CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

A. General description of project activity

B. Application of a baseline and monitoring methodology

C. Duration of the project activity / crediting period

D. Environmental impacts

E. Stakeholders' comments

Annexes

Annex 1: Contact information on participants in the project activity

Annex 2: Information regarding public funding

Annex 3: Baseline information

Annex 4: Monitoring plan

Appendices

Appendix 1: Action plan for expenditure on sustainable development

SECTION A. General description of project activity

A.1. Title of the project activity:

>>

Solar Thermal Power project at Kutcch District in Gujarat
Version 06
Date: 28/12/2012

A.2. Description of the project activity:

>>

Description of the project activity

Cargo Solar Power (Gujarat) Private Limited (CSPPL) envisages implementation of a 25 MW concentrated solar thermal technology based power project at Kutcch in Gujarat. The electricity generated from the project activity will be exported to the regional electricity grid and sold to the Gujarat State Electricity Utility (Gujarat Urja Vikas Nigam Limited) under a power purchase agreement.

The technology comprises of parabolic trough-shaped mirror reflectors which are used to concentrate sunlight on to thermally efficient receiver-tubes placed in the trough's focal line. Solar Collector Assembly is the basic functional unit and constitutes of 12 Solar Collector Elements of 12m. A thermal transfer fluid, such as synthetic thermal oil, is circulated in these tubes. The fluid is heated to approximately 400°C by the sun's concentrated rays and then pumped through a series of heat exchangers to produce superheated steam. The steam is converted to electrical energy in a conventional steam turbine generator.

Since the proposed project activity is a Greenfield project, the approved consolidated methodology ACM0002 already prescribes the baseline scenario as being "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 electricity exported by the proposed project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the North-East-West-North East (NEWNE) Grid which relies predominantly on fossil fuels (particularly coal). Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix.

The estimation of GHG emission reductions by the project activity is limited to carbon dioxide (CO_2) only and its primary source is the fossil fuels consumed in the NEWNE grid. The proposed project activity would generate approximately 117.2 Million Units of electricity and would lead to an estimated emission reduction of 111,204 tCO_2e annually over the chosen crediting period. The project activity is currently under implementation and is expected to be commissioned by December 2012.

View of the project participants on the contribution of the project activity to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the guidelines for CDM projects:

Social well being

- The proposed project would lead to generation of business opportunities and employment in the region thereby contributing towards social upliftment through direct and indirect benefits.
- The project activity in its execution will lead to development of infrastructure in the region and at the same time promote business in the region through the improvement in electricity generation capacity of the grid.

Economic well-being

- The project activity leads to an investment in the region accompanied with business and employment benefits along with improvement of grid supply which otherwise would not have happened in the absence of project activity.
- The clean electricity generated through solar power by the project activity would be fed into the local grid thereby improving the availability of electricity in the region. This would provide a better scenario for local industries and businesses to improve their production capacities thereby contributing towards the overall economic development of the region.

Environmental well being

- The project activity employs solar power for generation of electricity thereby displacing fossil fuels which are being rapidly consumed to meet the growing demand of electricity in the country thus contributing towards reduction in GHG emissions
- Solar power projects generate no end products in the form of solid waste (ash etc.) compared to alternative modes of power generation (e.g. coal based on which the Indian grid is primarily dependent). Hence the project activity is a cleaner source of power generation and is encouraging greener practice of power generation.
- The solar power project indirectly is contributing towards conservation of non–renewable resources which are under the constant threat of depletion due to excessive and rapid growth of energy demand. The growing threat of global warming which is a key concern is also addressed due to renewable energy use thereby mitigating climate change.

Technological well being

- The project activity uses concentrated solar power technology for large scale power generation thereby demonstrating the viability of solar based renewable energy generation in the region, which is fed into the nearest sub-station (part of the NEWNE Regional Grid), thus increasing energy availability under the service area of the substation. Hence the project leads to technological well being.

The National CDM Authority has mandated large scale projects to commit a minimum of 2% earning (net realization value) from sale of CER towards Sustainable Development Activities including society and community development activities[1]. The Project is expected to generate 111,204 CERs per annum upon registration. The net realization that is likely to accrue to CSPPL from selling CERs would be based on prevailing market for CERs after meeting statutory tax requirements and CER revenue sharing requirements with the utility as per the provisions of the Power Purchase Agreement ('PPA'). The action plan for expenditure on sustainable development activities is provided in Appendix 1.

A.3. Project participants:

>>

[1] http://www.cdmindia.in/detail_news.php?id=3

Name of Party involved (*) ((host) indicates a host party)	Private and/or public entity (ies) Project participants (*) (as applicable)	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
India (Host Country)	Cargo Solar Power (Gujarat) Private Limited (Private entity)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

A.4.1.1. Host Party(ies):

>>

Country: India

A.4.1.2. Region/State/Province etc.:

>>

State: Gujarat

A.4.1.3. City/Town/Community etc.:

>>

District: Kutchh
Village: Khanpur

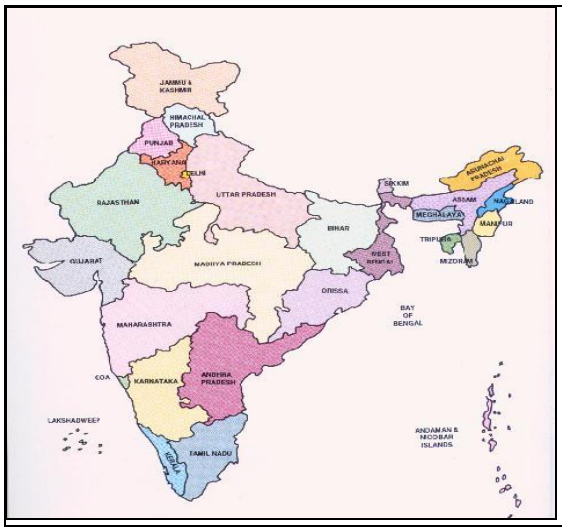
A.4.1.4. Details of physical location, including information allowing the unique identification of this project activity (maximum one page):

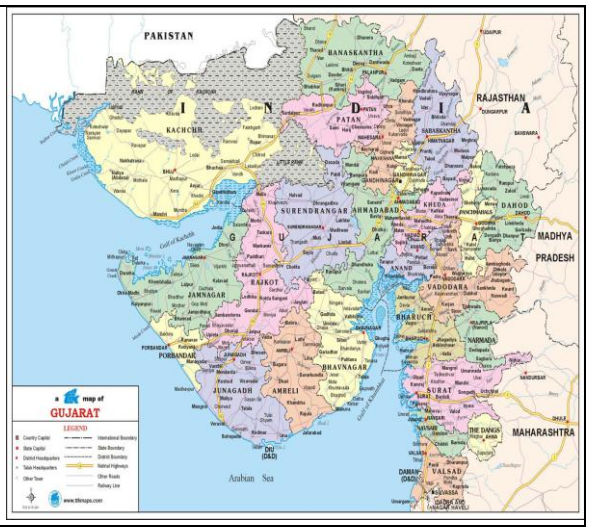
>>

Latitude : 22.3686° N to 22.3799° N
Longitude : 70.6922° E to 70.7083° E

The nearest airport and railway station are in Kandla which is at a distance of approximately 75 kms from the project location.

The location was chosen after detailed evaluation of the characteristics of the site. The proposed land area is barren and unfit for agricultural or other livelihood activities. Further, there is no habitation in the area and hence there has been no requirement for rehabilitation. The land has been found to have high potential to generate solar power.





Site Coordinates

Site Location

A.4.2. Category(ies) of project activity:

>>

The project activity is considered under "Grid-connected electricity generation from renewable sources", with a capacity more than 15 MW. Therefore as per the scope of the project activity enlisted in the 'list of sectoral scopes and related approved baseline and monitoring methodologies', the project activity may principally be categorized in:

Scope Number 1
Sectoral Scope – Energy Industries (renewable/non-renewable sources)
Methodology – ACM0002 - "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0)

A.4.3. Technology to be employed by the project activity:

>>

The Project activity envisages installation of 25 MW concentrated solar thermal power technology based grid connected power plant. Since the project activity is a Greenfield installation there was no electricity generation at the project site. The technical lifetime of the project activity would be 25 years as specified by the GERC order. CSPPL had appointed S2M Solutions, Spain to conduct a Direct Normal Irradiance (DNI) study and KPMG to prepare the Detailed Project Report. Based on the results of the DNI Study that were also used in the DPR, the net generation from the project activity has been assumed as 117,217 MWh.

In accordance with the applicable consolidated baseline methodology ACM0002, Version 12.3.0, since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is 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".

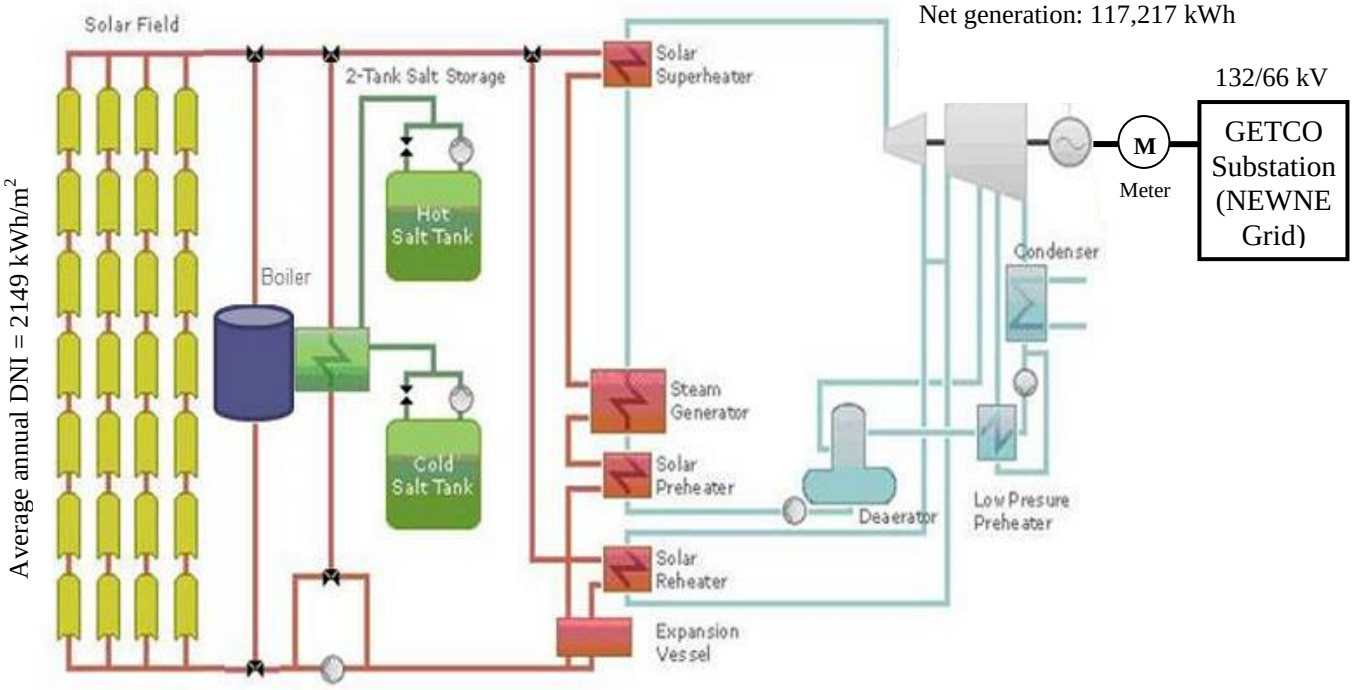
In the project activity parabolic trough solar field will be used for collection of the solar heat and this will supply steam to power plant (Rankine) systems, essentially fulfilling the role of a solar boiler in contrast to fossil-fuel-fired boilers. A heat transfer fluid, typically oil at temperatures up to 400°C, is circulated through the pipes and then pumped to a central power block area, where it passes through a heat exchanger. The oil's heat is then passed to a working fluid, such as water or steam, which is used in turn to drive a conventional turbine generator.

The Solar thermal plant can be broken down into following interlinked principal subsystems:

- Solar Collectors Field
- Salt Storage Tanks
- Heat Transfer Fluid (HTF) system
- Power Block
- Water System

These systems are identified in the following general plant schematic. In addition, there are several ancillary systems such as compressed air, nitrogen, and, if required, auxiliary fuel systems.

Gross gen.: 129,880 kWh
Auxiliary cons.: 12,663 kWh
Net generation: 117,217 kWh



Scheme of Cycle for the proposed Plant
Source: S2M Report

The technical details are as follows:

- The solar field is composed of solar collector assemblies (SCAs) connected in parallel to a thermally insulated pipeline. The cold working fluid (HTF) is pumped from the plant power block through a cold collector pipeline that distributes it to parallel loops in the solar field. Each loop is made up of 4 SCAs grouped in two adjacent rows with 2 SCAs each, connected by a header pipe.
- The Heat Transfer Fluid (HTF) shall be a eutectic mixture of biphenyl (73.5%) and diphenyl (26.5%) oxide. HTF is stable and is recommended to operate during long periods of time between 370ºC-400ºC.
- The Solar Steam Generator consists of preheater, evaporator, superheater and reheater
- The Steam Turbine will have 25 MWe of net capacity
- To maintain plant operation during hours of reduced radiation and after sunset, it has an integrated heat storage system. The solar energy that accumulates during the day is stored and used after sunset. During hours of surplus energy, the heat-transfer fluid (HTF) heats the salt to 386°C. During hours of lower insolation, the stored molten salt cools down to 292ºC, transferring its heat to the HTF. The freezing point of the salt is 221 °C.

The technology for the project is environmentally safe and sound. Further, there is no technology transfer associated with the project activity.

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

>>

Years	Annual estimation of emission reductions in

	tonnes of CO_2 e
2013	111,204
2014	111,204
2015	111,204
2016	111,204
2017	111,204
2018	111,204
2019	111,204
Total estimated reductions (tonnes of CO_2e)	**778,429**
Total number of crediting years	**7**
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	**111,204**

A.4.5. Public funding of the project activity:

>>

There is no recourse to any public funding in the proposed project activity. The project proponent hereby confirms that there is no diversion of Official Development Assistance (ODA) to the proposed project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

>>

Title of the baseline methodology: "Consolidated Baseline Methodology for grid-connected electricity generation from renewable sources".
Reference: ACM0002, Version 12.3.0 (Sectoral Scope: 01)

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html).

The approved methodology also draws upon Version 06.0.0 of the Methodological tool "Demonstration and assessment of additionality" and Version 05.0.0 of "Combined tool to identify the baseline scenario and demonstrate additionality" for establishing the additionality of the said project activity. The baseline for the said project activity is determined using the "Tool to calculate the Emission Factor of an electricity system" (Version 02.2.0, EB 61).

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

>>

The methodology ACM0002 Version 12.3.0 is being applied for the project activity. Since the project activity is a solar power based renewable energy project designed to export generated power to the grid, it is eligible to use this methodology. The applicability criterion for the methodology are stated and accordingly discussed below[2]:

- *The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.*

  The proposed project activity is a solar thermal power plant utilising energy from sun to generate electricity.

- *In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant 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 addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;*

  The proposed project activity is Greenfield project and not a capacity addition.

- *In case of hydro power plants, at least one of the following conditions must apply:*
  - *The project activity is implemented in an existing or multiple reservoirs, with no change in the volume of any of the reservoirs; or*

[2] The justification for the applicability conditions can be verified from the project Detailed Project Report (DPR)

- *The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity; or*
- *The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity.*

The proposed project activity is not a hydro power plant.

- *In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2 after the implementation of the project activity all of the following conditions must apply:*
  - *The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2;*
  - *All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project that collectively constitutes the generation capacity of the combined power plant;*
  - *The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;*
  - *The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m^2, is lower than 15 MW;*
  - *The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.*

The proposed project activity is not a hydro power plant.

- *The methodology is not applicable to the following:*
  - *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;*
  - *Biomass fired power plants;*
  - *Hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m^2.*

The project activity is a Greenfield solar thermal power project and does not involve any sort of fuel switching.

- *In the case of retrofits, 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, i.e. 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".*

The proposed project activity is a Greenfield project and not a capacity addition, retrofit or replacement.

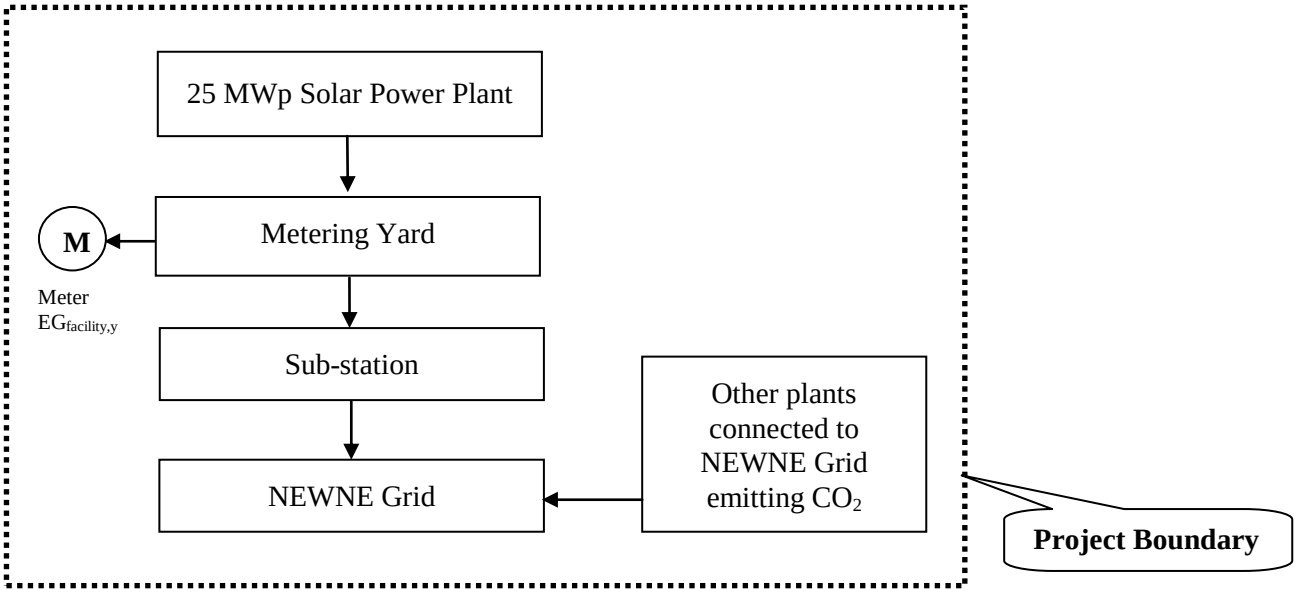
Hence, the methodology ACM0002 Version 12.3.0 is applicable to the project activity.

B.3. Description of the sources and gases included in the project boundary:

>>

The project boundary for the project activity is selected in accordance with the guidance provided in the applied methodology ACM0002 Version 12.3.0. The determination of the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the project power plant is connected to.

A diagram depicting the project boundary is shown below:



According to the methodology ACM0002 the following gases are to be considered for the boundary:

	Source	Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fired power plants that are displaced due to the project activity.	CO_2	Yes	The project activity is aimed at displacing the grid power, and thus reducing the CO_2 emissions resulting from the power generation.
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project Activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam.	CO_2	No	Not applicable for solar projects
		CH_4	No	Not applicable for solar projects
		N_2O	No	Not applicable for solar projects
	CO_2 emissions from combustion of fossil fuels for	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source

	electricity generation in solar thermal power plants and geothermal power plants	N_2O	No	Minor emission source
	For hydro power plants emissions of CH_4 from the reservoir	CO_2	No	Not applicable for solar projects
		CH_4	No	Not applicable for solar projects
		N_2O	No	Not applicable for solar projects

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

>>

The project activity is the installation of a new grid-connected renewable power plant. Thus, according to Baseline Methodology ACM0002 Version 12.3.0 is:

If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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

Accordingly the baseline is selected as the generation sources that are part of the NEWNE grid to which the power generated by the project is fed.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

>>

As per the decision 17/cp.7, paragraph 43, a CDM project activity is additional if anthropogenic emissions of green house gases by sources are reduced below those that would have occurred in absence of registered CDM project activity.

"Guidelines on the demonstration and assessment of prior consideration of the CDM" (EB62, Annex 13), states that for project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status. In line with the above guidance, the project proponent intimated the UNFCCC and National CDM Authority (Host Party DNA) of its intention to seek CDM for the proposed project activity vide its letter dated 18th June 2010 and received an acknowledgement for the same from UNFCCC on 8th July 2010. Hence it can be clearly established that CDM was seriously considered in the decision to proceed with the proposed project activity.

Further, the implementation timeline and the steps taken for the CDM registration process are presented below:

Date	Project Execution Step	CDM registration efforts	Evidence
18/06/2010		Submission of form for prior consideration of CDM to UNFCCC and National CDM Authority	Email dated 18/06/2010 and http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html
07/07/2010		Appointment of CDM Consultant	Letter of Engagement dated 07/07/2010
24/12/2010	Supplemental PPA for change of name to its SPV		Letter Ref No. GUVNL/COM/Solar/Cargo/2495
09/12/2010		Invitation of Quotations from DOE's for Validation	Emails dated 09/12/2010
16/02/2011		Appointment of DOE	Order dated 16/02/2011
21/02/2011	Finalization of Technical Evaluation Report for project activity		Technical Evaluation Report by Sun to Market Solutions, S.L.
14/03/2011	Finalization of Detailed Project Report for project activity		Email dated 14/03/2011
21/03/2011	Decision by the Board of Directors to implement project considering CDM revenues	Decision by the Board of Directors to implement project considering CDM revenues	Minutes of Meeting dated 21/03/2011
22/03/2011	Appointment of Lauren as EPC contractor (Project Start Date)		LOA Dated 22/03/2011

The demonstration of the additionality of the said project activity is being carried out in accordance with the additionality tool provided by the UNFCCC i.e. Methodological tool "Demonstration and assessment of additionality" Version 06.0.0. This tool provides a step-wise approach to demonstrate additionality, which is dealt with below:

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

Sub-step 1a: Define alternatives to the project activity:

Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity.

Sub-step 1b: Consistency with mandatory laws and regulations:

The alternative(s) shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. (This sub-step does not consider national and local policies that do not have legally-binding status.).

The proposed project activity envisages the installation of a solar thermal power plant with storage for generation of electricity and its supply to NEWNE grid. Hence, according to baseline methodology

ACM0002 Version 12.3.0, since the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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

Paragraph 105 of the "Clean Development Mechanism Validation and Verification Manual" Version 01.2 states that "The PDD shall identify credible alternatives to the project activity in order to determine the most realistic baseline scenario, unless the approved methodology that is selected by the proposed CDM project activity prescribes the baseline scenario and no further analysis is required."

The baseline alternative mentioned above is in compliance with all the applicable regulatory policies and laws. Additionally, the project proponent is under no compulsion to opt for any particular technology or even a renewable mode of power generation. There is no governmental body or EB policy which requires a particular kind of fuel to be chosen[3] and there is no legal requirement to which the above alternative does not conform.

Since, the methodology has prescribed the baseline scenario as discussed above and it is in compliance with mandatory laws and regulations, therefore there is no requirement of identification of alternatives to the project activity and Step 1 can be skipped.

Step 2: Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, use the following sub-steps:

Sub-step 2a: Determine appropriate analysis method

The project activity envisages the export of the power generated by the solar power plant to the grid and the revenues from the sale would be generated in accordance with the terms and tariffs established in the PPA. Thus, simple cost analysis cannot be used as the analysis method as the sale of the units of generated electricity shall result in a revenue stream during the operations of the project.

After eliminating Option I, the use of Benchmark analysis (Option III) is the method of analysis that has been selected as the most suitable method. This method determines the attractiveness of the project activity for the investors, as well as provides a measure of the viability of the investment to generate revenues during its operation, as compared with other avenues and investment options. Hence, the Benchmark analysis method is to be employed for analysis of the said project.

Sub-step 2b (Option III): Apply benchmark analysis

The financial indicator chosen for the project activity is the Project Internal Rate of Return (IRR). Project IRR has been calculated based on project cash outflows and cash inflows only, irrespective the source of financing. Financial and economic theory holds that a firm must expect an after-tax project IRR on the funds it invests that is at least sufficient to induce investors to purchase and hold the firm's debt and equity. In assessing the viability of a project, a firm should theoretically only invest in the project if the project IRR is greater than the weighted cost of debt and equity. The "Guidelines on the Assessment of

[3] http://www.powermin.nic.in/acts_notification/electricity_act2003/generation_electricity.htm

Investment analysis", (EB 62, Annex 5) Paragraph 12 states that "*... weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR*".

The guidance also states that *"in the cases of projects which could be developed by an entity other than the project participant the benchmark should be based on parameters that are standard in the market."*

Thus in view of the above, **the Weighted Average Cost of Capital (WACC) has been chosen as the benchmark for assessment against the project IRR**. The WACC methodology, as described below is a widely accepted method for calculating the cost of capital which is understood by both the finance community and the industry. WACC has been calculated by taking the respective proportion of debt and equity in the financing pattern as weights. Please note that in India, a debt to equity ratio of 70:30 is considered as the norm for financing power projects[4]. The benchmark for the project has been derived based on the cost of equity financing representing the required return on capital by investors and the cost of debt financing representing required rate of return on capital by the creditors as illustrated below[5]:

$$WACC = \frac{E}{V} \cdot R_e + \frac{D}{V} \cdot R_d \cdot (1 - T_c)$$

Where

$WACC$	=	Weighted Average Cost of Capital
E	=	Value of the equity
D	=	Value of the debt
V	=	Value of the equity + Value of the debt
R_e	=	Cost of Equity
R_d	=	Cost of Debt
T_c	=	Corporate tax rate

Of the examples suggested by the additionality tool, the project proponent has identified the *Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type* [paragraph 6(a) of sub-step 2b)] as the benchmark for cost of equity. The appropriate cost of debt has been taken as the *Prime lending rate* prevailing at the time of investment decision in accordance with "Guidelines on the Assessment of Investment analysis" Version 05. The same has been adjusted to tax rate in order to serve as a benchmark comparable to post tax IRR computations.

Cost of Debt:

Cost of debt is defined as the rate at which lenders agree to lend money to a project. The additionality tool and the guidance on assessment of investment analysis clarify that the benchmark for project with more than one potential developer should not be based on project specific parameters but should represent the standard in the market. Accordingly, the bank prime lending prevailing at the time of project start date has been considered as the cost of debt. The prime lending rate of the major nationalized bank in India at the time of investment was 13%. Interest costs are tax deductible, therefore in order to arrive at the post tax cost of debt, the cost of debt is multiplied with marginal tax rate. The

[4] Several regulations and orders refer this as the normative debt equity ratio for power projects e.g. CERC (Terms & Conditions for the determination of Tariff) Regulations (http://cercind.gov.in/2009/Whats-New/tariff-pdf/CERC-(Terms-and-Conditions-of-Tariff)-Regulations-2009-14.pdf), IREDA's norms for financing renewable energy projects (http://www.ireda.gov.in/pdf/Annexure%20A%20(Interest%20Rate%20and%20etc.).pdf) etc.

[5] http://www.investopedia.com/terms/w/wacc.asp#axzz1pxgTegsc

loan tenure of the project is 10 years, it may be noted that for the first 10 years of their operation, the power projects in India typically pay MAT owing to tax exemption as per the provisions of the Section 80IA of the Income Tax Act. Accordingly the marginal tax rate has been considered as 19.93% (MAT rate for the year 2010-11).

The post tax cost of debt therefore works out to: 13% * (1-19.93%) = 10.41%

Required rate of return on Equity:

According to Guidance 15 of the Guidelines on the Assessment of Investment Analysis (EB 62, Annex 5), "If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors."

The cost of equity was calculated using both approaches and the conservative value was used for further used for calculation of WACC benchmark.

- Approach (a): Selecting the values provided in Appendix A

According to paragraph 7 of the appendix to the Guidelines on the assessment of investment analysis Version 05, "*In situations where an investment analysis is carried out in nominal terms, project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate.*" Since the investment analysis is being carried out in nominal terms, the real term default values provided in the appendix require to be converted to nominal values by adding the inflation rate.

The default value for expected return on equity for energy industry in India in real term rates as per appendix to the Guidelines on the assessment of investment analysis is 11.75%.

The long-term inflation forecast from Reserve Bank of India which is the central bank of the host country is 5.5%[6].

Therefore, the expected return on equity in nominal terms is 11.75% + 5.5% = 17.25%.

- Approach (b): Calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors

The cost of equity was calculated using the Capital Asset Pricing Model (CAPM). As per CAPM, the cost of equity investment is the return of a risk-free security plus beta times the difference between the market return and the risk-free return.

While considering a new project, CAPM can provide the required rate of return that the project needs to yield, taking into account the volatility (risk) of the stock relative to the market (Beta). This required return on equity represents the cost of equity benchmark for the project.

The formula of CAPM is as follows:

$R_e = R_f + \beta (R_m - R_f)$

where:

R_e	=	Rate of return on equity;
R_f	=	Risk-free rate of return;

[6] Table A.7 of http://rbidocs.rbi.org.in/rdocs/PressRelease/PDFs/IEPR1717PF051.pdf

β	=	Beta or systematic risk for this type of equity investment coefficient reflecting the volatility (risk) of the stock relative to the market;
R_m	=	Expected market returns
$R_m - R_f$	=	Market risk premium;

The Government Securities have been taken to represent the risk free return. Stock index has been used to represent the market return.

Risk free rate:

The risk free rate is understood as the rate of return on an asset that is theoretically free of any risks, therefore the weighted average yield of Government of India Securities are considered as risk free rate determined at the time of project start i.e. at that point in time, the company had the alternative of this long term risk free investment. This data is published by Reserve Bank of India. (Source: http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/06MD240111F.pdf).

The applicable risk free rate is 7.94%.

Beta (β) Value:

The β in the CAPM equation helps to account for the systematic risk by quantifying the sensitivity of the stocks of the companies representing a particular project type/sector with the market returns. Thus, it incorporates the risk of a specific sector in the calculation of the cost of equity. The Beta value taken for this analysis is based on the beta values of the listed power companies engaged in similar business as the project activity at the time of investment decision estimated by regressing weekly returns on stock against local index.

Company Name	Beta	D/E	Tax Rate	Unlevered Beta
BF Utilities	0.831	1.12	N/A	N/A
TATA Power	0.972	0.55	25%	0.80
CESC Ltd	0.736	0.54	17%	0.75
JP Power	0.901	1.59	17%	0.70
Neyveli lignite	1.367	0.39	19%	1.21
GIPCL	1.572	0.85	15%	0.74
Reliance Infra	1.018	0.32	17%	1.21
Average Beta				**0.90**

The guidance on investment analysis requires the use of benchmark which represents standard market returns. These returns are assumed to reflect the risk free rate of return plus a market premium. The capital asset pricing model requires the adjustment of the market premium with the factor 'beta' which represents the volatility of a stock relative to a well diversified market portfolio.

In order to understand the standard market returns, it is essential to consider a wide range of companies Hence an attempt to study the beta values of companies with relatively significant investment in power sector including renewable and non renewable energy has been carried out.

The mean of the beta values of companies after unlevering has been estimated as **0.90** and the same has been chosen for further analysis.

Risk Premium:

The market risk premium, as measured and applied in practice, is the premium above the risk-free rate of return that investors expect to earn on a well-diversified portfolio of equities. In the CAPM, the premium

is estimated by looking at the difference between average return on stocks and return on government securities over an extended period of history. It is preferred to use long term premiums, since considering shorter time periods can lead to large standard errors because of volatility in stock returns[7]. The risk premium has been calculated as the difference in compounded annual return between the broad well diversified market portfolio represented by BSE-500 index and the Central Government Securities. The detailed calculations are presented in the attached excel sheet.
Source: BSE Stock Exchange (www.bseindia.com)

The applicable risk premium is 15.71%.

Market Rate of Return (R_m)
= 23.65 %
(Calculations provided in the excel sheet)

Expected Return on Equity
= 7.94% + 0.90 * 15.71% = 22.10%

Therefore, the expected return on equity from approach (a) is found to be conservative. Hence, the expected Return on Equity is taken as 17.25%.

The WACC is calculated as per the following formula:

$$WACC = \frac{E}{V} \cdot R_e + \frac{D}{V} \cdot R_d \cdot (1 - T_c)$$

The WACC thus estimated is equal to 12.46%. (Detailed calculations of WACC are explained in the Benchmark estimation excel sheet).

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

The project and equity internal rate of return for the proposed project activity without CDM revenues was computed for a period of 25 years, corresponding to the lifetime of the solar project based on the following assumptions[8] including various benefits available to the project activity from the National and Sectoral policies for promoting renewable energy generation in India. The assumptions used to calculate the IRR are listed below:

Parameter	Unit	Value	Reference
Capital Cost (with Land)	INR Lakh	82,938	Quotations by different suppliers
Funding for project			
Equity Component	%	30%	Detailed Project Report
Debt Component	%	70%	Detailed Project Report

[7] Page 6-7, Equity Risk Premiums, Aswath Damodaran (http://www1.worldbank.org/finance/assets/images/Equity_Risk_Premiums.pdf)

[8] The Investment analysis includes various benefits available to the project activity from the national and sectoral policies for promoting renewable energy generation in India such as accelerated depreciation, tax holidays etc.

Phasing of Expenditure			
Duration of Construction	Years	2	
Salvage Value	%	10%	GERC Order dated 29/01/2010
Particulars			
Installed Capacity	MW	25	Detailed Project Report/Power Purchase Agreement
Hours of thermal storage	Hrs	9	Detailed Project Report
Useful Life	Years	25	Detailed Project Report
Energy Generation			
Gross Generation	MWh	129,880	In accordance with the "Guidelines for reporting and verification of Plant Load Factors" Version 01 option 3 (b), the PLF and gross energy generation have been estimated based on the DNI Study prepared by S2M Solutions (a third party contracted by project proponent).
Plant Load Factor (back-calculated using gross generation value in DNI Study by S2M Solutions)	%	59.306%	
Auxiliary Consumption	%	9.75%	Study by S2M Solution and Detailed Project Report
Net Generation	MWh	117,217	Study by S2M Solution and Detailed Project Report
O&M Expenses			
O&M Expenses as % of project cost	%	1%	GERC Order dated 29/01/2010
O&M Expenses - Escalation Factor	%	5.00%	GERC Order dated 29/01/2010
Insurance Charge	%	0.35%	GERC Order dated 29/01/2010
Debt			
Interest on Term Loan	%	13.00%	SBI PLR
Loan Repayment Tenor	Years	10	Detailed Project Report
Moratorium Period	Years	0	Detailed Project Report
Debt sourcing %	%	75.00%	Detailed Project Report
Tariff			
Tariff -Solar Thermal (First 12 years)	INR/kWh	11.00	Power Purchase Agreement
Tariff -Solar Thermal (13 to 25 years)	INR/kWh	4.00	Power Purchase Agreement

Working Capital			
Working Capital - O&M Expenses	No. of months	1	GERC Order dated 29/01/2010
Working Capital - Receivables	No. of months	1	GERC Order dated 29/01/2010
Interest on Working Capital	%	12.00%	GERC Order dated 29/01/2010
Depreciation Rates			
Book Depreciation Rate (Year 1- 10)	%	5.28%	As per Companies Act
Book Depreciation Rate (Year 11- 25)	%	2.00%	As per Companies Act
Income Tax Depreciation Rate	%	15.00%	As per Companies Act
Taxation			
MAT	%	19.93%	As per Income Tax Act[9]
Corporate Tax Rate	%	33.22%	As per Income Tax Act
Income Tax Holiday	Years	10	As per Income Tax Act

The project IRR for the project activity was calculated in accordance with the "Guidelines on the Assessment of Investment Analysis" Version 05 as demonstrated below and its value was found to be 8.20%.

General issues in calculation and presentation

Guidance: *The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate. The IRR calculation may include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment. Project participants are requested to justify and DOEs are requested to validate the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period.*

→ The period of assessment has been chosen as the operational life of the project activity i.e. 25 years[10] which also satisfies the criteria of the maximum period of 20 years in accordance with the above guidance.

Guidance: *The fair value of any project activity assets at the end of the assessment period should be included as a cash inflow in the final year. The fair value should be calculated in accordance with local accounting regulations where available, or international best practice. It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets.*

→ The assessment period has been considered for the same duration as the operational life of the project activity i.e. 25 years. A salvage value of 10% of capital cost in accordance with the GERC order has been included as cash inflow in the final year.

[9] http://www.incometaxindiapr.gov.in/incometaxindiacr/contents/forms2010/pamphets/COMPANIES_2012_13.htm

[10] GERC Order

Guidance: *Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV). Taxation should only be included as an expense in the IRR/NPV calculation in cases where the benchmark or other financial indicator is intended for post-tax comparisons.*

→ Depreciation and all other non-cash items related to the project activity were added back to net profit for the purpose of calculating the project IRR. Tax has been included as an expense in the IRR calculation since the benchmark is intended only for post-tax comparisons.

Guidance: *Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing. The DOE should also validate that the listed input values have been consistently applied in all calculations.*

→ All input values used in the investment analysis were applicable at the time of investment decision.

Guidance: *In the case of project activities for which implementation ceases after the commencement and where implementation is recommenced due to consideration of the CDM the investment analysis should reflect the economic decision making context at point of the decision to recommence the project. Therefore capital costs incurred prior to the revised project activity start date can be reflected as the recoverable value of the assets, which are limited to the potential reuse/resale of tangible assets.*

→ The implementation of the project activity did not cease at any point of time after the initial decision for investment in the project after consideration of revenues from CDM.

Specific Guidance on the Calculation of Project IRR and Equity IRR

Guidance: *The cost of financing expenditures (i.e. loan repayments and interest) should not be included in the calculation of project IRR.*

→ The costs of financing expenditures have not been included in the calculation of the project IRR.

Using the assumptions in the tables above and referring to the guidance by the EB as demonstrated above, the project IRR for the project activity is found to be 8.20 %, which clearly depicts the fact that the project activity is not very attractive as an investment option since the returns are much below the selected benchmark of 13%.

From the analysis above, it is also clear that the project activity does not meet the stipulated benchmark without the CDM revenues and is hence additional.

Sub-step 2d: Sensitivity analysis

The sensitivity analysis of the IRR for the project activity was carried out in accordance with the "Guidelines on the Assessment of Investment Analysis" Version 05 as demonstrated below:

Guidance: *Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.. Where a DOE considers that a variable which constitute less than 20% have a material impact on the analysis they shall raise a corrective action request to include this variable in the sensitivity analysis*

→ The following parameters were subjected to variation in the sensitivity analysis:

- *Energy generation/PLF*
- *Capital Cost*
- *Operation & Maintenance Expenses*
- *Tariff*

The results of the sensitivity analysis have been presented in a spreadsheet along with the calculation of the IRR and have also been summarized below.

Guidance: *The DOE should assess in detail whether the range of variations is reasonable in the project context. Past trends may be a guide to determine the reasonable range. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative the DOE shall provide an assessment of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity.*

→ All parameters that were subjected to a sensitivity analysis were assessed for a variation from -10% to +10%. The results of the sensitivity analysis are summarized below:

Sensitivity Analysis				Comments
Parameter	-10%	0%	10%	
Energy Generation	6.62%	8.20%	9.70%	The energy generation is estimated based DNI study conducted by S2M which is already on a higher side and is not anticipated to increase any further during the project lifetime.
Capital Cost	10.39%	8.20%	6.31%	The decrease in capital cost is not anticipated.
Tariff	6.62%	8.20%	9.70%	The tariff is fixed according to the PPA signed with the state electricity utility and is not anticipated to change during the PPA period.
O&M Cost	8.38%	8.20%	8.01%	The O&M costs may increase in the future, however a decrease in O&M costs is not anticipated.

The above sensitivity analysis shows the IRR for the project does not exceed the benchmark even after variation in critical factors hence the financial analysis demonstrated above is robust.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Since the project activity is a measure that involves use of renewable energy, as per paragraph 47 of the methodological tool "Demonstration and assessment of additionality" version 06.0.0, the following steps have been followed for common practice analysis:

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

Since the proposed project activity has a proposed installed capacity of 25 MW, the applicable output range for common practice analysis will be 12.5 MW to 37.5 MW (± 50% of 25 MW).

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step;

N_{all} = All the power plants in the applicable output range in the applicable geographical area. Thus for the proposed project activity this will include all the power plants in the range from 12.5 MW to 37.5 MW commissioned in India before the start date of the proposed project activity i.e. 22 March 2011.

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

N_{diff} = All the power plants with technologies different from that of the proposed project activity in the applicable output range in the applicable geographical area. Hence for the proposed project activity, this will include all the power plants in the range from 12.5 MW to 37.5 MW commissioned in India before the start date of the proposed project activity i.e. 22 March 2011 and use technologies different from solar photovoltaic technology for power generation as will be used by the proposed project activity.

Step 4: Calculate factor $F = 1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

Therefore, $F = 1-\frac{N_{diff}}{N_{all}} = \frac{N_{all} - N_{diff}}{N_{all}}$

($N_{all} – N_{diff}$) represents all the plants using solar photovoltaic technology in the range of 12.5 MW to 37.5 MW installed in India before 22 March 2011.

As per the the MNRE report on MW size grid connected solar power plants in India (http://mnre.gov.in/file-manager/UserFiles/powerplants_241111.pdf), as on 22 March 2011, there was no solar power plant installed in India in the range of 12.5 MW to 37.5 MW capacity.

Therefore, $(N_{all} – N_{diff}) = 0$

and $F = (N_{all} – N_{diff})/N_{all} = 0$

Since the factor F is less than 0.2 and N_{all}-N_{diff} is less than 3, the proposed project activity is not a common practice within the power sector in the country.

Sub-step 4b: Discuss any similar options that are occurring:

The Methodological Tool "Demonstration and assessment of additionality" Version 06.0.0 states in Sub-step 4b that *"If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive (as contended in Step 2) or faces barriers (as contended in Step 3)."*

- ✓ On the basis of the conclusions of the analysis in Sub-step 4a, it is seen that there are no similar project activities in the host country currently under operation.

Hence as per Methodological tool "Demonstration and assessment of additionality" Version 06.0.0 further analysis of step 4 (b) is not required.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Project emissions

CO_2 emissions from the combustion of fossil fuels shall be accounted for as project emissions ($PE_{FF,y}$).

There is no provision to use fossil fuel in the current process of the project activity. However, in case there is a change in the policy or process in the future, the calculation of project emissions shall be done using the latest version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

Baseline Emissions

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:

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

Where:

BE_y	=	Baseline emissions in year *y* (tCO_2)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the version 02.2 of the "Tool to calculate the emission factor for an electricity system"

Calculation of $EG_{PJ,y}$

(a) Greenfield plants

Since the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, therefore:

$EG_{PJ,y} = EG_{facility,y}$

Where:

$EG_{PJ,y}$	=	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)
$EG_{facility,y}$	=	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)

Calculation of $EF_{grid,CM,y}$

In accordance with the "Tool to calculate the emission factor for an electricity system" Version 02.2, combined margin CO_2 emission factor for grid connected power generation is calculated stepwise as below:

Step 1: Identify the relevant electric power system

For the purpose of determining the electricity emission factors, a **project electricity system** is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints.

The Indian power system is divided into two independent regional grids, namely NEWNE and Southern grid. Each grid covers several states. Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the regional problems relating to the grid.

Each state in a regional grid meets their demand with their own generation facilities and also with allocation from power plants owned by the central sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the central sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. There are also electricity transfers between regional grids, and small exchanges in the form of cross-border imports and exports (e.g. from Bhutan). Recently, the Indian regional grids have started to work in synchronous mode, i.e. at same frequency.

Table 1: States connected to different regional grids

Regional grid	**NEWNE Grid**				**Southern grid**
	Northern	**Eastern**	**Western**	**North Eastern**	**Southern**
States	Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh and Uttarakhand	Bihar, Orissa, West Bengal, Jharkhand and Sikkim	Gujarat, Madhya Pradesh, Maharashtra, Goa and Chattisgarh	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura	Andhra Pradesh, Karnataka, Kerala and Tamil Nadu
Union Territories	Delhi and Chandigarh	Andaman-Nicobar	Daman & Diu, Dadar & Nagar Haveli	-	Pondicherry, Lakshadweep

The NEWNE grid constitutes several states including Maharashtra. These states under the regional grid have their own power generating stations as well as centrally shared power-generating stations. While the power generated by own generating stations is fully owned and consumed through the respective state's grid systems, the power generated by central generating stations is shared by more than one state depending on their allocated share. Presently the share from central generating stations is a small portion of their own generation.

Since the CDM project would be supplying electricity to the NEWNE grid, it is preferable to take this grid as the project boundary rather than the state boundary. It also minimizes the effect of inter state power transactions, which are dynamic and vary widely. Considering free flow of electricity among the

member states and the union territory, the entire NEWNE grid is considered as a single entity for estimation of baseline.

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

Project participants may choose 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 Option I for the calculation of the operating and build margin emission factor i.e. off-grid power plants are not being included in the calculation.

Step 3: Select an operating margin (OM) method

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

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

As per the tool, any of the four methods can be used. For the proposed project activity, simple OM method has been chosen to calculate the operating margin emission factor ($EF_{grid,\ OM,\ y}$). However, the simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. The low-cost/must-run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

Table: Share of Low Cost / Must-Run (% of Net Generation)

	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**
NEWNE	18.0%	18.5%	19.0%	17.4%	15.9%
South	27.0%	28.3%	27.1%	22.8%	20.6%
India	20.1%	20.9%	21.0%	18.7%	17.1%

Ref: CO_2 Baseline Database for the Indian Power Sector – CEA, Version 06.[11]

Percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) = 17.7 %

The calculation above shows that the generation from low-cost/must-run resources constitutes less than 50% of total grid generation, hence usage of the **Simple OM method** in the project case is justified.

The Simple OM emission factor can be calculated using either of the two following data vintages for years(s) *y*:

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period,

[11] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

or

- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

The project proponents choose the *Ex ante* option for estimating the simple OM emission factor wherein as described above a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period will be undertaken.

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

The simple OM method has been selected as justified above. The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units using the following formula:

$$EF_{grid,OM,simple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO2,i,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,,y}$	=	Simple operating margin CO_2 emission factor of in year y (tCO_2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power unit m in year y (MWh)
m	=	All power units serving the grid in year y except low-cost / must-run power units
I	=	All fossil fuel types combusted in power plant / unit m in year y
y	=	Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

In India, the Central Electricity Authority (CEA) has estimated the baseline emission factor for the power sector. This data has also been endorsed by the DNA and is the most authentic information available in the public domain. The details of same can be found on CEA website at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm.

Step 5: Calculate the build margin (BM) emission factor

In terms of vintage of data, project participants can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex-post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The project proponent wishes to choose option 1.

Capacity additions from retrofits of power plants should not be included in the calculation of the build margin emission factor.

The sample group of power units *m* used to calculate the build margin should be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-units}}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) (SET ≥ 20%) and determine their annual electricity generation (AEG_{SET}-≥20%, in MWh);

(c) From $SET_{5\text{-units}}$ and $SET_{\geq 20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin.

In India, the installed capacity and corresponding annual generation from power plants is quite high. The Central Electricity Authority (CEA) has estimated the annual electricity generation from $SET_{\geq 20\%}$ to be larger than the generation from $SET_{5\text{-units}}$. The details of same can be found on CEA website at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm. Further, none of the power units in $SET_{\geq 20\%}$ started to supply electricity to the grid more than 10 years ago. Therefore, SET_{sample} is selected as $SET_{\geq 20\%}$ for the estimation of build margin.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \cdot EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{gid, BM, y}$	=	Build margin CO_2 emission factor in year y (tCO_2 / MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year y (MWh)
$EF_{EL, m, y}$	=	CO_2 emission factor of power unit *m* in year y (tCO_2 / MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which power generation data is available

Calculations for the Build Margin emission factor $EF_{gid, BM, y}$ is based on the most recent information available on the plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of the power plant capacity additions in the electricity system that comprise 20 % of the system generation and that have been built most recently ($SET_{\geq 20\%}$).

Step 6. Calculate the combined margin emissions factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

The weighted average CM method (option A) should be used as the preferred option. Therefore, the combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$	=	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

The following default values should be used for w_{OM} and w_{BM}:

- Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods.
- All other projects: w_{OM} = 0.5 and w_{BM} = 0.5 for the first crediting period, and w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period, unless otherwise specified in the approved methodology which refers to this tool.

As mentioned before, the baseline emission factors have been calculated as per CEA sourced data for various regional grids in India according to the formulas specified above. As this is the most authentic information available in the public domain, the baseline emission factor used in the calculation of

baseline emissions for the proposed project activity is being referred from the same for transparency and conservativeness[12].

Leakage

According to ACM0002 Version 12.3.0, no leakage emissions are to be considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected.

Emission Reductions

Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
BE_y	=	Baseline emissions in year *y* (t CO_2)
PE_y	=	Project emissions in year *y* (t CO_2e)

B.6.2. Data and parameters that are available at validation:

>>

Data / Parameter:	**$EF_{OM,y}$**
Data unit:	tCO_2/MWh
Description:	Operating Margin emission factor for NEWNE grid
Source of data used:	Referred from CO_2 Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 6.0.
Value applied:	0.9942
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated it as CEA sourced data 3 years' vintage data (2007-08, 2008-09 and 2009-10) and option of ex ante calculation based on Simple Operating Margin Method. Computed once during PDD finalization.

Operating Margin Estimation for NEWNE Grid (tCO_2 / GWh)		
Year	**Operating Margin (tCO_2e/GWh)**	**Net Generation (GWh)**
2007-08	0.9999	401,642
2008-09	1.0066	421,803
2009-10	0.9777	458,043
Generation Weighted Average OM	**0.9942 tCO_2e / MWh**	

Any comment:	The value has been fixed ex-ante.

Data / Parameter:	**$EF_{BM,y}$**
Data unit:	0.8123 tCO_2/MWh
Description:	Build Margin emission factor for NEWNE grid

[12] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Source of data used:	Referred from CO_2 Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 6.0.
Value applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as per CEA sourced data for the year 2009-10. The build margin is calculated in this database as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation and option of ex ante calculation. Computed once during PDD finalization.
Any comment:	The value has been fixed ex-ante.

Data / Parameter:	**EF_y**
Data unit:	tCO_2/MWh
Description:	Combined Margin CO_2 emission factor for NEWNE grid
Source of data used:	Estimated figure based on 75% of OM and 25% of BM values
Value applied:	0.9487 tCO_2/GWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as per CEA sourced data with 3 years vintage data and option of ex ante calculation based on 75% of OM and 25% of BM values approach. Computed once during PDD finalization.
Any comment:	The value has been fixed ex-ante.

Combined Margin Estimation for NEWNE Grid (tCO_2e / MWh)	
Generation Weighted Average OM ($EF_{grid, OM,y}$)	**0.9942**
BM ($EF_{grid, BM, y}$)	**0.8123**
Combined Margin (EF_{CO2})	**0.9487**

B.6.3. Ex-ante calculation of emission reductions:

>>

Baseline Emissions

Parameter	**Value**	**Units**
Installed Capacity	25	MW
Gross Generation	129,880	MWh/yr
Auxiliary Consumption/Field Losses	9.75	%
Net Generation	117,217	MWh/yr

Particulars	**Unit**	**2006-07**	**2007-08**	**2008-09**
Simple Operating Margin (incl. Imports)	tCO_2e/MWh	0.9999	1.0066	0.9777
Net Electricity Generation	GWh	401,642	421,803	458,043
Generation Weighted Average Operating Margin	tCO_2e/MWh	0.9942		

Particulars	Unit	Value	Weight
Generation Weighted Average Operating Margin	tCO_2e/MWh	0.9942	0.75
Build Margin (not adjusted for imports)	tCO_2e/MWh	0.8123	0.25
Combined Margin (incl. Imports) (Wt. Avg. of OM & BM) Emission Factor	tCO_2e/MWh	0.9487	

Baseline Emissions BE_y = 0.9487 x 117,217 = 111,204 tCO_2e

Project Emissions

There are no fossil fuels proposed to be used in the project activity. Hence, project emissions can be neglected.

Emission Reductions

$ER_y = BE_y - PE_y$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e)
BE_y	=	Baseline emissions in year *y* (t CO_2)
PE_y	=	Project emissions in year *y* (t CO_2e)

ER_y = 111,204 – 0 tCO_2 = 111,204tCO_2

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Estimation of Project activity emissions (tonnes of CO_2e)	Estimation of Baseline emissions (tonnes of CO_2e)	Estimation of Leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2013	0	111,204	0	111,204
2014	0	111,204	0	111,204
2015	0	111,204	0	111,204
2016	0	111,204	0	111,204
2017	0	111,204	0	111,204
2018	0	111,204	0	111,204
2019	0	111,204	0	111,204
TOTAL	0	**778,429**	**0**	**778,429**

B.7. Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	**$EG_{facility,y}$**
Data unit:	MWh
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data to be	Joint Meter Reading Sheets

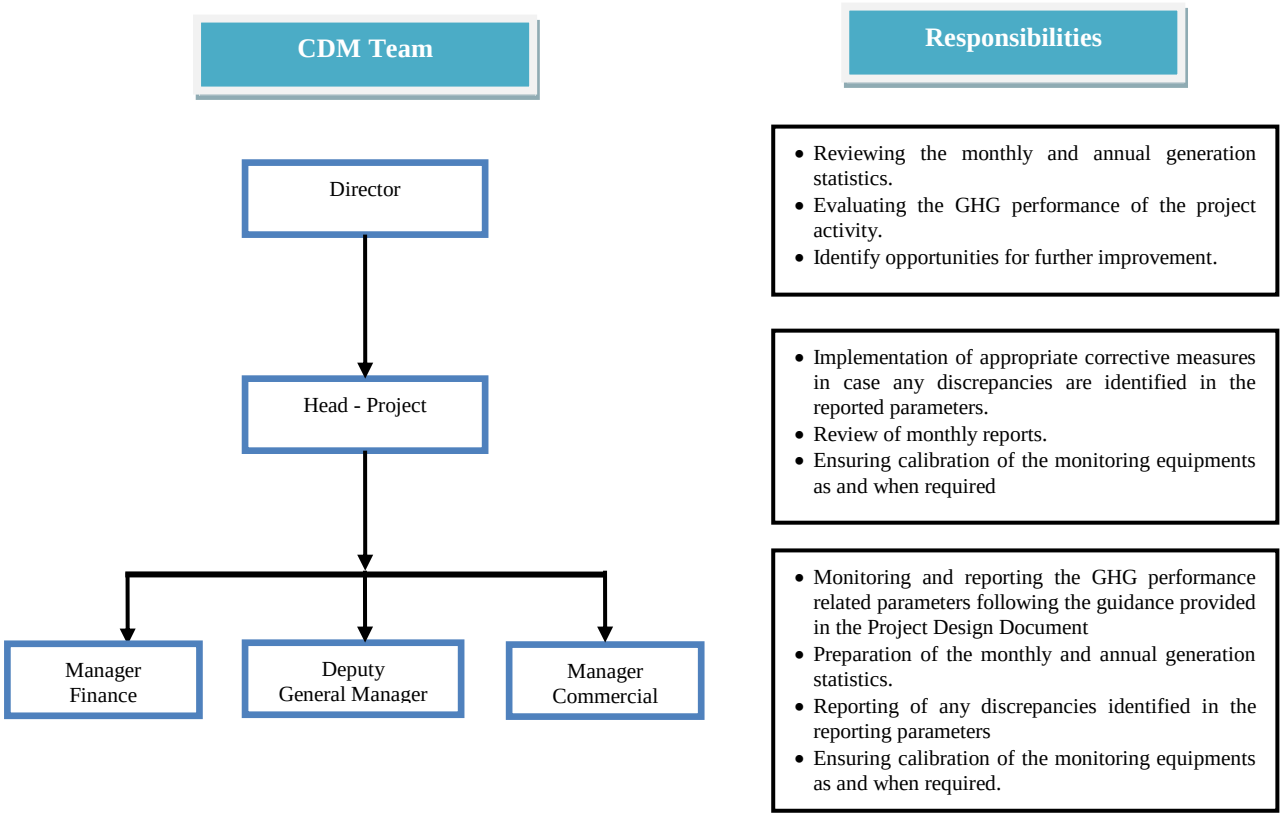
used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	117,217
Description of measurement methods and procedures to be applied:	The net electricity generation supplied by the project plant/unit to the grid would be measured as the difference of the quantity of electricity supplied by the project plant/unit to the grid and quantity of electricity delivered to the project plant/unit from the grid. Main and check electricity meters installed at the grid-interconnection point would be used and measurement would be done on a continuous basis with monthly recording.
QA/QC procedures to be applied:	Calibration of main and check meters will be undertaken once in a period of three years in accordance with the Power Purchase Agreement (PPA) or more frequently if required as per manufacturer specifications. This is also conservative when compared with the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 which states that all interface meters shall be tested at least once in five years [13]. In case the meters are found to be faulty they would be duly repaired or replaced.
Any comment:	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

B.7.2. Description of the monitoring plan:

>>

The authority and responsibility of project management as well as registration, monitoring, measurement and reporting lies with CSPPL. It has formulated a Project Team to ensure proper and continuous monitoring of the performance of turbines and generation of power. The operation and management structure implemented by the project proponent for the purpose of the project activity is illustrated below:

[13] Section 18.1 (b) Page 12 states all interface meters shall be tested at least once in five years. (http://www.cea.nic.in/reports/regulation/meter_reg.pdf)



Operation & Management Structure

Monitoring Plan Objective and Organisation

The purpose of the monitoring plan is to measure the net electricity delivered to the electricity grid. Within the CDM team, a supervisor will be designated for the solar power site, which will be responsible for compiling, monitoring and reporting of GHG performance related parameters (Process Parameters, Procedures, Calibration).

This data collated from the site will be aggregated by the next superior CDM team member. The data and documents received from the site supervisor will be compiled in a format called the CDM format / report. Quality checks will also be undertaken at this level to ensure all discrepancies are addressed. The net electricity attributable to the project activity will be calculated by subtracting the total electricity imported from the total electricity exported to the grid. The onus of reviewing, storing and archiving of all CDM related information relevant to the project activity in a suitable manner would rest with this team member.

The Project Manager will aggregate and review all the data received from site supervisors. The review will be conducted to ensure compliance to the requirements of the monitoring plan and other CDM modalities and procedures including calibration frequency. Corrective measures will be applied in case any discrepancy is observed. The Project Manager will further submit a consolidated report to the Project Head who will finally review and sign the monthly performance from the project activity.

To ensure that the data is reliable and transparent, the project entity will establish Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

Monitoring and Archiving of Data

The net electricity delivered to the local regional grid by the project needs to be monitored. The monitoring data will be derived from periodic electricity meter records kept by the project owners and/or the grid company, which are crosschecked with actual invoices sent by project owners to the grid company. The CDM team within the operator of the power plant will be responsible for collecting the monitoring data and will provide the meter readings for electricity delivered and if available calibration certificates. Further, for cross checking purposes, the project proponent will also carry out measurements/calculation of gross electricity generation and auxiliary electricity consumption which will be recorded in site log books.

The electricity data will be recorded by the shift in-charge in the site log books and would be forwarded to the site manager. On regular basis, as decided by the CDM team, the site manager would prepare and forward the reports to the designated site supervisor of the CDM team for review and archiving.

The data will be archived electronically and be stored for 2 years after the end of the crediting period of the project activity.

Quality Assurance and Quality Control

The main and check meters will be installed and maintained by CSPPL and the grid authority respectively at the grid interconnection point. CSPPL will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation. The metering devices will be calibrated and inspected properly and periodically as per standard industry norms and requirements of the power purchase agreement.

The CDM team will meet periodically to review project parameters, check data collected, emissions reduced etc. The following will be the procedure for taking corrective action and addressing any non-conformances discovered:

- All the mismatching data along with the name of the respective site manager and in-charge of logbooks name will be recorded in a Note Book.
- The respective site supervisors in the CDM team will send FAR (Forward Action Request) or CAR (Corrective Action Request) to the concerned CDM Member.
- After receipt of the communication, within one week, the concerned site in-charge will correct the data and will reply to the site supervisor in the CDM team.
- The corrected data will then be compiled by the respective site supervisors

B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies):

>>

Date of completion of the application of the baseline study: 06/06/2011

Name of person/entity determining the baseline: CSPPL has determined the baseline for the project activity. The entity is also the project participant listed in Annex-I where the contact information has also been provided.

SECTION C. Duration of the project activity / crediting period

C.1. Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

22/03/2011

According to Paragraph 67 of the Report on 41st meeting of the Executive Board of the Clean Development Mechanism, "*the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation services required for the project activity.*" The start date for the proposed project activity is taken as the date of LOI to the EPC contractor.

C.1.2. Expected operational lifetime of the project activity:

>>

25 years

C.2. Choice of the crediting period and related information:

Renewable crediting period- 7 x 3 years

C.2.1. Renewable crediting period:

C.2.1.1. Starting date of the first crediting period:

>>

01/01/2013

The project proponent confirms that the crediting period will not commence prior to the date of registration.

C.2.1.2. Length of the first crediting period:

>>

7 years 0 months

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

Not Applicable

C.2.2.2. Length:

>>

Not Applicable

SECTION D. Environmental impacts

>>

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

According to Indian regulation, the implementation of the solar thermal project does not require an environmental impact assessment. The Ministry of Environment and Forests (MoEF), Government of India notification[14] S.O. 3067 (E) dated December 01, 2009 regarding the requirement of Environment Impact Assessment (EIA) studies as per the Environment Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) MINISTRY OF ENVIRONMENT AND FORESTS) states that 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. Solar thermal projects are not included in this list and thus an EIA is not required.

Further, an office memorandum dated 30/06/2011 from the MoEF clarifies that solar thermal power projects are not covered under the provisions of EIA notification 2006 (submitted to the DOE).

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

As discussed above, the project activity would not have any significant environmental impacts. The EIA study conducted by the project proponent is being submitted.

[14] Reference : http://moef.nic.in/downloads/rules-and-regulations/3067.pdf

SECTION E. Stakeholders' comments

>>

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

The project activity is the installation of a 25 MW solar thermal power project in the state of Gujarat to supply electricity to the regional grid. The stakeholders identified in the project activity include the local villagers and representatives of village governing body in and around the project location.
The stakeholders were invited for a meeting through personal invitation letters in the local language. Further, invitation notices were also put up in regional language in the respective village panchayat offices.

The meeting was conducted on 1st December 2010 at Sharma Resorts, Gandhidham, District Kucchh, for which invitation letters were sent out in advance. A record of the people attending the meeting was maintained and all comments from the stakeholders received during the meeting were recorded.

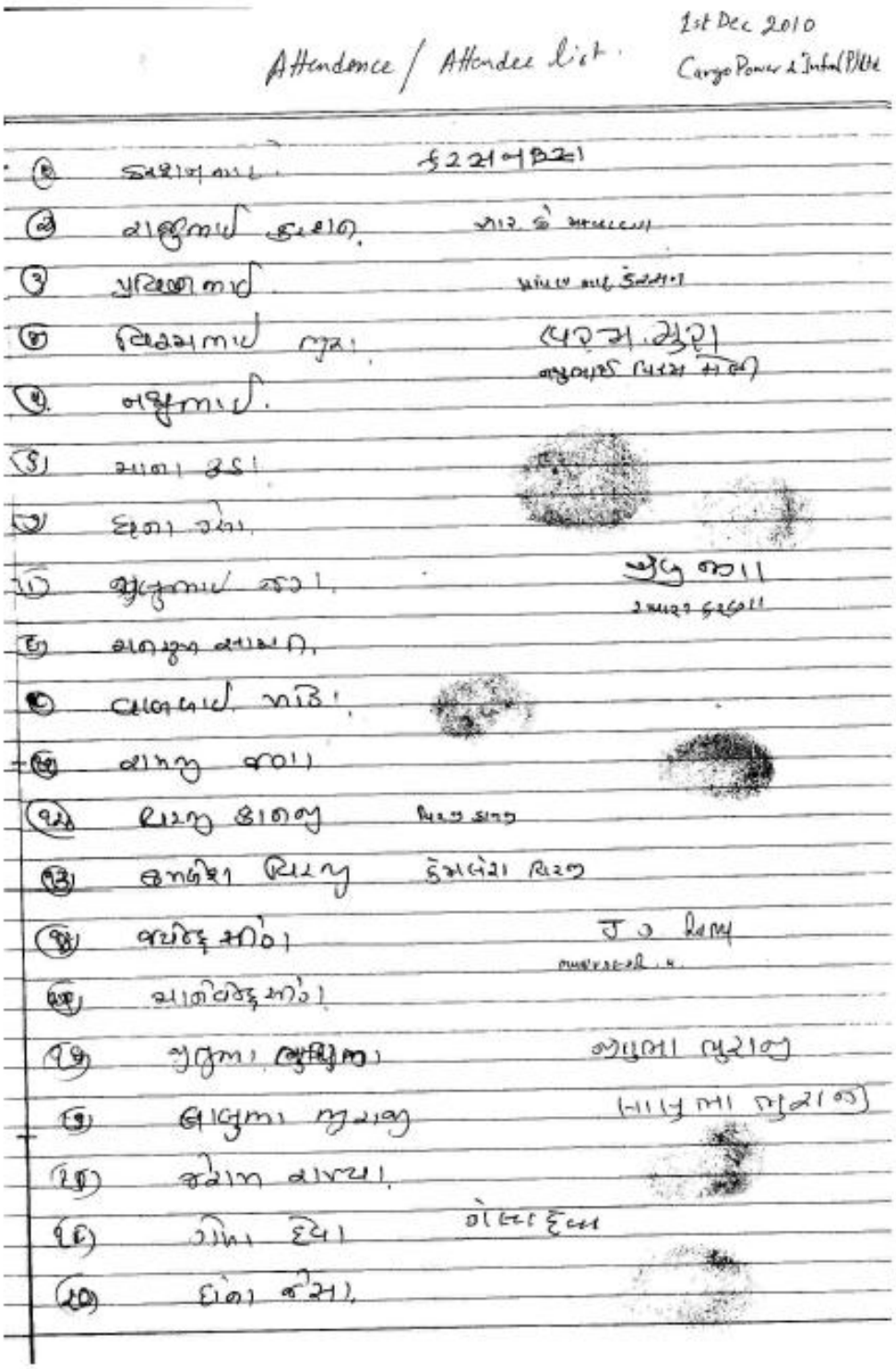
E.2. Summary of the comments received:

>>

In accordance with the procedural requirements for the CDM process, the project proponent organized a stakeholder consultation meeting. Besides being a requirement for the CDM process, the meeting provided the project proponent a forum to clarify any queries the local inhabitants in the region may have about the project activity. A brief summary of the comments received and the clarifications provided by Cargo are provided in the table below:

Name of the Stakeholder	Query/Comment	Response
Rajubhai Krishan bhai	When will the project get commissioned? Further, what is the period for which the project will generate electricity?	The project construction will take approximately 2-3 years and will have a technical lifetime of 25 years. Thus the project will generate electricity continuously for a period of 25 years.
Nathubhai Viram bhai Koli	How many local villagers will get employment in the project?	The project proponent clarified that the preference for employment in the project will be given to the local villagers based on their skills and technical expertise. Further, during project construction, many local contractors will be utilized for transport, construction works etc.
Mr. Manvendra Singh Jadeja	Will there will be any pollution or environmental impact due to this project?	The project proponent clarified that the project on the virtue of being a solar project will not lead to any harmful impacts on the environment. Further, it will increase availability of power in the region and lead to economic development.

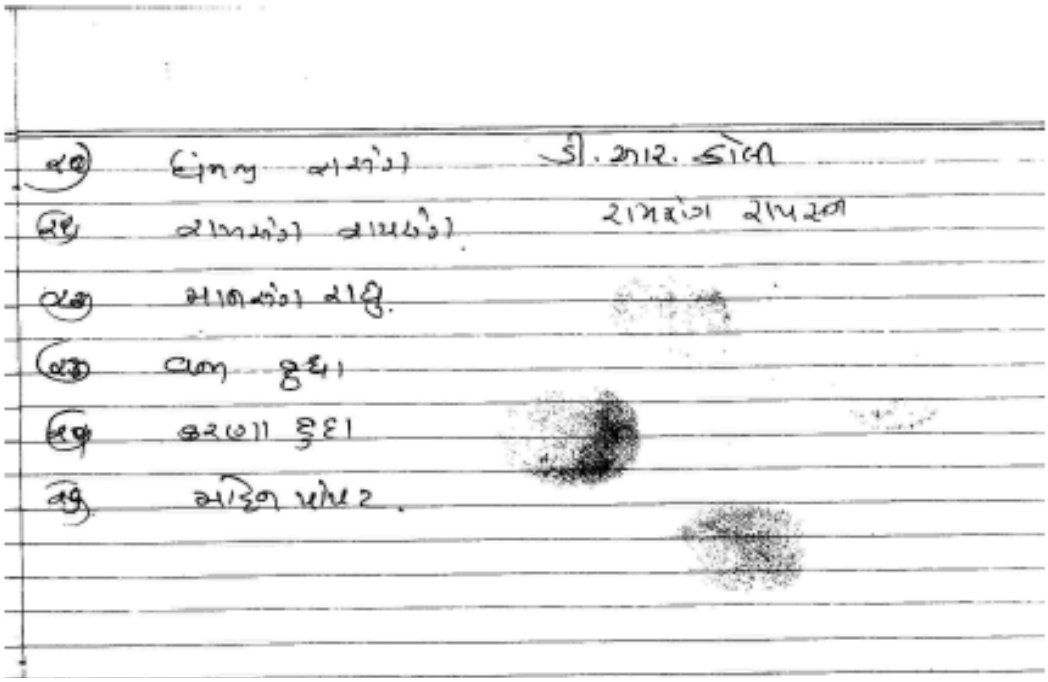
The attendance records for the local stakeholder meeting are as follows:



Attendance / Attendee list.

1st Dec 2010

Cargo Power & Infra (P) Ltd



E.3. Report on how due account was taken of any comments received:

>>

There were no adverse comments received from the stakeholders and the net beneficial effects of the project activity were acknowledged by the stakeholders present in the meeting.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Cargo Solar Power (Gujarat) Private Limited
Street/P.O.Box:	Asaf Ali Road,
Building:	Jindal House, 1/9B
City:	New Delhi
State/Region:	New Delhi
Postcode/ZIP:	110002
Country:	India
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	Mr. Dhruv Batra
Title:	Director
Salutation:	Mr.
Last name:	Batra
Middle name:	
First name:	Dhruv
Department:	
Mobile:	+91 98737 55555
Direct FAX:	+91 11 29240588
Direct tel:	
Personal e-mail:	db@cpil.co.in

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no recourse to any public funding by the project proponents to implement the proposed project activity.

Annex 3

BASELINE INFORMATION

Information with respect to the baseline has already been explained under section B.6.

Annex 4

MONITORING INFORMATION

The monitoring plan has been already explained in section B.7.2.

Appendix 1

Action plan for expenditure on sustainable development

1. The project proponent **Cargo Solar Power (Gujarat) Pvt. Ltd.** has committed to share 2% (approximately INR Six lakhs per year) of its Certified Emission Reduction (CERs) in connection with his/her CDM project based on the issuance and transaction of the CERs.

2. The committed amount of money will be utilized for addressing the identified issues in the following villages:

Identified Villages	Total Population	Key issues for development
Chitrod	4,000	There are no parks or dispensaries in these villages around the project area.
Kumbharia	2,500	
Khanpar	800	

3. Accordingly, the project proponent has identified the activities/ support for the following villages:

S No	Village Name	Activities/Support proposed over the project life time	Approximate amount in INR
1	Khanpar	• Building and maintaining a Children's Park in the area • Building a Dispensary in the area • Developing common sanitary facilities around the area	6 lakhs
2	Chitrod		
3	Kumbharia		

4. The implementation details along with local contact and money transfer mechanism are as follows:

The Project Proponent will carry out the above listed community development activities such as building and maintenance of Children's Park and dispensary in the area near the project activity. The area development plan will be shared with the local community representatives and other stakeholders.	
Local contact of project proponent	Money transfer mechanism
Biswas Kumar Srivastava Email: bks@cpil.co.in	Not applicable

5. Details of monitoring arrangement

Monitoring Committee	The PP will form a local level "Monitoring Committee". The committee would constitute Mr. Raju Bhai Kholi, resident Village Khanpar, Taluka Rapar, District Kutch as the local representative from the Khanpar village. Mr. Biswas Kumar Srivastava from Cargo Solar

	Power (Gujarat) Pvt. Ltd. would be the local contact for monitoring the implementation of community development activities.
Monitoring Parameters	Building and maintaining a Children's Park in the area • Status of construction of park • Amount spent on construction activities • Amount spent on maintenance activities Building a Dispensary in the area • Status of construction of dispensary • Amount spent on construction activities • Number of people using the facility Developing common sanitary facilities around the area • Number of common sanitary facilities constructed • Amount spent on construction activities • Amount spent on maintenance activities
Monitoring Frequency	Annually

- - - - -