

(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 05.0.0, EB 87, Annex 9, allows to weigh the operating margin and Build margin at 75% and 25%, respectively for wind and solar projects and 50% and 50%, respectively for hydro and biomass projects.

CPA is solar project activity, hence weigh the operating margin and Build margin at 75% and 25%, respectively is considered for emission factor calculations.

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 wind/solar energy projects and 50% for |
|-----------------|---|

| | |
|--------------------------|--|
| | Hydro/biomass projects |
| W_{BM} | 25% weight for wind/solar energy projects and 50% for Hydro/biomass 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) |

For Solar Projects

**Baseline Emission factor (INDIAN Grid) = 0.75*0.9941 + 0.25*0.9285
= 0.9777 tCO₂/MWh**

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 CPA is not geo-thermal or solar thermal, project emissions are not applicable.

Being CPA as solar project, there are no any project emissions involved as per methodology.

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.

Being CPA as solar project, there are no any Leakage emissions involved as per methodology.

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.

As discussed above, project emissions and leakage emissions are zero for CPA,hence

ER_y = BE_y

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

D.6.2. Data and parameters fixed ex-ante

(Copy this table for each data and parameter.)

| | |
|-------------------------|--|
| 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 11, April 2016 |
| Value(s) applied | 0.9941 |

| | |
|---|--|
| Choice of data or Measurement methods and procedures | Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014-2015. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, 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 first crediting period. |

| | |
|---|---|
| Data / Parameter | EF _{grid,BM,y} |
| Unit | tCO ₂ /MWh |
| Description | Build Margin CO ₂ emission factor in year y |
| Source of data | Calculated from CEA database, Version 11, April 2016 |
| Value(s) applied | 0.9285 |
| Choice of data or Measurement methods and procedures | Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0” as 3-year generation weighted average using data for the years 2012-2013, 2013-2014 & 2014-2015. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 11.0, 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 first crediting period. |

| | |
|---|--|
| Data / Parameter | EF _{grid,CM,y} |
| Unit | tCO ₂ /MWh |
| Description | Combined Margin CO ₂ emission factor in year y |
| Source of data | Calculated from CEA database, Version 11, April 2016 |
| Value(s) applied | For solar projects 0.9770 |
| Choice of data or Measurement methods and procedures | Calculated as per “Tool to calculate the emission factor for an electricity system, version 05.0.0”. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” Version 11, April 2016, 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 first crediting period. |

D.6.3. Ex-ante calculation of emission reductions

Formula used to calculate the net emission reduction for the CPA 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_{facility,y} expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

$$BE_y = EG_{\text{facility},y} * EF_{\text{grid},\text{CM},y}$$

Where,

$EG_{\text{facility},y}$ = Total quantity of net electricity delivered to the NEWNE/ Southern grid

| CPA Investors' Name | Capacity | PLF (%) | Generated Power (MWh) p.a | Baseline Emission Factor (tCO ₂ /MWh) | Baseline emissions (tCO ₂ / year) |
|--------------------------|----------|---------|---------------------------|--|--|
| EnKing International PoA | 1 MW | 21.55% | 1,888 | 0.9777 | 1,845 |

$EF_{\text{grid},\text{CM},y}$ = Baseline emission factor for Indian Grid
 = 0.9770 tCO₂/MWh for solar projects

$$BE_y = 1,888 * 0.9777$$

$$= 1,845$$

As per Section B.6.1:

$$PE_y = 0$$

$$LE_y = 0$$

Thus,

$$ER_y = BE_y - PE_y - LE_y$$

$$ER_y = BE_y - 0 - 0$$

$$ER_y = BE_y$$

Therefore,

$$ER_y = 1,845 \text{ tCO}_2$$

D.6.4. Summary of the 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 | 1,845 | 0 | 0 | 1,845 |
| Year 2 | 1,845 | 0 | 0 | 1,845 |
| Year 3 | 1,845 | 0 | 0 | 1,845 |
| Year 4 | 1,845 | 0 | 0 | 1,845 |
| Year 5 | 1,845 | 0 | 0 | 1,845 |
| Year 6 | 1,845 | 0 | 0 | 1,845 |
| Year 7 | 1,845 | 0 | 0 | 1,845 |
| Year 1 | 1,845 | 0 | 0 | 1,845 |
| Total | 12,915 | 0 | 0 | 12,915 |
| Total number of crediting years | 7 | | | |

| | | | | |
|--|-------|---|---|-------|
| Annual average over the crediting period | 1,845 | 0 | 0 | 1,845 |
|--|-------|---|---|-------|

D.7. Application of the monitoring methodology and description of the monitoring plan

The same is discussed in below sections

D.7.1. Data and parameters to be monitored

(Copy this table for each data and parameter.)

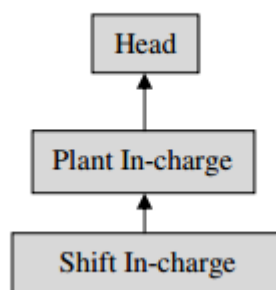
| | |
|---|--|
| Data / Parameter | EGfacility,y |
| Unit | MWh |
| Description | Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the CPA in year y |
| Source of data | Credit Report /JMR as per Monthly Generation Report |
| Value(s) applied | 1,888 (Estimated Value, specific to CPA and this value will be in accordance with project parameters) |
| 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: One in five years</p> <p>Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted in MWh.</p> <p>The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from joint meter reading certificates/credit notes issued by state electricity board as per below equation:</p> $EG_{facility,y} = EG_{Export} - EG_{Import}$ <p>The joint reading at metering point is carried out once in a month in presence of O&M officials and state electricity board personnel. The calculations/measurement of net electricity supplied to grid is under purview of state electricity board and the CME or CPA owner has no role on it. CME will get value of net electricity supplied to grid and hence this parameter is mentioned as a part of monitoring plan.</p> <p>Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the PP to the State Electricity Board or invoices with third party.</p> |
| Monitoring frequency | Monthly |
| QA/QC procedures | The calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2 or 0.5. The meter accuracy class and calibration interval is under purview of state electricity board and CME/CPA owner do not have any control on it. It is also noted that apportioning procedure (if applicable for CPA) is under control of state electricity board and PP do not have any control on it. The available parameter to CME/CPA owner is the net electricity supplied to grid and same parameter is mentioned as monitoring parameter. |
| Purpose of data | The Data/Parameter is required to calculate the baseline emission |
| Additional comment | |

D.7.2. Description of the monitoring plan

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected renewable energy power project being implemented in India. The monitoring plan, which will be implemented by the CME 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 results with the CME. CME proposed the following structure for data monitoring, collection, data archiving and calibration of equipments for this CPA. The team comprises of the following members:

Organisational Structure for Monitoring



CME has assigned the responsibility of operation and maintenance of CPA with relevant and authorised O&M contractors. The Plant In-charge and Shift In-Charge would be deployed by O&M contractors.

Responsibilities of Head: Overall functioning and maintenance of the CME.

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.

The proposed CPA having dedicated metering which measures electricity export and import of the CPA and difference of export and import is considered for determination of net electricity supplied to grid.

QA & QC Procedures to be followed

Necessary check meters as required would be installed, to operate in standby mode or when the main meters are not working. All meters will be calibrated at least once in five year as per CEA notification. Records of calibration certificates will be maintained for verification. Hence, high quality is ensured with the above parameters. The calibration of meters is under purview of state electricity board and CME/CPA owner do not have any control on it.

Data Recording and Storage

For measuring the net energy supplied to grid by the CPA at the interconnection point, one set of Main meter and Check Meter shall be provided. Representatives of both CME/CPA Owner and State Utility will be present to record the monthly meter readings. The state utility will prepare the credit report for the net energy supplied to the grid and same will be used as a basic document for monitoring and verification of the net energy supplied to the grid. Based on the monthly credit report, the CME/CPA Owner shall raise an invoice to the utility. Utility will pay to the CME/CPA Owner based on this document.

The above document will be kept at safe storage for verification of emission reductions generated from the project activity. The period of data storage will be 2 years beyond crediting period.

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. However, in case monitoring equipment get failed or found faulty, they shall be replaced with calibrated meters as quickly as possible. In case main meter get failed or found faulty, the reading of check meter will be considered.

Personnel training

In order to ensure a proper functioning of the CPA and a properly monitoring of emission reductions, the staff will be trained. The Shift In-charge and Plant In-charge will be trained in equipment operation, data recording, operation and maintenance and emergency procedures in compliance with the monitoring plant.

SECTION E. Approval and authorization

The same will be provided after receipt of Indian DNA.

Appendix 1. Contact information of CPA implementer(s) and responsible person(s)/ entity(ies) for completing the CDM-CPA-DD-FORM

| | |
|--|--|
| CPA implementer and/or responsible person/ entity | <input checked="" type="checkbox"/> CPA implementer(s) <input type="checkbox"/> Responsible person/ entity for completing the CDM-CPA-DD-FORM |
| Organization | EnKing International PoA |
| Street/P.O. Box | Vijay Nagar |
| Building | Office No 201, Plot No 48, Scheme 78, Part 2 |
| City | Indore |
| State/Region | Madhya Pradesh |
| Postcode | 452010 |
| Country | India |
| Telephone | +91-0731-4289086 |
| Fax | +91-0731-4289086 |
| E-mail | manish@enkingint.org |
| Website | www.enkingint.org |
| Contact person | Mr. Manish Dabkara |
| Title | CEO |
| 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 |

| | |
|--|--|
| CPA implementer and/or responsible person/ entity | <input type="checkbox"/> CPA implementer(s) <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-CPA-DD-FORM |
| Organization | EKI Energy Services Ltd. |
| Street/P.O. Box | Vijay Nagar |
| Building | Enking Embassy, Office No 201, Plot No 48, Scheme 78, Part 2 |
| City | Indore |
| State/Region | Madhya Pradesh |
| Postcode | 452010 |
| Country | India |
| Telephone | +91-0731-4289086 |
| Fax | +91-0731-4289086 |
| E-mail | ramkrishna.patil@enkingint.org |
| Website | www.enkingint.org |
| Contact person | Mr. Ramkrishna Patil |

| | |
|------------------------|--|
| Title | GM-Operations |
| Salutation | Mr. |
| Last name | Patil |
| Middle name | - |
| First name | Ramkrishna |
| Department | CDM Services Dept. |
| Mobile | +91-9096562065 |
| Direct fax | +91-0731-4289086 |
| Direct tel. | +91-0731-4289086 |
| Personal e-mail | ramkrishna.patil@enkingint.org |

Appendix 2. Affirmation regarding public funding

EnKing International PoA confirm that there would be no divergence of Official Development Assistance (ODA) in any of the CPAs under PoA. This would be confirmed through undertaking / declaration from the CPA owner submitted to EnKing International PoA

Appendix 3. Applicability of methodology(ies) and standardized baseline(s)

Please refer section D.2 of the CPA-DD for the same

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

Please refer to section D.6.1 and D.6.3 of the CPA-DD for the same

Appendix 5. Further background information on monitoring plan

Please refer to section D.7 of the CPA-DD for the same

Appendix 6. Summary of post registration changes

Not Applicable

Document information

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
|----------------|---------------|--|
| 05.0 | 15 April 2016 | Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0). |
| 04.0 | 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. |
| 03.0 | 25 June 2014 | Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the component project activity design document form for CDM component project activities (these instructions supersede the "Guidelines for completing the component project activity design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a CPA implementer and/or responsible person/ entity for completing the CDM-CPA-DD-FORM in A.13. and Error! Reference source not found.; • Add general instructions on post-registration changes in paragraph 4 and 5 of general instructions and Error! Reference source not found.; • Change the reference number from <i>F-CDM-CPA-DD</i> to <i>CDM-CPA-DD-FORM</i>; • Editorial improvement. |
| 02.0 | 13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the component project activity design document form" (EB 66, Annex 16). |
| 01.0 | 27 July 2007 | EB33, Annex42 Initial adoption. |

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: component project activity, project design document