SOLAR ENERGY PROJECT(S) BY SB ENERGY PRIVATE LIMITED

Document Prepared By EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project and its Implementation Status

The proposed project activity is a step towards supporting the implementation and installation of grid connected renewable energy power plants in India. The implementation of project activity ensures energy security, diversification of the grid generation mix and sustainable growth of the electricity generation sector in India by means of Solar PV technology.

The main goal of project activity is to implement renewable energy projects in the country and the significant importance of revenues from sale of Verified Carbon Units (VCUs) to achieve this goal forms the basis of the implementation of this project activity. The project activity is a voluntary action and SB Energy Private Limited is the Project Proponent for their project activity. There are no mandatory laws or regulations existing in India requiring PP or any other party to develop a programme for renewable generation plants.

The project activity will support the development of new grid-connected renewable energy power plants in India and will cover the solar energy technologies. It seeks to enable investment in large scale grid connected plants that export their generated output to the regional / national electricity grid in India.

The electricity generated by renewable technology (solar PV) installed as part of the project activity will be supplied to the regional grid there by displacing the consumption of electricity from the regional grid electricity distribution system.

The objective of the project activity is to develop a platform for reducing VCS Registration timelines and process costs for registration of individual projects under VCS.

The proposed project activity involves the installation of Solar PV Power Projects. The total installed capacity of the project is 2,250 MW; which involves operation of Solar PV projects in multiple states of India. The project is promoted by following project owners which are as follows:

Sr No.	Owner of Project/SPV	Project Location	State	Project Capacity (MW)	Commissioning Date
1	SBG Cleantech Project Co. Pvt Ltd .	Kurnool	Andhra Pradesh	182	27/02/2017
				68	22/03/2017
				100	28/03/2017
2	SB Energy One Private Limited	Bhadla	Rajasthan	100	21/09/2018
				100	24/09/2018
				100	24/09/2018
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20	04/10/2018
				20	04/10/2018
				30	18/09/2018

				30	18/09/2018
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	Yet to be commissioned
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	Yet to be commissioned
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Yet to be commissioned
7	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned
8	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	Yet to be commissioned

These are the SPVs of SB Energy Private Limited and the project is promoted by SB Energy Private Limited. As on date, 750 MW capacity has been commissioned out of the total 2250 MW capacity.

The location and geographical boundary of the project can be defined as India. The estimated annual emission reductions from the project activity are 43,54,646 tCO_2e/year, thereon displacing 45,95,933 MWh/year. The total emission reductions for 10 years crediting period will be 43,546,464 tCO_2e.

During the current monitoring period the project resulted in emission reductions of 13,31,623 tCO_2e.

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.

1.2 Sectoral Scope and Project Type

The project activity under consideration is not a grouped project activity.

Sectoral Scope Applicable to project: 01 – Energy Industries (renewable/non-renewable Sources)
Project Type: I – Renewable Energy Projects

Title: ACM0002 Grid-connected electricity generation from renewable sources --- Version 19 Reference: ACM0002 Version 19[1]

1.3 Project Proponent

Organization name	SB Energy Private Limited
Contact person	Mr N.P. Singh
Title	General Manager- Assurance & Taxation
Address	5th Floor, NH-8, New Delhi- 110036, India.
Telephone	+91 9871114689
Email	npsingh@sbenergy.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Ltd.
Role in the project	Project Consultancy
Contact person	Mr. Bhaskar Dutta
Title	Manager- Operations
Address	Office No 201, Plot No 48, Scheme 78, Part 2, Vijay Nagar, Indore, Madhya Pradesh 452010, India
Telephone	+919907534900
Email	bhaskar@enkingint.org

1.5 Project Start Date

The first project activity under consideration was commissioned and power generation started on 27/02/2017. Hence the project start date is considered as 27th Feb 2017.

1.6 Project Crediting Period

Project crediting period for project activity is taken as 10 years renewable twice. Accordingly the start date of the first crediting period is 27/02/2017 and end date will be 26/02/2027.

[1] http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

First crediting period is from 27/02/2017 to 26/02/2027.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

The project is a large scale project that involves setting up of 2,250 MW of Solar power project.

Project Scale	
Project	
Large project	✓

As the estimated annual average GHG emission reductions or removal per year is 43,54,646 tCO_2e which is more than 300,000 tonnes of CO_2e per year, thus the project falls in the category of Large Project.

Total emission reductions for project activity being included in the project are as below

Year	Estimated GHG emission reductions or removals (tCO_2e)
Year 1	43,74,731
Year 2	43,52,857
Year 3	43,52,748
Year 4	43,52,638
Year 5	43,52,528
Year 6	43,52,417
Year 7	43,52,305
Year 8	43,52,193
Year 9	43,52,080
Year 10	43,51,967
Total estimated ERs	**43,546,464**
Total number of crediting years	10
Average annual ERs	43,54,646

1.8 Description of the Project Activity

The proposed project activity involves the installation of Solar PV project. The total installed capacity of the project is 2,250 MW; which involves installation of Solar PV projects of different capacities located in different states of India. The project is promoted by SB

Energy Private Limited, who will act as project proponent on behalf of all the individual SPV's.

The Project activity is a new facility (Greenfield) and the electricity generated by the Project will be exported to the Indian electricity grid. The Project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the Project.

In the Pre- project scenario the entire 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.

The project shall result in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 43,54,646 tCO_2e per year, thereon displacing 45,95,933 MWh/year amount of electricity from the grid per year.

Solar PV Project Technology Details –

The project activity aims to harness solar energy through installation of PV with total installed capacity of 2,250 MW.

Technical specifications of 350 MW Solar PV Project by SBG Cleantech Project Co. Pvt Ltd are as follows:

Sr No.	Particulars	Details
1	Technology used	Polycrystalline
2	Rating of Solar Modules	310 to 320 Wp, Make- Trina Solar
3	Number of modules of each type	310 Wp- 264,840 315 Wp- 775,280 320 Wp- 402,360
4	Invertor	350 numbers of 1 MW each, make TMEIC
5	Transformer	175 nos.

Technical specifications of 300 MW Solar PV Project by SB Energy One Pvt. Ltd are as follows:

Sr No.	Particulars	Details
1	Technology used	Polycrystalline
2	Rating of Solar Modules	325 to 330 Wp
3	Number of modules of each type	325 Wp- 492,398 (make Jienergy) 325 Wp- 325,874 (make

		CSUN) 330 Wp- 394,730 (make Jienergy) 330 Wp- 119,265 (make CSUN)
4	Invertor	96 numbers of 3.125 MW, make Sungrow
5	Transformer	24 nos.

Technical specifications of 100 MW Solar PV Project by SB Energy Three Pvt. Ltd are as follows:

Sr No.	Particulars	Details
1	Technology used	Polycrystalline
2	Rating of Solar Modules	325 to 330 Wp
3	Number of modules of each type	325 Wp- 190,869 (Make-Jienergy) 330 Wp- 251,654 (Make-Jienergy)
4	Invertor	32 numbers of 3.125 MW, make Sungrow
5	Transformer	8 nos.

The other projects are still in pipeline and are yet to be commissioned. Hence their technical specifications are yet to be finalized. The same will be updated in future verification once the projects are commissioned and actual technical specifications are finalized.

The estimated lifetime of the project activity is considered as 25 years for solar technology. This may increase depending on the operation & maintenance of the plant.

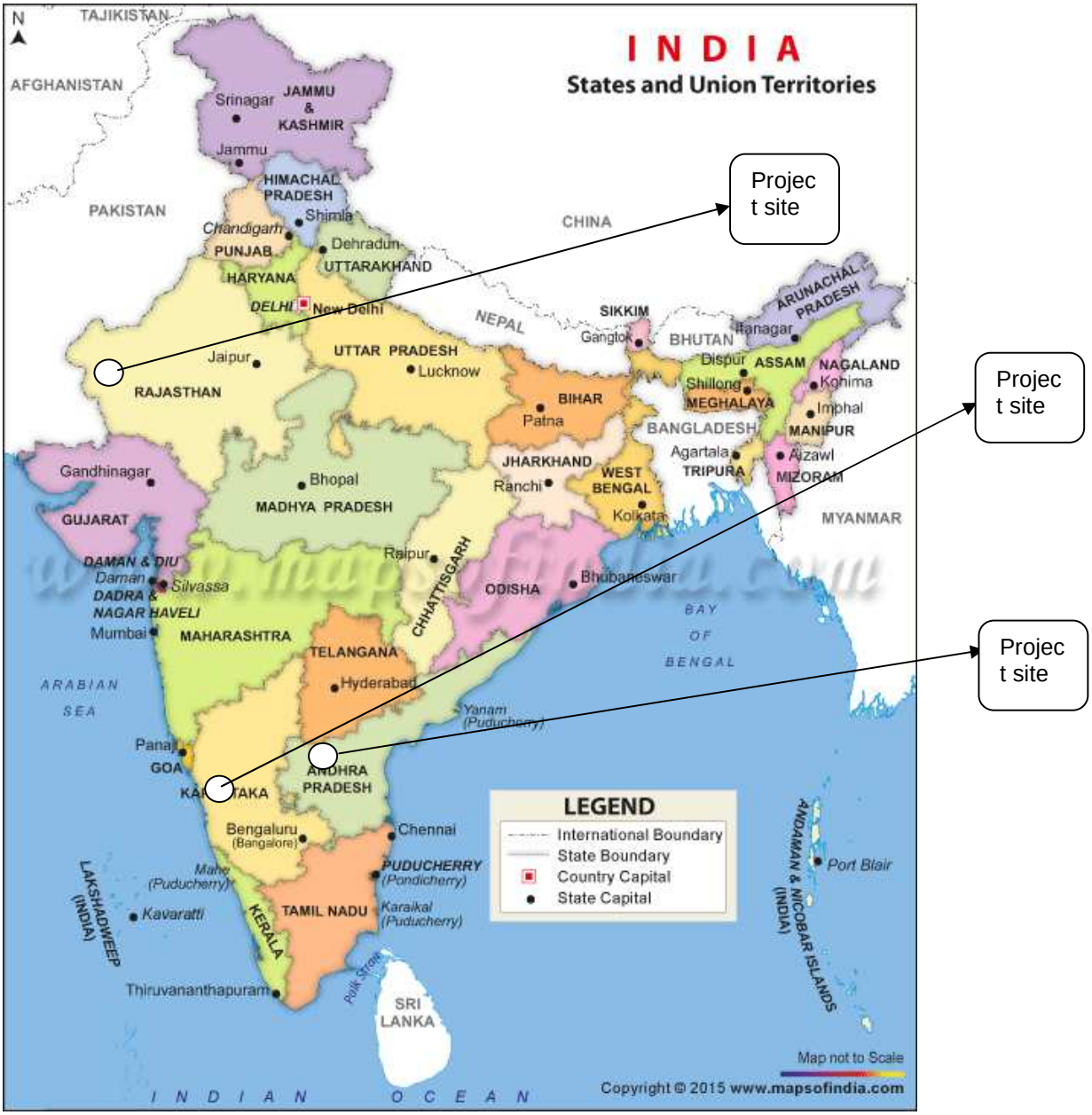
1.9 Project Location

The solar plants are located at various states of India and respective location is given below

Sr No.	Owner of Project	Project Location	State	Project Capacity (MW)	Geographical Coordinates
1	SBG Cleantech Project Co. Pvt	Kurnool	Andhra Pradesh	182 68	15°41'01.02"N -

	Ltd			100	78°17'00.44"E
2	SB Energy One Private Limited	Bhadla	Rajasthan	100 100 100	27°27'54.93"N - 71°59'38.96"E
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20 20 30 30	27°31'53.94"N - 71°57'46.99"E
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	27°29'04.1"N - 72°01'25.1"E
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	13°59'32.08"N - 78°25'26.92"E
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	26°57'12.41"N - 72°03'34.99"E
7	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	14°56'58.59"N - 78°13'12.84"E
8	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	14°13'26.44"N - 77°25'47.83"E

The map of project site is as indicated in the following figure:



1.10 Conditions Prior to Project Initiation

The project activity is a Greenfield renewable power generation projects. These will be installed at locations where there was no power generation activity at the site. In the absence of the project activity, the equivalent amount of electricity would have been generated from the existing/new power plants connected to the grid.

Therein, the main emission source in the pre-project scenario are the grid connected power plants and the primary GHG involved is CO_2.

The project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

For this project activity, the baseline scenario is the same as conditions existing prior to project initiation. Please refer section 2.4 of joint VCS PD and MR for baseline scenario for the project activity.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project has received all the necessary approvals for development and commissioning for the 2,250 MW Solar PV project from the respective State Nodal Agencies and is in compliance to the local laws and regulations. As of now, 750 MW out of 2250 MW total project capacity is commissioned and remaining 1500 MW capacity solar project is yet to be commissioned and it is under the process of receiving all the required statutory approvals from the respective State Nodal Agency.

Compliance related to following aspects will be provided for each of the project activity to be included:

- Commissioning certificates
- Power Purchase agreement with state electricity board

Apart from above, as per Central pollution Control Board directions No. B-29012/ESS (CPA) /2015-16 dated 07/03/2016, the wind/solar projects, the category of industries has been changes from Green to White. As per this re-categorisation exercise," There shall be no necessity of obtaining the Consent to Operate'' for White category of industries. An intimation to concerned SPCB / PCC shall suffice". As per this rule, No necessity of consent for non-polluting industries.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Project is owned by each SPV of SB Energy Private Limited, hence it possess right of use of ER credits. The Ownership is demonstrated through the following documents.

1) Commissioning certificates for Solar PV Project in the name of each SPV issued by respective state nodal agencies /authorities

2) Power Purchase Agreement of each SPV with respective State Electricity Board

1.12.2 Emissions Trading Programs and Other Binding Limits

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

1.12.3 Other Forms of Environmental Credit

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India[2].

1.12.4 Participation under Other GHG Programs

The proposed project activity has not been registered and is not seeking registration at moment under any other GHG programs.

The project is seeking registration only in VCS program.

1.12.5 Projects Rejected by Other GHG Programs

The Project is not rejected by other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This is not a grouped project activity. Thus, this section is not applicable for this project.

Leakage Management

Not applicable to the project activity.

Commercially Sensitive Information

Not applicable. No any commercially sensitive information has been excluded from the public version of the project description. There is no commercially sensitive information.

Sustainable Development

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

Social well-being: The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

Economic well-being: The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the

[2] https://recregistryindia.nic.in/index.php/publics/registered_regens

nearby area improves which directly and indirectly improves the economy and life style of the area.

Technological well-being: The successful operation of project activity would lead to promotion of Solar based power generation and would encourage other entrepreneurs to participate in similar projects

Environmental well-being: Solar being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity also helps in avoiding significant amount of GHG emissions. The project activity will generate power using zero emissions Solar PV based power generation which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities.

Further Information

Not Applicable.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Title : Grid-connected electricity generation from renewable sources
Reference : The project activity meets the eligibility criteria of large scale project as it is more than 15 MW
Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 19[3]
Type I : Energy industries (renewable / non-renewable sources)
Category : Approved Consolidated Methodology (ACM0002)

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system[4] - Version 07.0 (EB 100, Annex 04)
- Methodological Tool- Tool for the demonstration and assessment of additionality[5] - Version 07.0.0 (EB 70, Annex 08)

2.2 Applicability of Methodology

The project activity involves generation of grid connected electricity from renewable solar energy. The project activity has capacity of 2,250 MW which will qualify for a large scale CDM project activity under Type-I of the large scale methodologies. The project status is

[3] http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

[4] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

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

corresponding to the methodology ACM0002 version 19 and applicability of methodology is discussed below.

Applicability Criterion	**Project Case**
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s)	The project activity is a Renewable Energy Project i.e. Solar Power Project which falls under applicability criteria option 1 (a) i.e., "Install a Greenfield power plant". Hence the project activity meets the given applicability criterion.
2. The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The option (a) of applicability criteria 2 is applicable as project is renewable energy solar power plant/unit.
3. In case of hydro power plants, one of the following conditions shall apply:[6] (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is	The project is installation of new solar based electricity generation plants (not a hydro power plant). Hence this criterion is not applicable.

[6] Project participants wishing to undertake a hydroelectric project activity that result in a new reservoir or an increase in the volume of an existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.

	increased and the power density calculated using equation (3), is greater than 4 W/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m^2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
4.	In the case of integrated hydro power projects, project proponent shall:	The project is solar power project and thus the criterion is not applicable to this project activity.
5.	Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or	The project is solar power project and thus the criterion is not applicable to this project activity.
6.	Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	The project is solar power project and thus the criterion is not applicable to this project activity.

7.	The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	(a) The project activity is Greenfield and there is no switching of fossil fuel to renewable energy. Hence the criteria is not applicable to the project activity (b) The project is not a biomass fired power plant. Hence the criterion is not applicable to the project activity.
8.	In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	Not applicable, the solar project is a Green field project activity and this project is not the enhancement or up gradation project.
9.	In addition, the applicability conditions included in the tools referred to below apply.[7]	Please refer tables below.

Tool to calculate the emission factor for an electricity system[8] - Version 07.0 (EB 100, Annex 04)

Applicability Criterion	**Project Case**
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is a grid connected Greenfield Solar power project and thus the tool is applicable.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to	Steps involved in calculation of Emission Factor is included in section B.6.3 of the PDD as per the requirement of the tool

[7] The condition in the "Combined tool to identify the baseline scenario and demonstrate additionality" that all potential alternative scenarios to the proposed project activity must be available options to project participants; does not apply to this methodology, as this methodology only refers to some steps of this tool.

[8] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

Applicability Criterion	Project Case
off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Project is located in non-Annex I country and hence the tool is applicable
Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	The project is a Solar project and there is no involvement of biofuels.

- Methodological Tool- Tool for the demonstration and assessment of additionality- Version 07.0.0 (EB 70, Annex 08)

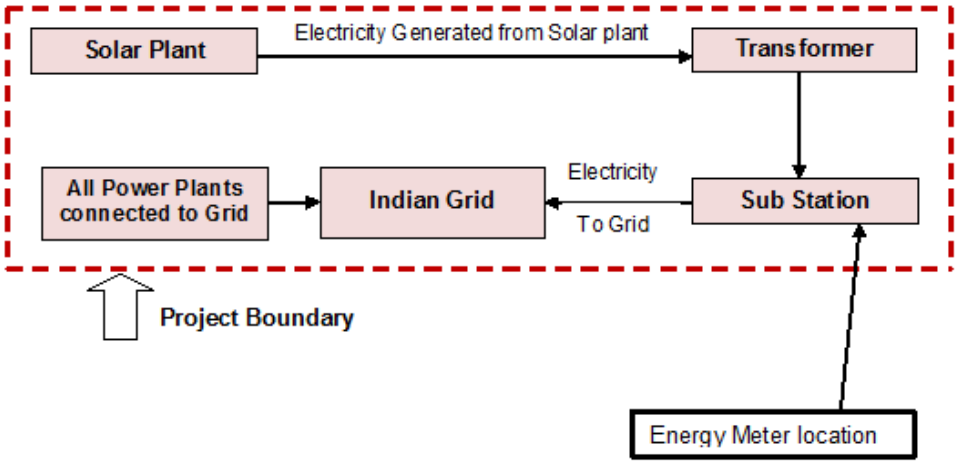
  Applicability Criteria has been demonstrated in section on additionality below.

  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 proposed capacity of project activity is 2,250 MW which is applicable as per large scale project activities methodology ACM0002: Grid-connected electricity generation from renewable sources Version 19. The project capacity will be always remain the same and hence the project activity will always be large scale project activities throughout the crediting period and thereafter.

2.3 Project Boundary

As per ACM0002 version 19 - "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 project activity will evacuate power to the Indian grid. Therefore the entire Indian grid and all connected power plants have been considered in the project boundary for the VCS project activity.



The GHG emission sources considered for the project boundary and their explanations are as follows:

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other emissions are emitted
Project	Greenfield Solar PV Power Project Activity.	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	Project activity does not emit other forms of GHG emissions

2.4 Baseline Scenario

As per the approved consolidated Methodology ACM0002 (Version 19) para 22: *"If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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 project activity involves setting up of solar projects to harness the power of sun 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 Indian 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 Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

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 data from an official source (where available) and made publically available. The CEA database version 13[9] is the latest available data at the time of PD submission to DOE for validation, hence same is considered for emission factor calculations.

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

Parameter	Value	Nomenclature	Source
$EF_{grid,CMy}$	0.9475 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 (0.25) values, sourced from Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9726 tCO_2/MWh	Operating margin CO_2 emission factor for the project electricity system in year y	Calculated as the last 3 year (2014-15, 2015-16, 2016-17) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.8723 tCO_2/MWh	Build margin CO_2 emission factor for the project electricity system in year y	Baseline CO_2 Emission Database, Version 13.0, June 2018 published by Central Electricity Authority (CEA), Government of India

2.5 Additionality

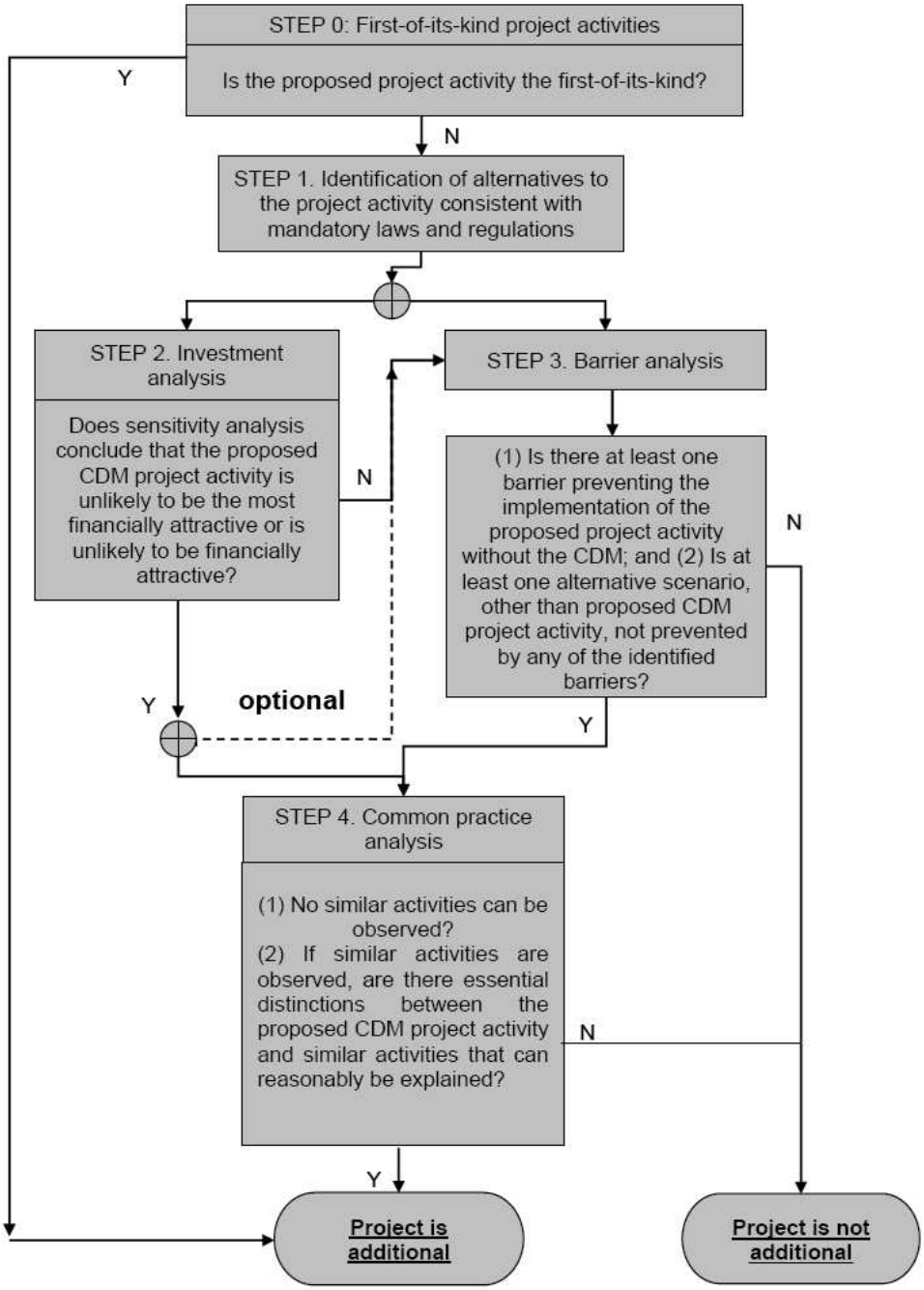
The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology or standardized baseline.

Specify the methodology or standardized baseline that establishes automatic additionality for the proposed project activity (including the version number and the specific paragraph, if applicable).	NA
Describe how the proposed project activity meets the criteria for automatic additionality in the relevant methodology or standardized baselines.	NA

The present VCS project generates power using Solar PV energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology ACM0002 (Version 19). The methodology requires the project investor to determine the additionality based on "Methodological Tool-Tool for the demonstration and assessment of additionality", Version 7.0.0. The step-wise

[9] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

approach to establish additionality of the project activity has been followed, details of which are provided in the following paragraphs:



In line with VCS Standard version 3.7, the additionality of the Project activity is ascertained in line with the applicable guidance from the UNFCCC. The demonstration of additionality for the proposed Project activity is being carried out in accordance with the additionality tool provided by the UNFCCC i.e. Methodological tool “Investment Analysis” Version 07.0.0 and 08.00,. The tool provides a step-wise approach to demonstrate additionality which is displayed below:

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

The proposed project activity is not the first-of-its-kind. Hence not applicable.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per the applied methodology ACM0002 version 19.0; Para 22, if the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity generated by the project activity would have otherwise been generated by the operation of grid connected power plant and by the addition of new generation sources.

As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives.

Step 2: Investment Analysis

Sub-step 2a: Determine appropriate analysis method

As per Methodological tool "Investment Analysis" (version 07.0.0 and version 08.00 As per investment decision date), for financial analysis of the project, the following three options are available:

Option I: Simple Cost Analysis
Option II: Investment Comparison Analysis
Option III: Benchmark Analysis

The project will generate revenues from sale of electricity, therefore Option I is not applicable. Option II also does not apply since there is no comparable investment alternative available to the project participant. The most appropriate financial analysis method is therefore option III: the benchmark analysis, where the returns on investment in the project activity are compared to benchmark returns that are available to any investors in the country.

Sub-step 2b: Option III. Apply benchmark analysis

Project participant has considered Post-Tax Equity IRR for investment analysis at the time of decision-making. As Project participant is only interested in the returns project is generating on the portion of investment costs, which is financed by them in the form of equity.

The guidance of Investment Analysis is used for project activity. As per guidance Required/expected returns on equity are appropriate benchmarks for an equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark.

Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis.

Default Value Benchmark:

As per para 20 of EB 92, Annex 5 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:

Depending upon the date of decision making dates for the respective project activities, the default values for cost of equity has been considered and represented as below:

Sr No	Investor Name	Decision Date	Default Value	Tool Version	Benchmark Applied
1	SBG Cleantech Project Co. Pvt. Ltd.	22/11/2016	11.06%	Version 07, EB 92 Annex 5	15.48%
2	SB Energy One Private Limited	18/11/2016	11.06%	Version 07, EB 92 Annex 5	13.84%
3	SB Energy Three Private Limited	18/11/2016	11.06%	Version 07, EB 92 Annex 5	15.17%
4	SB Energy Four Private Limited	18/11/2016	11.06%	Version 07, EB 92 Annex 5	15.28%
5	SB Energy Solar Private Limited	07/06/2018	10.73%	Version 08, EB 97 Annex 8	14.27%
6	SB Energy Six Private Limited	05/04/2018	10.73%	Version 08, EB 97 Annex 8	14.27%
7	SB Energy Seven Private Limited	20/03/2018	10.73%	Version 08, EB 97 Annex 8	15.05%
8	SBG Cleantech Project Co Five Private Limited	22/05/2018	10.73%	Version 08, EB 97 Annex 8	15.05%

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[10] = {(1+Real Benchmark)*(1+Inflation rate)}-1

- Inflation Rate forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India & in case where RBI Inflation forecast was not available Average Inflation rate forecast for India has been sourced from IMF web site.

Benchmark estimation:
The benchmark estimation has been shown in the table above for each project activity.

[10] As per Fisher Equation, https://en.wikipedia.org/wiki/Fisher_equation

Inflation Forecast for India as per RBI website[11]:

Since RBI publishes the inflation forecast for 5 years and 10 years, PP has considered the maximum 10 year inflation .

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

Input values are based on publicly available data sources which can be clearly validated by the DOE, thus it complies with guidance 11 of EB 92, Annex 5. Key assumptions used for calculating post-tax Equity IRR applicable at the time of investment decision, which is in line with are set out below:

The Post tax Equity IRR is evaluated for the entire lifetime of the project activity, i.e. 25 years. It is calculated based on the cash outflows from and cash inflows into the project activity.

Input Values for 350 MW Solar project by SBG Cleantech Project Co. Pvt. Ltd are as follows:

Cost of the Project Activity	
SPV Name	**SBG Cleantech ProjectCo Private Limited**
Project Location	Kurnool
State	Andhra Pradesh
AC Project Capacity (MW)	350
Expected Date of Commissioning	31-Mar-2017
Life of Plant in years	25
	DPR
	14-Nov-16

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	28,004.00	-	28,004.00
Total	28,004.00	-	28,004.00
O&M Expenses	**192.50**	-	**192.50**
	5% Escalation, starting from 1st Yr.		

Assumptions and Values considered for Financial Analysis are as follows:

Considering the input values, Equity IRRs is given below:

SBG Cleantech ProjectCo Private Limited	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
	5.57%	**15.48%**
Assumption and financial of the project		
Details of the project	**Source**	**Link**

[11] https://rbi.org.in/Scripts/PublicationsView.aspx?id=16696

State where the project is situated	Andhra Pradesh	As per DPR	
Total Capacity (MW)	350.00	As per DPR	
Expected Date of Commissioning	31-Mar-17	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	-
Generation of electricity			
PLF (%)	24.00%	As per DPR	-
Annual generation (kWh)	735,840,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	-
Tariff rate at the decision making (INR/kWh)	4.63	As per DPR	-
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	192.50	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	280.04	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	70.00		-
Financial parameters			
TOTAL COST (INR Mn.)	28,004.00	As Per DPR	
Loan Amount (INR Mn.)	21,003.00	As Per DPR	
Equity Investment (INR Mn.)	7,001.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	21,003.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	437.563	Calculated Value	-
1st instalment from (Qtr. end)	30-Jun-17	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	28,004.00	Calculated Value	

Salvage Value (%)	10.00%		
Salvage value (INR Mn.)	2,800.40	Calculated Value	
Net Depreciable Value (INR Mn.)	25,203.60	Calculated Value	
Residual Value (INR Mn.)	2,800.40	Calculated Value	
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2016-17**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Considering the above input parameters, sensitivity analysis for the above project is as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	5.57%		15.48%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	3.81%	5.57%	7.24%	57.64%
O&M	5.72%	5.57%	5.76%	-678.85%
Project Cost	7.19%	5.57%	4.19%	-39.26%
Tariff Rate	3.81%	5.57%	7.24%	57.64%

Input Values for 300 MW Solar PV project by SB Energy One Pvt. Ltd are as follows:

Cost of the Project Activity	
SPV Name	**SB Energy One Private Limited**
Project Location	Bhadla
State	Rajasthan
AC Project Capacity (MW)	300
Expected Date of Commissioning	31-Aug-2018
Life of Plant in years	25
	DPR
	14-Mar-16

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	15,000.00	**-**	15,000.00
Total	15,000.00	-	15,000.00
O&M Expenses	**150.00**	**-**	**150.00**
	5% Escalation, starting from 1st Yr.		

Assumptions and Values considered for Financial Analysis are as follows:

SB Energy One Private Limited	Equity IRR without CDM	Benchmark (Equity IRR)
	1.45%	**13.84%**

Assumption and financial of the project			
Details of the project		**Source**	**Link**
State where the project is situated	Rajasthan	As per DPR	
Total Capacity (MW)	300.00	As per DPR	
Expected Date of Commissioning	31-Aug-18	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	
Generation of electricity			
PLF (%)	24.00%	As per DPR	
Annual generation (kWh)	630,720,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	

Tariff rate at the decision making (INR/kWh)	2.45	As per DPR	-
Escalation in tariff rate	0.0%		-
Transmission & Wheeling Losses (%)	0.00%		-
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	150.00	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	150.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	60.00		-
Financial parameters			
TOTAL COST (INR Mn.)	15,000.00	As Per DPR	
Loan Amount (INR Mn.)	10,500.00	As Per DPR	
Equity Investment (INR Mn.)	4,500.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	10,500.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	218.750	Calculated Value	-
1st instalment from (Qtr. end)	31-Dec-18	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	15,000.	Calculated Value	

	00		
Salvage Value (%)	10.00%		
Salvage value (INR Mn.)	1,500.00	Calculated Value	
Net Depreciable Value (INR Mn.)	13,500.00	Calculated Value	
Residual Value (INR Mn.)	1,500.00	Calculated Value	
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2018-19**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project are as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	1.45%		13.84%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	-0.21%	1.45%	3.03%	86.17%
O&M	1.79%	1.45%	1.10%	-560.47%
Project Cost	2.78%	1.45%	0.35%	-51.65%
Tariff Rate	-0.21%	1.45%	3.03%	86.17%

Input Values for 100 MW Solar PV project by SB Energy Three Pvt. Ltd are as follows:

Cost of the Project Activity	
SPV Name	**SB Energy Three Private Limited**
Project Location	Bhadla
State	Rajasthan
AC Project Capacity (MW)	100
Expected Date of Commissioning	31-Aug-2018
Life of Plant in years	25
	DPR
	8-Mar-16

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	5,000.00	-	5,000.00
Total	5,000.00	-	5,000.00
O&M Expenses	**50.00**	-	**50.00**
	5% Escalation, starting from 1st Yr.		

Assumptions and Values considered for Financial Analysis are as follows:

SB Energy Three Private Limited	Equity IRR without CDM	Benchmark (Equity IRR)
	1.93%	**15.17%**

Assumption and financial of the project			
Details of the project		**Source**	**Link**
State where the project is situated	Rajasthan	As per DPR	
Total Capacity (MW)	100.00	As per DPR	
Expected Date of Commissioning	31-Aug-18	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	
Generation of electricity			
PLF (%)	24.00%	As per DPR	
Annual generation (kWh)	210,240,000	Calculated Value	

Annual Degradation per year	0.50%	As per DPR	-
Tariff rate at the decision making (INR/kWh)	2.45	As per DPR	-
Escalation in tariff rate	0.0%		-
Transmission & Wheeling Losses (%)	0.00%		-
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	50.00	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	50.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	5.00		-
Financial parameters			
TOTAL COST (INR Mn.)	5,000.00	As Per DPR	
Loan Amount (INR Mn.)	3,500.00	As Per DPR	
Equity Investment (INR Mn.)	1,500.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	3,500.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	72.917	Calculated Value	-
1st instalment from (Qtr. end)	31-Dec-18	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	5,000.00	Calculated Value	
Salvage Value (%)	10.00%		-
Salvage value (INR Mn.)	500.00	Calculated Value	
Net Depreciable Value (INR Mn.)	4,500.00	Calculated Value	
Residual Value (INR Mn.)		Calculated	-

	500.00	Value	
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2018-19**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project are as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	1.93%		15.17%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	0.31%	1.93%	3.51%	92.03%
O&M	2.27%	1.93%	1.59%	-617.56%
Project Cost	3.31%	1.93%	0.81%	-52.27%
Tariff Rate	0.31%	1.93%	3.51%	92.03%

Input Values for 200 MW Solar PV project by SB Energy Four Pvt. Ltd are as follows:

SPV Name	**SB Energy Four Private Limited**
Project Location	Bhadla
State	Rajasthan

AC Project Capacity (MW)	200
Expected Date of Commissioning	31-May-2019
Life of Plant in years	25
	DPR
	8-Mar-16

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	12,000.00	-	12,000.00
Total	12,000.00	-	12,000.00
O&M Expenses	**100.00**	-	**100.00**
	5% Escalation, starting from 1st Yr.		

Assumptions and Values considered for Financial Analysis are as follows:

Details of the project		Source	Link
State where the project is situated	Rajasthan	As per DPR	
Total Capacity (MW)	200.00	As per DPR	
Expected Date of Commissioning	31-May-19	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	
Generation of electricity			
PLF (%)	24.00%	As per DPR	
Annual generation (kWh)	420,480,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	
Tariff rate at the decision making (INR/kWh)	2.45	As per DPR	
Escalation in tariff rate	0.0%		
Transmission & Wheeling Losses (%)	0.00%		
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	100.00	As per DPR	
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	
Insurance (INR Mn.)	120.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	40.00		

Financial parameters			
TOTAL COST (INR Mn.)	12,000.00	As Per DPR	
Loan Amount (INR Mn.)	8,400.00	As Per DPR	
Equity Investment (INR Mn.)	3,600.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	8,400.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	175.000	Calculated Value	-
1st instalment from (Qtr. end)	30-Sep-19	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	12,000.00	Calculated Value	
Salvage Value (%)	10.00%		-
Salvage value (INR Mn.)	1,200.00	Calculated Value	
Net Depreciable Value (INR Mn.)	10,800.00	Calculated Value	
Residual Value (INR Mn.)	1,200.00	Calculated Value	-
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2019-20**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html

Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project activity are as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	-0.67%		15.28%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	-2.13%	-0.67%	0.72%	133.56%
O&M	-0.34%	-0.67%	-1.01%	-890.90%
Project Cost	0.62%	-0.67%	-1.61%	-62.22%
Tariff Rate	-2.13%	-0.67%	0.72%	133.56%

Input Values for 200 MW Solar PV project by SBG Cleantech Project Co Five Pvt. Ltd are as follows:

SPV Name	**SBG Cleantech Project Co Five Private Limited**
Project Location	Pavagada
State	Karnataka
AC Project Capacity (MW)	200
Expected Date of Commissioning	31-Oct-2019
Life of Plant in years	25
	DPR
	18-May-18

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	12,200.00	-	12,200.00
Total	12,200.00	-	12,200.00

O&M Expenses	**110.00**	**-**	**110.00**
	5% Escalation, starting from 1st Yr.		

Assumptions and projections of the project are as follows:

Details of the project		**Source**	**Link**
State where the project is situated	Karnataka	As per DPR	
Total Capacity (MW)	200.00	As per DPR	
Expected Date of Commissioning	31-Oct-19	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	-
Generation of electricity			
PLF (%)	22.50%	As per DPR	-
Annual generation (kWh)	394,200,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	-
Tariff rate at the decision making (INR/kWh)	4.36	As per KERC Tariff Order	http://kredlinfo.in/General/KERC%20tariff%20orders/Determination%20of%20tariff%20and%20other%20norms%20in%20respect%20of%20new%20Solar%20Power%20Projects.pdf
Escalation in tariff rate	0.0%		-
Transmission & Wheeling Losses (%)	0.00%		-
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	110.00	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	122.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	40.00		-
Financial parameters			
TOTAL COST (INR Mn.)	12,200.00	As Per DPR	
Loan Amount (INR Mn.)	9,150.00	As Per DPR	
Equity Investment (INR Mn.)	3,050.00	As Per DPR	
Term loan			

Loan Amount (INR Mn.)	9,150.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	190.625	Calculated Value	-
1st instalment from (Qtr. end)	31-Mar-20	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	12,200.00	Calculated Value	
Salvage Value (%)	10.00%		-
Salvage value (INR Mn.)	1,220.00	Calculated Value	
Net Depreciable Value (INR Mn.)	10,980.00	Calculated Value	
Residual Value (INR Mn.)	1,220.00	Calculated Value	-
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2019-20**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5,	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-

		11 and 12	17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project activity is as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	7.24%		15.05%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	5.31%	7.24%	9.15%	38.09%
O&M	7.47%	7.24%	7.01%	-389.13%
Project Cost	9.06%	7.24%	5.76%	-30.06%
Tariff Rate	5.31%	7.24%	9.15%	38.09%

Input Values for 600 MW Solar PV project by SB Energy Six Pvt. Ltd are as follows:

SPV Name	**SB Energy Six Private Limited**
Project Location	Phalodi
State	Rajasthan
AC Project Capacity (MW)	600
Expected Date of Commissioning	31-Aug-2019
Life of Plant in years	25
	DPR
	2-Apr-18

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	36,000.00	-	36,000.00
Total	36,000.00	-	36,000.00
O&M Expenses	**330.00**	-	**330.00**
	5% Escalation, starting from 1st Yr.		

Assumptions and projections of the project are as follows:

Details of the project	Source	Link

State where the project is situated	Rajasthan	As per DPR	
Total Capacity (MW)	600.00	As per DPR	
Expected Date of Commissioning	31-Aug-19	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	-
Generation of electricity			
PLF (%)	24.00%	As per DPR	-
Annual generation (kWh)	1,261,440,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	-
Tariff rate at the decision making (INR/kWh)	2.45	As per DPR	-
Escalation in tariff rate	0.0%		-
Transmission & Wheeling Losses (%)	0.00%		-
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	330.00	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	360.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Financial parameters			
TOTAL COST (INR Mn.)	36,000.00	As Per DPR	
Loan Amount (INR Mn.)	25,200.00	As Per DPR	
Equity Investment (INR Mn.)	10,800.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	25,200.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	525.000	Calculated Value	-
1st instalment from (Qtr. end)	31-Dec-19	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	36,000.00	Calculated Value	

Salvage Value (%)	10.00%		
Salvage value (INR Mn.)	3,600.00	Calculated Value	
Net Depreciable Value (INR Mn.)	32,400.00	Calculated Value	
Residual Value (INR Mn.)	3,600.00	Calculated Value	
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2019-20**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project is as follows:

	Equity IRR without CDM	Benchmark (Equity IRR)
Final Results	-0.33%	14.27%

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	-1.79%	-0.33%	1.05%	120.49%

O&M	0.02%	-0.33%	-0.69%	-718.74%
Project Cost	0.84%	-0.33%	-1.31%	-59.15%
Tariff Rate	-1.79%	-0.33%	1.05%	120.49%

Input Values for 250 MW Solar PV project by SB Energy Seven Pvt. Ltd are as follows:

SPV Name	**SB Energy Seven Private Limited**
Project Location	Kadapa
State	Andhra Pradesh
AC Project Capacity (MW)	250
Expected Date of Commissioning	30-Sep-2019
Life of Plant in years	25
	DPR
	18-Apr-18

in INR MN

Items	Cost	Tax	Cost + Tax
Total Project Cost	15,000.00	-	15,000.00
Total	15,000.00	-	15,000.00
O&M Expenses	**137.50**	-	**137.50**
	5% Escalation, starting from 1st Yr.		

Assumptions and projections of the project are as follows:

Details of the project		Source	Link
State where the project is situated	Andhra Pradesh	As per DPR	
Total Capacity (MW)	250.00	As per DPR	
Expected Date of Commissioning	30-Sep-19	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	-
Generation of electricity			
PLF (%)	21.50%	As per DPR	-
Annual generation (kWh)	470,850,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	-
Tariff rate at the decision making (INR/kWh)	4.63	As per DPR	-
Escalation in tariff rate	0.0%		-
Transmission & Wheeling Losses (%)	0.00%		-
Operation and maintenance cost and Insurance			

O & M Expenses (INR Mn.)	137.50	As per DPR	-
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	-
Insurance (INR Mn.)	150.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Administrative expenses	25.00		-
Financial parameters			
TOTAL COST (INR Mn.)	15,000.00	As Per DPR	
Loan Amount (INR Mn.)	11,250.00	As Per DPR	
Equity Investment (INR Mn.)	3,750.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	11,250.00	As Per DPR	-
Interest rate (%)	11.00%	As Per DPR	-
Loan Tenure (Qtr.)	48	Assumption	-
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	234.375	Calculated Value	-
1st instalment from (Qtr. end)	31-Dec-19	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	15,000.00	Calculated Value	
Salvage Value (%)	10.00%		-
Salvage value (INR Mn.)	1,500.00	Calculated Value	
Net Depreciable Value (INR Mn.)	13,500.00	Calculated Value	
Residual Value (INR Mn.)	1,500.00	Calculated Value	-
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2019-20**		

Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project is as follows:

	Equity IRR without CDM		Benchmark (Equity IRR)	
Final Results	8.25%		15.05%	
Sensitivity Analysis	**Equity IRR**			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	5.95%	8.25%	9.86%	31.63%
O&M	8.14%	8.25%	7.68%	-326.00%
Project Cost	9.78%	8.25%	6.41%	-26.18%
Tariff Rate	5.95%	8.25%	9.86%	31.63%

Input Values for 250 MW Solar PV project by SB Energy Solar Pvt. Ltd are as follows:

SPV Name	**SB Energy Solar Private Limited**
Project Location	Ananthapur
State	Andhra Pradesh
AC Project Capacity (MW)	250
Expected Date of Commissioning	31-May-2019
Life of Plant in years	25
	DPR
	8-Mar-18

in INR MN

Items	Cost	Tax	Cost + Tax

Total Project Cost	15,000.00	-	15,000.00
Total	15,000.00	-	15,000.00

O&M Expenses	**125.00**	**-**	**125.00**
	5% Escalation, starting from 1st Yr.		

Financial assumptions for the project are as follows:

Details of the project		**Source**	**Link**
State where the project is situated	Andhra Pradesh	As per DPR	
Total Capacity (MW)	250.00	As per DPR	
Expected Date of Commissioning	31-May-19	As per offer letter	
Life of the plant (Yrs.)	25	As per DPR	
Generation of electricity			
PLF (%)	24.50%	As per DPR	
Annual generation (kWh)	536,550,000	Calculated Value	
Annual Degradation per year	0.50%	As per DPR	
Tariff rate at the decision making (INR/kWh)	2.73	As per DPR	
Escalation in tariff rate	0.0%		
Transmission & Wheeling Losses (%)	0.00%		
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	125.00	As per DPR	
O & M free for (Yr.)	-		
Escalation in the operational expenses (%)	6.00%	As per DPR	
Insurance (INR Mn.)	150.00	CERC order	http://www.cercind.gov.in/2016/orders/SO17.pdf
Financial parameters			
TOTAL COST (INR Mn.)	15,000.00	As Per DPR	
Loan Amount (INR Mn.)	10,500.00	As Per DPR	
Equity Investment (INR Mn.)	4,500.00	As Per DPR	
Term loan			
Loan Amount (INR Mn.)	10,500.00	As Per DPR	
Interest rate (%)	11.00%	As Per DPR	
Loan Tenure (Qtr.)		Assumption	

	48		
Moratorium Period (Qtr.)	-	Assumption	
Repayment Period (Qtr.)	48	Calculated Value	-
Repayment instalments value (INR Mn.)	218.750	Calculated Value	-
1st instalment from (Qtr. end)	30-Sep-19	Considered from the next Quarter End	-
Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	15,000.00	Calculated Value	
Salvage Value (%)	10.00%		-
Salvage value (INR Mn.)	1,500.00	Calculated Value	
Net Depreciable Value (INR Mn.)	13,500.00	Calculated Value	
Residual Value (INR Mn.)	1,500.00	Calculated Value	-
IT Depreciation			
IT Depreciation(%)	7.69%	IT act	https://www.incometaxindia.gov.in/charts%20%20tables/depreciation%20rates.htm
Income Tax			
Financial Year	**FY 2019-20**		
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 29, Para E(I)	http://indiabudget.nic.in/budget2015-2016/ub2015-16/fb/bill.pdf
Corporate Tax / MAT (%)	33.00%	As Per IT rule	https://www.bankbazaar.com/tax/corporate-tax.html
Service Tax (%)	15.00%	As Per Income Tax Rule	http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html
Surcharge (%)	10.00%	As Per Income Tax Rule	http://taxguru.in/income-tax/income-tax-rate-chart-assessment-year-201516-financial-year-201415.html
Education cess (%)	1.00%	As Per Income Tax Rule, Pg 5, 11 and 12	http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html
Final Tax rates			
Income tax rate (%)	33.33%	Calculated Value	
MAT (%)	36.66%	Calculated Value	
Service Tax (%)	15.15%	Calculated Value	

Sensitivity Analysis of the project is as follows:

Sensitivity Analysis	Equity IRR			
Variation %	**-10%**	**Normal**	**10%**	**Breaching Value**
PLF	7.97%	10.01%	12.17%	19.55%
O&M	10.20%	10.01%	9.82%	-236.45%
Project Cost	12.20%	10.01%	8.34%	-17.40%
Tariff Rate	7.97%	10.01%	12.17%	19.53%

The VCS project activity cannot be considered as financially attractive as the equity IRR for the project activity is less than the Benchmark.

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SBG Cleantech Project Co Pvt Limited (350 MW)	5.57%	15.48%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy One Pvt. Limited (300 MW)	1.45%	13.84%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy Three Pvt. Limited (100 MW)	1.93%	15.17%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy Four Pvt. Limited (200 MW)	-0.67%	15.28%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy Six Pvt. Limited (600 MW)	-0.33%	14.27%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy Project Co. Five Pvt. Limited (250 MW)	7.24%	15.39%

Project Investor	**Equity IRR without CDM**	**Benchmark (Equity IRR)**
SB Energy Seven Pvt. Limited (250 MW)	8.25%	15.39%

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The Post tax Equity IRR is evaluated for the entire lifetime of the project activity, i.e. 25 years. It is calculated based on the cash outflows from and cash inflows into the project activity.

Key Assumptions supporting financial projections are provided in excel spreadsheet to the DOE.

Based on result of IRR excel spreadsheets, equity IRR is less than Benchmark.

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark). Thus it can be easily concluded that project activity is additional & is not business as usual scenario.

Sub-step 2d: Sensitivity Analysis

Addressing Guidance 28 & 29 of EB 92, Annex 5, following factors has been subjected to sensitivity analysis:

1. PLF
2. O&M Cost
3. Project Cost
4. Tariff

The rationale of sensitivity is, "The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis."

Sensitivity Analysis of all the projects included in the present VCS Project has been shown above.

The results of sensitivity analysis show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate Equity IRR is significantly lower than the benchmark. And it is evident from the results given above; the project remains additional even under the most favourable conditions.

Probability to breach the benchmark:
Sensitivity Parameter 1 : PLF
PLF considered in financials for is as per Third Party DPR in line with **"Guidelines for the reporting and validation of Plant load factors" stated in EB48 Annex11 option 3(b)**. Also variation in PLF of more than 10% is unlikely to happen as the PLF has been reported as per the Third Party Report based on long term data.
Sensitivity Parameter 2 : O&M
The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation (as evidence by the O&M agreement) and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. Hence, the reduction in the O&M cost is highly unlikely. Also actual O & M cost is finalized hence any variation in the same is not possible.

Sensitivity Parameter 3 : Project Cost
Project Cost for financial analysis is considered from DPR of the project activity, being available at the time of investment making decision to go ahead with the project activity. The actual project cost is lower than the DPR cost. Since the Purchase Order cost is firm, there is no possibility of project cost going below this level. However, Sensitivity is carried out for threshold level below which benchmark is not breached.
Sensitivity Parameter 4 : Tariff Rate
The tariff has been sourced from DPR of project, being available at the time of decision making. Also tariff is compared from PPA which is fixed for entire lifetime of the project activity. Hence, there is no probability to get variation for the same. However, Sensitivity is carried out for +/-10% even then the benchmark is not breached.

Outcome of Step 2:

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark Equity IRR) for any of the investor. Thus it can be easily concluded that project activity is additional & is not business as usual scenario.

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice analysis

For the concerned project activity, Common Practice Analysis has been carried out for 2250 MW capacity Solar PV Project.

Stepwise approach for common practice analysis has been carried out as per Methodological tool “Common Practice”, version 03.1 EB 84, Annex 7:
Step (1): Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

Range	Capacity	Unit
+50%	3375	MW
Capacity of the proposed project activity	2250	MW
-50%	1125	MW

Step (2): Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

(a) The projects are located in the applicable geographical area;

(b) The projects apply the same measure as the proposed project activity;

(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;

(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;

(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;

(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

a) As the projects are located in Rajasthan, Andhra Pradesh and Karnataka state of India, therefore, projects in the geographical area of Rajasthan, Andhra Pradesh and Karnataka have been chosen for analysis. The project activity involves generation of electricity from solar energy. The project activity are located in the state of Rajasthan, Andhra Pradesh and Karnataka in India and the policy applicable for the solar projects is regulated by respective state policy. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective states and they differ for respective states. The projects implemented in different states are claimed as different since the policies and regulations differ in each state. Each state has different policies regarding renewable energy, hence Rajasthan state is considered as geographical region for common practise analysis.

b) The project activity is a green-field solar power project and uses measure (b) "Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies". Therefore, projects applying same measure (b) are candidates for similar projects.

c) The energy source used by the project activity is solar. Hence, only solar energy projects have been considered for analysis.

d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.

e) The capacity range of the projects is within the applicable capacity range from 3375 MW to 1125 MW.

f) The start date of the concerned project activity is 27-Feb-2017. Therefore projects, which have started commercial operation before 27-Feb-2017, have been considered for analysis.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are
N_{solar}= 0

Step (3): Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}.

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects.
N_{all} = 0

Step (4): Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria:

1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects.

2. Investment climate on the date of the investment decision – The solar projects developed under different phases and different batches of National Solar Mission (NSM) can considered as different technology projects. For proposed project activity, there are no any different technology project considered out of similar identified projects.

Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects.

N_{diff} = 0

Step (5): Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

Calculate $F = 1-N_{diff}/N_{all}$
$F = 1-(0/0) = 1$

As per methodological tool "common practise" version 03.1, the proposed project activity is a "common practice" within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3.

Thus if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise.

Outcome of Common Practise analysis:

As,
i. F = 1; is greater than 0.2
ii. $N_{all} - N_{diff}$ = 0; is not greater than 3

The project activity does not satisfy both conditions. Hence, project activity is not a common practice.

Thus, the proposed project activity is not a "common practice" within a sector in the applicable geographical area.

The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.

2.6 Methodology Deviations

Not applicable

3 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

According to the approved baseline methodology ACM0002 Version 19

Baseline emissions:

The baseline emission calculation for the project activity is attributable to the CO_2 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.

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

Where,

$\mathbf{BE_y}$	=	Baseline Emissions in year y; tCO_2
$\mathbf{EG_{facility,y}}$	=	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
$\mathbf{EF_{grid,CM,y}}$	=	CO_2 emission factor of the grid in year y; tCO_2/MWh

As per the approved consolidated Methodology ACM0002 (Version 19):

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (t CO_2/yr)

$EG_{PJ,y}$ = 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/yr)

$EF_{grid,CM,y}$ = 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)

As per methodology, combined grid emission factor as per the "Tool to calculate the emission factor for an electricity system" version 07 is calculated as below.

CO_2 Baseline Database for the Indian Power Sector, Version 13, June 2018[12] 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 07.0, EB 100, Annex 4[13], the following steps have been followed.

STEP 1: Identify the relevant electricity systems;

[12] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

[13] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

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 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 CO_2 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	Telengana
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)

	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
India	19.6%	16.9%	18.6%	16.8%	15.1%	14.6%

Data Source: Central Electricity Authority (CEA) database Version 13, June'2018[14]

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of five 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.

[14] http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

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 VCS PD 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 first 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. The CEA database has followed the approach of simple OM in line with tool to calculate emission factor for an electricity system.

Option A of tool has been selected. The operating margin, therefore, can be calculated by dividing the grid's total CO_2 emissions by the net generation of all thermal stations. In other words, it represents the weighted average emissions rate of all thermal stations.

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

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2014-15	2015-16	2016-17
INDIAN Grid	8,10,011	8,71,753	9,16,278

Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
	2014-15	2015-16	2016-17
INDIAN Grid	0.9903	0.9655	0.9636

Weighted Generation Operating Margin	
INDIAN Grid	**0.9726**

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)	
	2016-17
INDIAN Grid	**0.8723**

(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 07.0.0, EB 100, Annex 4, 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.

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)

Baseline Emission factor (INDIAN Grid) = 0.75*0.9726+ 0.25*0.8723
= 0.9475 tCO_2/MWh

The baseline emission factor is ex-ante parameter and will remain constant throughout the crediting period.

3.2 Project Emissions

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 not geo-thermal or solar thermal, project emissions are not applicable for solar power projects.

Hence PE_y= 0

3.3 Leakage

Leakage Emissions: As per methodology, 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.

As per methodology, For renewable energy projects, there is no any leakage emissions occurred.

Hence, $LE_y = 0$

3.4 Estimated Net GHG Emission Reductions and Removals

As per methodology ACM0002 (version 19), net GHG emission reductions are calculated as follows:

$ER_y = BE_y – PE_y$

ER_y = Emission reductions in year y (tCO_2e/yr)

BE_y = Baseline emissions in year y (tCO_2e/yr)

PE_y = Project emissions in year y (tCO_2e/yr)

Since, $PE_y = 0$, hence $ER_y = BE_y$

Ex-ante calculation (estimate) of net GHG emission reductions:

Ex-ante emission reduction calculations are calculated based on current project activity under consideration. Summary of ex-ante emission reduction calculations is as follows:

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
Year 1	43,74,731	0	0	43,74,731
Year 2	43,52,857	0	0	43,52,857
Year 3	43,52,748	0	0	43,52,748
Year 4	43,52,638	0	0	43,52,638
Year 5	43,52,528	0	0	43,52,528
Year 6	43,52,417	0	0	43,52,417
Year 7	43,52,305	0	0	43,52,305
Year 8	43,52,193	0	0	43,52,193
Year 9	43,52,080	0	0	43,52,080
Year 10	43,51,967	0	0	43,51,967
Total	**43,546,464**	0	0	**43,546,464**

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 13, June 2018
Value applied:	0.9726
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07.0.0" as 3-year generation weighted average using data for the years 2014-2015, 2015-2016 & 2016-2017. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire first crediting period.

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 13, June 2018
Value applied:	0.8723
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as per the latest data available for the most recent year 2016-17. The data is obtained from "CO_2 Baseline Database for Indian Power Sector" version 13, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire first crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 13, June 2018

Value applied:	0.9475
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07.0.0". The data is obtained from "CO_2 Baseline Database for Indian Power Sector" Version 13, June 2018, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire first crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity in year y
Source of data	Credit Report /JMR as per Monthly Generation Report
Description of measurement methods and procedures applied	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 Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted in MWh. 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: $EG_{facility,y} = EG_{Export} - EG_{Import}$ 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 PP/Project activity owner has no role on it. PP/Project activity owner will get value of net electricity supplied to grid and hence this parameter is mentioned as a part of monitoring plan. 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.
Frequency of monitoring/recording	Continuous monitoring and monthly recording
Value applied:	45,95,933

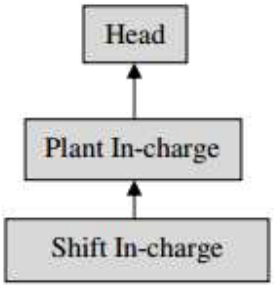
Monitoring equipment	Monitoring equipment will be energy meter installed at the project activity site. Readings will be cross checked with back up meter. The accuracy class of meters, calibration frequency of meters is totally under purview of state electricity board and PP does not have any control on it. For detailed schedule of calibration of energy meters used in the project activity please refer Appendix- 1.
QA/QC procedures applied	The calibration of all the meters will be undertaken once in five years[15] and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.5s or higher. The meter accuracy class and calibration interval is under purview of state electricity board and PP/Project Activity owner do not have any control on it. It is also noted that apportioning procedure (if applicable for project activity) is under control of state electricity board and PP do not have any control on it. The available parameter to PP/project activity 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.
Calculation method	The parameter is measured and if any calculation is required, the calculation is based on measured parameters.
Comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period

4.3 Monitoring Plan

The monitoring plan, which is implemented by the PP 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 PP. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:

Organisational Structure for Monitoring



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

[15] http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

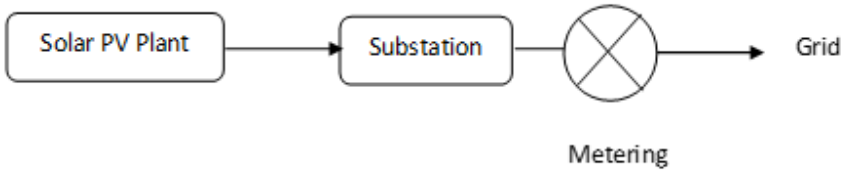
Responsibilities of Head: Overall functioning and maintenance of the data.
Responsibilities of Plant In-charge: Responsibility for Maintains the data records, ensures completeness of data, and reliability of data (calibration of equipments).
Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day log book for monitored data.

In the event when the individual verification period dates and billing cycle dates of the project activity do not coincide, then the electricity export will be apportioned based on number of days. The ratio of number of days under monitoring period and total number of days under billing cycle will multiplied to total electricity export to billing cycle.

For project activity which involves solar projects with common metering, apportioning will be followed to determine net electricity export to grid. The apportioning procedure is not under control of PP, thus value of net electricity supplied to grid is available to PP and same is mentioned as monitoring parameter. The value of net electricity supplied to grid is used for ER calculations.

It is to be noted that the metering arrangement, accuracy class of meters, feeder arrangements, calibration frequency of meters are under control of state electricity board and PP does not have any control on it. Thus any deviation at actual site or during verification is accepted.

Sample Line diagram of Solar PV project being followed at site is as follows:



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/ project activity owner do not have any control on it.

Data Recording and Storage

For measuring the net energy supplied to grid by the project activity at the interconnection point, one set of Main meter and Check Meter shall be provided. Representatives of both project activity 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 project activity Owner shall raise an invoice to the utility. Utility will pay to the project activity 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 project activity 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.

5 SAFEGUARDS

5.1 No Net Harm

The project activity does not cause any harm to the local ecology. It primarily requires the installation of the solar PV power project, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

Also as per the Central Pollution Control Board of India notification[16] Solar PV project falls under White Category and are practically non-polluting.

5.2 Environmental Impact

According to Indian regulation, the implementation of the renewable energy power project does not require an Environmental Impact Assessment (EIA). As all the project activity 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 analyse the environmental impacts at the groped project activity 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 project activity.

[16] http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

5.3 Local Stakeholder Consultation

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

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

All the stakeholders have been invited through public notice to attend the stakeholders meeting.

The project proponents organized stakeholders meeting in order to take into account the concerns of the nearby villagers regarding the project implementation. As a part of continuous feedback from stakeholders, there were no other major comments or protest raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.

For the VCS project activity under consideration, stakeholder consultation was held at each of the project activity site. Relevant outcomes from respective stakeholder consultations for each of the projects are provided as follows:

SBG Cleantech ProjectCo Private Limited (350 MW): The stakeholder meeting for the VCS project activity at Kurnool was held at the plant site on September 12, 2015. Stakeholders were invited for the meeting by sending invitations in the form of notification in public places and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

SB Energy One Pvt Ltd (300 MW): The stakeholder meeting for the VCS project activity was held at the plant site on September 14, 2016. Stakeholders were invited for the meeting by sending invitations in the form of notification in public place and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

SB Energy Three Pvt Ltd (100 MW): The stakeholder meeting for the VCS project activity instance -3 at Kalwakurthy was held at the plant site on September 14, 2016. Stakeholders were invited for the meeting by sending invitations in the form of notification in public place to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

SB Energy Four Pvt Ltd (200 MW): The stakeholder meeting for the VCS project activity was held at the plant site on October 15, 2018. Stakeholders were invited for the meeting by sending invitations in the form of notification in public places and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

SB Energy Six Pvt. Ltd: The stakeholder meeting for the VCS project activity at Phalodi was held at the plant site on September 16, 2018. Stakeholders were invited for the meeting by sending invitations in the form of public notification and by personalized invitations to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

SB Energy Solar Pvt. Ltd: The stakeholder meeting for the VCS project activity at Andhra Pradesh was held at the plant site on September 22, 2018. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 15th September 2018) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

SBG Cleantech Project Co Five Pvt Ltd: The stakeholder meeting for the VCS project activity at Pavagada site was held at the plant site on September 23, 2018. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 15th September 2018) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

SB Energy Seven Pvt Ltd: The stakeholder meeting for the VCS project activity at Kadapa, Andhra Pradesh site was held at the plant site on Jan 13, 2019. Stakeholders were invited for the meeting by means of public notice and sending personal invitations on 5th January 2019) to key stakeholders such as government officials, panchayat representatives and other relevant organizations. Comments received from stakeholders during the meeting have been documented in the minutes of meeting document.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions.

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The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

5.4 Public Comments

The project had been listed for public comments for the period from 24th September 2018 to 24th October 2018, however no any comments had been received from Global stakeholders[17].

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	$EG_{facility,y}$
Data unit	MWh
Description	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity in year y
Value applied:	1, 405,410
Comments	Quantity of net electricity supplied (MWh) to the grid is the difference of export and import. For detailed schedule of calibration of energy meters used in project activity please refer Appendix- 1

6.2 Baseline Emissions

The baseline emission calculation for the project activity is attributable to the CO_2 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.

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

= 1, 405,410 * 0.9475 = 1, 331,623

Where,

BE_y	=	Baseline Emissions in year y; tCO_2
$EG_{PJ,y}$	=	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

6.3 Project Emissions

As per methodology, for renewable energy projects, there is no any project emissions occurred.

Hence, PE_y= 0

[17] https://www.vcsprojectdatabase.org/#/pipeline_details/PL1805

6.4 Leakage

As per methodology, for renewable energy projects, there is no any leakage emissions occurred.

Hence, $LE_y = 0$

6.5 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
27/02/2017 to 31/12/2017	521,071	0	0	521,071
01/01/2018 to 31/12/2018	810,552	0	0	810,552
Total	1, 331,623	0	0	1, 331,623

It is to be noted here that as per the estimated emission reduction estimated from the project activity for the current monitoring period is 1,471,922 tCO_2e, whereas actual emission reductions achieved are 1,331,623 tCO_2e, which is approximately 10% lower than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, and not within the control of the project participant. The higher generation during the current verification period is hence due to certain natural conditions and hence acceptable.

APPENDIX 1: METER CALIBRATION DETAILS

Particular	**Meter Serial No.**	**Accuracy Class**	**Calibration Date**	**Validity**
SBG Cleantech Project Co Pvt Ltd(350 MW)				
Pooling Station 206				
Main Meter	16196408	0.2 s	20/02/2017	19/02/2022
Check Meter	16196417	0.2 s	20/02/2017	19/02/2022
Pooling Station 203				
Main	16196315	0.2 s	20/02/2017	19/02/2022

Meter				
Check Meter	16196317	0.2 s	20/02/2017	19/02/2022
Pooling Station 204				
Main Meter	16196320	0.2 s	20/02/2017	19/02/2022
Check Meter	16196328	0.2 s	20/02/2017	19/02/2022

Particular	Meter Serial No.	Accuracy Class	Calibration Date	Validity
SB Energy One Pvt Ltd (300 MW)				
Metering Location L1 (Feeder A)				
Main Meter	2843291	0.2 s	10/08/2018	09/08/2023
Check Meter	2843292	0.2 s	10/08/2018	09/08/2023
Metering Location L1 (Feeder B)				
Main Meter	2843294	0.2 s	10/08/2018	09/08/2023
Check Meter	2843295	0.2 s	10/08/2018	09/08/2023
Metering Location L1 (Feeder C)				
Main Meter	2843297	0.2 s	10/08/2018	09/08/2023
Check Meter	2861554	0.2 s	10/08/2018	09/08/2023
Metering Location L1 (Feeder D)				
Main Meter	2843300	0.2 s	10/08/2018	09/08/2023
Check Meter	2843301	0.2 s	10/08/2018	09/08/2023
Metering Location L4 (Feeder A)				
Main Meter	2843327	0.2 s	10/08/2018	09/08/2023
Check Meter	2843328	0.2 s	10/08/2018	09/08/2023
Metering Location L4 (Feeder B)				
Main Meter	2843330	0.2 s	10/08/2018	09/08/2023
Check Meter	2843331	0.2 s	10/08/2018	09/08/2023
Metering Location L4 (Feeder C)				
Main Meter	2843333	0.2 s	10/08/2018	09/08/2023
Check Meter	2843334	0.2 s	10/08/2018	09/08/2023
Metering Location L4 (Feeder D)				
Main Meter	2843336	0.2 s	10/08/2018	09/08/2023

Check Meter	2843337	0.2 s	10/08/2018	09/08/2023
Metering Location L5 (Feeder A)				
Main Meter	2843339	0.2 s	10/08/2018	09/08/2023
Check Meter	2843340	0.2 s	10/08/2018	09/08/2023
Metering Location L5 (Feeder B)				
Main Meter	2861546	0.2 s	10/08/2018	09/08/2023
Check Meter	2861547	0.2 s	10/08/2018	09/08/2023
Metering Location L5 (Feeder C)				
Main Meter	2861549	0.2 s	10/08/2018	09/08/2023
Check Meter	2861550	0.2 s	10/08/2018	09/08/2023
Metering Location L5 (Feeder D)				
Main Meter	2861552	0.2 s	10/08/2018	09/08/2023
Check Meter	2861553	0.2 s	10/08/2018	09/08/2023

Particular	**Meter Serial No.**	**Accuracy Class**	**Calibration Date**	**Validity**
SB Energy Three Pvt Ltd (100 MW)				
Metering Location P2 (Feeder 1)				
Main Meter	RJB 92275	0.2 s	10/08/2018	09/08/2023
Check Meter	RJB 92278	0.2 s	10/08/2018	09/08/2023
Metering Location P2 (Feeder 2)				
Main Meter	RJB 92279	0.2 s	10/08/2018	09/08/2023
Check Meter	RJB 92276	0.2 s	10/08/2018	09/08/2023
Metering Location P2 (Feeder 3)				
Main Meter	RJB 92280	0.2 s	10/08/2018	09/08/2023
Check Meter	RJB 92277	0.2 s	10/08/2018	09/08/2023
Metering Location P3 (Feeder 1)				
Main Meter	RJB 92288	0.2 s	10/08/2018	09/08/2023
Check Meter	RJB 92289	0.2 s	10/08/2018	09/08/2023
Metering Location P3 (Feeder 2)				
Main Meter	RJB 92285	0.2 s	10/08/2018	09/08/2023
Check	RJB 92284	0.2 s	10/08/2018	09/08/2023

Meter				
Metering Location P3 (Feeder 3)				
Main Meter	RJB 92286	0.2 s	10/08/2018	09/08/2023
Check Meter	RJB 92287	0.2 s	10/08/2018	09/08/2023